

Debating Biology

Sociological reflections on health,
medicine and society

Edited by

Simon J. Williams, Lynda Birke
and Gillian A. Bendelow

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Debating Biology

Relations between the biological and social sciences have been hotly contested and debated over the years. The uses and abuses of biology, not least to legitimate or naturalize social inequalities and to limit freedoms, have rightly been condemned. All too often, however, the style of debate has been reductionist and ultimately unfruitful. As we enter an age in which ultra-Darwinian forms of explanation gather momentum and the bio-tech revolution threatens a 'Brave New World' of possibilities, there is an urgent need to re-open the dialogue and rethink these issues in more productive ways.

Debating Biology takes a fresh look at the relationship between biology and society as it is played out in the arena of health and medicine. Bringing together contributions from both biologists and sociologists, the book is divided into five themed sections:

- *Theorizing Biology* draws on a range of critical perspectives to discuss the case for 'bringing the biological back'.
- *Structuring Biology* focuses on the interplay between biological and social factors in the 'patterning' of health and illness.
- *Embodying Biology* examines the relationship between the lived body and the biological body.
- *Technologizing Biology* takes up the multiple relations between biology, science and technology.
- *Reclaiming Biology* looks at the broader ethical and political issues these agendas raise.

Written in an accessible and engaging style, this timely volume will appeal to a wide audience within and beyond the social sciences, including students, lecturers and researchers in health and related domains.

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Introduction

Debating biology

*Simon J. Williams, Lynda Birke and
Gillian A. Bendelow*

Why debate biology? Has biology been ‘neglected’ or downplayed in past/present sociological theory – as the title of this book implies? Does this matter? Can new non-reductionist positions be recovered or developed here, for instance? And what issues does this raise for contemporary debates on health, medicine and society and the challenges of the twenty-first century? These are some of the questions which contributors to this volume have addressed, starting from the premise that bridging the gap between sociology and biology does indeed matter.

‘Biology’ may be viewed as both a subject of scientific study and set of living processes and animating principles, with complex relations between the two.¹ As a body of knowledge, clearly demarcated from the ‘human sciences’, biology emerged late in the nineteenth century. For various reasons, those boundaries have since been carefully maintained, leading to schisms that bedevil any attempt to think through them. So, ‘biology’ has come to mean the study of processes largely internal to bodies, while ‘human sciences’ have focused on behaviour and practices of humans. Nonhumans, however, remain in the sphere of the biological. These divisions, which reinforce cultural separations of (human) culture from nature, and mind from body, are thus maintained by the disciplinary boundaries themselves. As a result, the living processes called ‘biologica’ do not seem to have a place in the study of human societies, or are seen only in terms of discursive construction. Where, then, does (the/a) sociology of health or a sociology of the body stand? And where, too, lies lived experience of those living processes, especially when they are going awry in disease?

Just as ‘biology’ is problematic, so too are appeals to ‘nature’. It is quite possible nonetheless, as Soper rightly argues, to recognize that there is ‘no reference to that which is independent of discourse’, yet to ‘dissent from any position which appeals to this truth as a basis for denying the extra-discursive reality of nature’ (Soper 1995: 8). Nature, from this latter (realist) standpoint, refers to the ‘structures, processes and causal powers that are constantly operative within the physical world, that provide the objects of study of the natural sciences, and condition the possible forms of human intervention in biology or interaction with the environment. It is the nature

to whose laws we are always subject even as we harness them to human purpose, and whose processes we can neither escape nor destroy' (1995: 155–6).²

Sociology has not entirely neglected these questions, of course. Biological considerations, for example, can be found in classical scholarship and debate. From Marx's deliberations on man as a 'natural animal',³ to Parsons's theorizing of relations between biological, personality, social and cultural systems, and from Spencer's (in)famous 'organic analogies',⁴ to Elias's theory of 'symbol emancipation' and the 'civilizing process', the lines of these debates can be traced. To this we may add Foucault's own critical observation that sociology, or more specifically medical sociology, had its origins in nineteenth-century social medicine (Turner 1992: 152). Yet invoking the biological is far from bringing it directly into theory; on the contrary, the biological has at best served as a foil for the sociological imagination, and at worst been dismissed or denounced altogether. Either way, the biological has remained under-theorized: a problem worsened today, in many respects, given the current tendency (as touched on above) to reduce the world to our social constructions of it.

There are, to be sure, many (good) reasons for past/present sociological distrust or scepticism of the biological, in whatever guise. The *biologisms* of the recent past, for instance, including Social Darwinism, eugenics and (Nazi) racial science, could all be roundly condemned on a number of counts: 'philosophically, because they violated the logical distinction between facts and values; scientifically, because genetic differences on the distribution of mental and moral traits among individuals and races appeared insignificant; and morally, because of the cruelties committed in their name' (Kaye 1986: 2). Recourse to the biological, it seems, has too often served dubious ends: called upon to legitimate inequalities and to limit freedoms. So why invoke the biological, we might ask? Surely social and cultural change outstrips biological evolution by far?⁵

Perhaps, but that in itself does not challenge the belief proposed by many advocates of neo-Darwinism, that any processes of social evolution are nonetheless constrained by earlier processes of biological evolution. Our ancient hunting and gathering past, in this story, is the foundation of what we are today, and no amount of cultural change can wipe that away. Linked to a growing fascination with genetics, this belief has resurfaced in the guise of evolutionary psychology (EP). The dangers of a 'gene's eye' view of the world – which in the hands of EP effectively reduces us to lumbering, dispensable machines in-the-service-of our 'selfish-genes' via the 'modularized' architecture of our minds – has rightly engendered much heated discussion and debate here, particularly when accompanied by erroneous claims of a victory over a misplaced notion of the 'Standard Social Science Model' (SSSM).

What is needed then, is not a retreat into former dualisms, nor a slide into any assimilation of sociology to biology or vice versa, but (re)newed

dialogue. We need to recover or develop (new) non-reductionist ways of envisaging these relations in an attempt to go beyond any such dualisms. Fortunately, there are a number of more or less promising signs here. Some biologists, for example, have sought to move beyond simple biologisms, to find other ways of speaking about living organisms and about human existence (e.g. Rose 1997). Meanwhile, challenges come from outside academia, from several of the new social movements: environmentalist and animal rights activists, for example, call into question the profound divisions between nature/culture and animal/human which underlie so much academic debate. And within sociological theory there are new challenges which expose the limits of reductionism, and which draw upon a variety of non-reductionist positions in doing so.

First, and perhaps most obviously, there have been several explicit calls to re-conceptualize the relationship between biology and the social sciences, and hence to reconstruct the established division of labour. Benton (1991), for example, over a decade ago, raised just these issues, highlighting both the urgency and desirability of a new alignment of the social with the (other) life sciences.⁶ Networks of categorical oppositions of the mind/body, nature/culture, biology/society, meaning/cause, human/animal variety, he noted, were intellectual obstacles in the way of meeting many contemporary challenges, from the politics of health to ecological agendas. The task of any proposed realignment, from this viewpoint, can now be seen as one of

providing conceptual room for organic bodily and environmental aspects and dimensions of social life to be assigned their proper place without, at the same time, abandoning the very real intellectual achievements of the ‘founding figures’ of the modern social sciences in defence of the autonomy and specificity of those disciplines vis-à-vis the life-science specialisms.

(1991: 25)

Dickens (2000) too, whilst mindful of the historical problems of social Darwinism, seeks new ways in which evolutionary thought and social theory can be combined, bringing together historical materialism and aspects of contemporary biology to create a ‘Social Darwinism’ which is ‘fit’ for the twenty-first century. (Critical) realist agendas mesh closely with these arguments, themselves coming to the fore in social theory today as a viable if not vital alternative to the worst excesses of reductionism, be it social or biological.⁷ As Sayer succinctly puts it:

Biological, chemical and physical powers are necessary conditions for the existence of the social world but the latter has properties – particularly or ‘essentially’, communicative interaction and discourse, which are irreducible to or emergent from these ontological strata. If we couple this stratified ontology with a critical realist analysis of causation, in

which . . . the existence of a causal power is not uniquely and deterministically linked to a particular outcome, then it becomes possible to see that the acknowledgement of a biological (and other physical) substratum of social life need not be seen as denying variety and agency at the social level. (2000: 100)

Rose and Rose's (2000) appositely entitled volume *Alas Poor Darwin: Arguments Against Evolutionary Psychology* gives further voice to these debates – from biologists, anthropologists, sociologists, cultural critics and philosophers – challenging any such reductionism whilst providing the basis for a richer understanding of the biosocial nature of the human condition.⁸ Steven Rose emphasises how all organisms are engaged in evolutionary becoming; for humans particularly, that becoming has created societies, and invented technologies and cultures – and it is a becoming that enables future change rather than tying us into the past. 'We . . . are profoundly shaped by [our cultures and technologies] in ways that make our futures as individuals, societies and species radically unpredictable', Rose argues; human becoming thus 'enables us to create individual lives and collective societies whose future lies at least in part in our own hands' (2000: 263).

These debates in turn link to broader concerns with the body and society. If recent sociological theory has renewed interest in the body, then we must be mindful of the need to challenge prevailing dualisms – for example, through lived notions such as *embodiment*, which helps to overcome past (sociological) problems associated with the disembodied rational actor. Bodies *become*, both as biological entities and – simultaneously – (as) socially engaged actors.

The emotions, too, in parallel fashion, have enjoyed a reversal of fortunes in recent years given centuries of neglect. Dismissing emotion (as 'irrational'), from this latter embodied perspective, is itself unreasonable and unnecessary. On the one hand, postmodern and post-structuralist critiques have proved useful here, as a source of challenge to ossified dualisms. On the other hand, this has often come at too high a price, bringing with it a form of discourse determinism, perhaps a postmodern 'free-for-all', in which the matter of bodies, to put it bluntly, is no real matter at all.⁹ The sociology of the body and emotions, nevertheless, given its eclectic theoretical base and the move toward a more integrated phase of theorizing, remains a key domain and a vibrant arena in which these debates are unfolding, including some more or less promising attempts to go beyond the biological without leaving it out altogether (Hochschild 1983; Turner 1992; Williams and Bendelow 1998).

Debates within various strands of feminism echo and deepen these arguments; themselves in many ways serving to problematize (malestream) claims that the sociology of the body, let alone a 'return' to the biological, is 'new' at all. Feminists, to be sure, have experienced a somewhat ambivalent relationship to their 'biological bodies', given centuries of oppression

based upon them; yet at the same time, feminist activism has necessarily drawn on concepts of biological bodies in areas such as women's health. Recent theoretical debates, nonetheless, have helped bring the biological body (back) in, in important ways – from Haraway's (1991) deliberations on the immune system and the biopolitics of postmodern bodies, to Fausto-Sterling's (2000) critical reflections on 'Sexing the body', and from Grosz's (1994) corporeal feminism, to Birke's (1999) call to bring biological science and feminist theory together in newly enmattered ways which include rather than deny our fleshy bodies. These authors seek to engage biology with feminist theory in new ways.

Men's bodies, too, have been the subject of much discussion and debate in recent years, particularly through a growing corpus of literature on masculinities (Connell 1995). The politics of gender relations, in this respect, has itself become more complex and contested, including greater attention to *differences within* as well as *similarities between* genders, and the need to think of gender as more than a social or biological dichotomy (Annandale 1998: 154).

From here it is but a short step to a series of agendas in health, in which the limits of reductionist thinking, if not the search for viable alternatives, are increasingly apparent. A number of examples may given here, from on-going research into health inequalities – particularly work on the 'socio-biological translation' and the tracking of biological and social risks across the lifecourse – through the (biological) body in chronic illness and the disability debate, to the growing popularity of so-called 'holistic health' and 'natural healing'. The 'bio-tech revolution' too, of course, with its reductionist solutions to complex problems, poses a series of important challenges in health as elsewhere. Key questions here, include the following: Is the new genetics a 'backdoor' to eugenics (Duster 1990)? How do we ensure that the benefits of these new technologies outweigh the risks? Is this the beginning of a new global phase of bio-capitalism, bio-colonialism, bio-prospective, bio-patenting, or even bio-piracy, call it what you will (Lock 2001)? Are we moreover, as some claim, on the verge of a new 'posthuman' future (Fukuyama 2002)? And what of our rights as well as our responsibilities?

Answers to these questions remain unclear. The dangers, however, should not be underestimated. Triumphalist accounts of scientific progress and the conquest of disease, and the merits of individual choice, for example, mask how genetic technologies can undermine people's freedom by intensifying genetic determinism and discrimination, individualizing responsibility for health and welfare, and fanning the flames of intolerance toward diversity (Kerr and Shakespeare 2002): eugenics by outcome, that is to say, rather than policy intent. Regulation, moreover, is largely ineffective, not least because it is all too often guided by goals of perfect health and commercial profit (Kerr and Shakespeare 2002). What is needed instead, Kerr and Shakespeare argue, is to listen to people directly affected by the new genetics,

particularly disabled people and women, and to challenge the values and practices that shape genetics, thereby helping to ensure that the mistakes of the past are not repeated in the present or that problems are currently being grown for the future. 'Genomics', they conclude, 'demands both global and local monitoring and controls through democratic means. Otherwise global eugenics will flourish' (2002: 189).

The need for a critical sociology is vital here, as this suggests; one which not simply champions deliberative democracy in the public sphere, but works towards viable, non-reductionist positions to draw upon in so doing. Ecological politics and animal welfare/rights agendas, in their many forms, add further urgency and potency to these debates whilst reminding us, at one and the same time, of our place in the world and the dangers of anthropocentric self conceit (read deceit). Denying our evolutionary kinship and commonalities with other species, and/or our ecological interdependencies with living and non-living forces and process, from this latter viewpoint, is indeed unwarranted and unnecessary.

What this amounts to, then, are a series of key agendas and challenges which necessitate, nay demand, a rethinking of biology/society relations. On the one hand, as we have noted, these developments are already (well) underway. On the other hand, much remains to be done, given renewed dangers of reductionism in a new global era of bio-capitalism. Whether this spells a 'posthuman' future is of course an open question, though caution is clearly need here in any such claims. What it most certainly does spell, however, to repeat, is the need for a re-engagement or rapprochement of the biological and social sciences in a non-reductionist spirit which: (i) lays to rest the false starts and problems of the past whilst (ii) respecting the discrete analytical potential and autonomy of both in an ontologically stratified and epistemologically diverse world.

It is against this backdrop of growing concerns and emerging debates that the present volume is located. Taking critical issues and cutting-edge developments in health, medicine and society as a focal point, the emphasis here is on *debating* the salience and significance of biology/society relations as played out in these interrelated arenas and substantive domains of inquiry. Health, as noted earlier, is a key site from which to fashion these (evolving) debates given a range of pertinent topics, from the limits of biomedicine to inequalities in health, chronic illness and disability to the impact of innovative health technologies. The word *debating* is critical here. There is no policing of a distinct party line, in other words, but a commitment instead to open discussion and debate from a variety of angles and viewpoints. What does emerge very clearly, nonetheless, in keeping with the foregoing concerns, are a series of arguments which seek to recover or develop anew a series of non-reductionist positions of the *both/and* rather than the either/or variety; positions which help us meet the above challenges, in health and beyond, in a constructive and informed fashion as part and parcel of on-going dialogue and debate.

The aims of the book then, to summarize, are as follows:

- (i) To *debate* critically the merits of the case for bringing ‘biology’ and the ‘biological’ ‘back’ into sociology (terms themselves under critical investigation);
- (ii) To *expose* critically the limits of reductionist thinking, biological or social, through a range of alternative (non-reductionist) positions and (non-dualist) viewpoints;
- (iii) To *explore* these issues in relation to key challenges, developments and debates regarding health, medicine and society.

Whilst our emphasis is on debating these issues sociologically, however, we have tried to draw on a variety of voices. The book, therefore, includes contributions both from sociologists (of health and illness) and (feminist) biologists, as well as those with other disciplinary backgrounds, interests and involvements (in addition to sociology) in areas such as medicine, nursing, ecology and wildlife photography. It also includes many key international figures in the field with a wealth of expertise to draw upon. A properly informed debate, we argue, demands no less.

Structure and content of the book: outlining the debates

The book is divided into five themed sections concerning various dimension of the biology/society debate, themselves cross cutting and inter-related, which in turn relate to key agendas in health, medicine and society.

The first theme, *Theorizing biology*, involves a preliminary discussion of the case for bringing the biological ‘back’ in, drawing on a range of critical perspectives in so doing. Key issues here include: (i) the case for an evolutionary approach to human disease which brings biological and cultural (read broadly) processes together, thereby ‘bridging the gap’ (Basiro Davey: Chapter 1), (ii) the limits of Ultra-Darwinism/evolutionary psychology (EP) (Paul Higgs and Ian Rees Jones: Chapter 2); (iii) feminist debates on biology, (non-human) animals and science (Lynda Birke: Chapter 3) and; (iv) critical realist attempts to theorize biology–society relations, taking Juvenile Batten disease as a case study (Graham Scambler and Sasha Scambler: Chapter 4). During the course of their contributions, the authors return to, and reassess, former dichotomized modes of Western thought and practice in an attempt to rethink biology/society relations, in ways which take us beyond the Scylla of ‘biology-as-bedrock’ and the Charybdis of social or cultural constructionism. The chapters, in this respect, set the stage for the contributions which follow.

The second key theme, *Structuring biology*, focuses specifically on the interplay between biological and social factors in the ‘patterning’ of health and illness according to factors such as class (Mildred Blaxter: Chapter 5), gender (Ellen Annandale: Chapter 6), ethnicity (David Kelleher

and Brian Hall: Chapter 7) and ageing (Mike Bury and Mike Wadsworth: Chapter 8). How, for example, does society affect health deep within the recesses of the human body? What is meant by the 'socio-biological translation'? To what extent are these relations reciprocal and mutually reinforcing over time? Are developmental perspectives and life-course approaches useful here? Can the notion of 'capital' provide some sort of synthesis of these concerns? And to what extent does recourse to the biological provide the basis for a critique rather than a legitimation of existing social arrangements: a process in which the latter negates and distorts the former? These are some of the questions taken up and addressed by contributors in this section of the volume. What emerges here are a complex series of interactions and relations between biological and social factors, themselves variable at any point in time, which may indeed be more or less profitably approached through *dynamic* notions such as 'health capital' across the lifecourse.

Building on these issues, the third key theme, *Embodying biology*, focuses on the interweaving of biological and social factors in and through a series of corporeal agendas and health-related matters concerning: the problematic sex/gender and nature/nurture distinctions (Anne Fausto-Sterling: Chapter 9); childhood bodies and the limits of social constructionism (Simon Williams and Gillian Bendelow: Chapter 10); body-building, steroids and health (Lee Mongahan: Chapter 11); the biological and social dimensions of chronic illness, identity and the body (Louise Millward and Mike Kelly: Chapter 12); and the liminal qualities of sleep, death and dying (Simon Williams: Chapter 13). Key questions addressed here include the following: What do these issues reveal about the nature and status of our physical being and material existence? To what extent does an adequate sociological engagement with the body, in sickness and in health, force us to confront and incorporate the biological in social explanation? And what implications does this have for existing notions of selfhood and identity? The underlying message emerging from these diverse contributions is clear. Relations between the biological and the social are *lived*, *experienced* and *expressed* in and through our *embodied* being-in-the-world, with all the *contingency* and *uncertainty* this entails, from birth to death. The lived body and the biological body are themselves, in other words, inextricably intertwined in a mutually informing fashion: the former incorporating the latter. The ethereal body of social constructionism is thereby both problematized and more fully materialized.

The fourth section, *Technologizing biology*, takes up the multiple relations and mediations between biology, science and technology, within and beyond medicine, including debates surrounding (selective) childbirth and human reproduction in India (Marsha Henry: Chapter 14); the new genetics and disabled people (Tom Shakespeare: Chapter 15); the bio-statistical and biosocial dilemmas of hormone replacement therapy (HRT) (Frances Griffiths and Eileen Green: Chapter 16); cosmetic surgery/breast

enhancement (Peter Conrad and Heather Jacobson: Chapter 17); (xeno)transplants (Renée Fox: Chapter 18); and the bio-chemical self in the era of Prozac (Nick Crossley: Chapter 19). What challenges do these developments raise? How should they be theorized and understood? What rights, risks and responsibilities are at stake here? To what extent are the very boundaries between human, animal and machine being reconfigured in the process? And what role should sociology play in these developments and debates? On the one hand, these contributions underline the bewildering array of possibilities which stretch before us: possibilities which take us from *control* to *transformation*, *enhancement* to *modification*, *replacement* to *replication*. On the other hand they remind us, in doing so, of the risks inherent in these very developments, not least the possibilities of new forms of reductionism, by default or design, intent or outcome, in this Brave New, if not 'Posthuman', World.

These foregoing debates, in turn key into a broader series of bioethical/biopolitical agendas, themselves touched on throughout the volume but more fully addressed in this fifth and final section: *Reclaiming biology*. Key issues here include: thinking through the boundaries of bioethics in a (post)human world (Arthur Frank: Chapter 20); (realist) reflections on the relationship between biology, vulnerability and politics (Bryan Turner: Chapter 21); the red and green agendas of ecology and health (Ted Benton: Chapter 22), and finally; the search for an 'alternative' metaphysics of relations and translations between the biological and social world (Anne Scott: Chapter 23). A mobilization around the (bio)politics and (bio)ethics of health, as these chapters amply testify, has never been more vital, not least through a defence of human rights, a reaffirmation of our ecological relations and responsibilities to the world around us, and a commitment to 'alternative' visions which take us beyond the limits of reductionism and dualism alike. One outcome of rethinking issues this way, as Benton elegantly puts it, is 'to theorise social relations not simply as relations between social actors, . . . but also as relations between human social actors and elements or aspects of non-human nature: physical objects and forces, artefacts, chemical substances, populations of cultivated, domesticated and wild varieties and species of non-human animals and plants, spatial envelopes, land and ecosystems, both modified and unmodified by past human activity, and so on'. It also, of course, provides a potent rallying call to action, both inside and outside the academy, with a series of promising new alliances forged en route.

This volume, then, provides various ways of bringing biology 'back' in, both to sociology in general and to medical sociology in particular, drawing on a range of different perspectives, viewpoints and topics in so doing. These are part and parcel of an on-going (and long over-due) debate, if not collective struggle. We need to find ways of overcoming our heritage of deeply entrenched dualisms, to find ways of acknowledging ourselves as social and biological actors. The task is urgent, as new (global) threats to

health and to bodily and species integrity emerge. The stakes are high: they implicate us all.

Notes

- 1 Critics no doubt will gleefully pounce at this point, particularly those of a strong constructionist persuasion, countering any such pronouncements themselves as socially constructed. This may well be so, but pushed to an extreme, an important insight is traded for an untenable position.
- 2 See also Franklin (2001) on *Nature and Social Theory*.
- 3 For debates as to Marx's views on these and related matters, see Geras (1983) and Benton (1989, 1993), for example.
- 4 It was Spencer indeed, as Dickens (2000: 19) reminds us, who coined the term 'survival of the fittest', some ten years in fact before Darwin's *Origin of the Species*. See also Benton (1991, 2000) on the Darwin–Wallace debate.
- 5 This flags a long-running debate as to whether we are talking here, in any such theories of social evolution, of *analogies* and *parallels* struck with the natural world, or of human society as *part* of nature (see for example Dickens 2000: 19–25).
- 6 Hirst and Woolley's (1986) book *Social Relations and Human Attributes* provides another important reference point here in the recent past: a book which attempts to overcome a number of divisions within sociology, including a detailed exposition and exploration of relations between biology and culture.
- 7 The sociology of *translation*, developed by Latour (1993) and others, is another more or less promising development here, given its refusal to countenance the notion that society is constructed through human action and meaning alone, stressing instead a variety of human and non-human relations in a hybrid world.
- 8 The target of these criticism includes the likes of distinguished sociologists such as Runciman (1999) who, in *The Social Animal*, draws on many of these assumptions, including Dawkins' (1976) notion of 'memes'. For a compelling critique of this 'granular' approach to culture, see Benton's (2000) chapter in the Rose and Rose volume.
- 9 Writers such as Haraway (1991), of course, steer a more considered path here, as one might expect from a feminist biologist and historian of science.

References

- Annandale, E. (1998) *The Sociology of Health and Medicine*, Cambridge: Polity.
- Baldi, P. (2001) *The Shattered Self: The End of Natural Evolution*, Cambridge, MA: MIT Press.
- Benton, T. (1989) 'Marxism and natural limits: an ecological critique and reconstruction', *New Left Review*, 178, 51–86.
- Benton, T. (1991) 'Biology and social science: why the return of the repressed should be given a (cautious) welcome', *Sociology*, 25, 1: 1–29.
- Benton, T. (1996) 'Marxism and natural limits: an ecological critique and reconstruction', in T. Benton (ed.) *The Greening of Marxism*, New York: Guilford Press.
- Benton, T. (1993) *Natural Relations: Ecology, Animal Rights and Social Justice*, London: Verso.
- Benton, T. (2000) 'Social causes and natural relations', in H. Rose and S. Rose (eds) *Alas Poor Darwin: Arguments Against Evolutionary Psychology*, London: Jonathan Cape.

- Birke, L. (1999) *Feminism and the Biological Body*, Edinburgh: Edinburgh University Press.
- Connell, R.W. (1995) *Masculinities*, Cambridge: Polity.
- Dawkins, R. (1976) *The Selfish Gene*, Oxford: Oxford University Press.
- Dickens, P. (2000) *Social Darwinism*, Buckingham: Open University Press.
- Duster, T. (1990) *Backdoor to Eugenics*, New York: Routledge.
- Fausto-Sterling, A. (2000) *Sexing the Body*, New York: Basic Books.
- Franklin, A. (2001) *Nature and Social Theory*, London: Sage.
- Fukuyama, F. (2002) *Our Posthuman Future*, London: Profile Books.
- Geras, N. (1983) *Marxism and Human Nature: Refutation of a Legend*, London: Verso.
- Grosz, E. (1994) *Volatile Bodies: Toward a Corporeal Feminism*, Bloomington and Indianapolis: Indiana University Press.
- Haraway, D. (1991) *Simians, Cyborgs and Women*, London: Free Association Press.
- Hirst, P. and Woolley, P. (1986) *Social Relations and Human Attributes*, London: Tavistock.
- Hochschild, A.R. (1983) *The Managed Heart: The Commercialization of Human Feeling*, Berkeley CA: University of California Press.
- Kaye, H.L. (1986) *The Social Meaning of Modern Biology: From Social Darwinism to Sociobiology*, New Haven/London: Yale University Press.
- Kerr, A. and Shakespeare, T. (2002) *Genetic Politics: From Eugenics to Genome*, Cheltenham: New Clarion Press.
- Latour, B. (1993) *We Have Never Been Modern*, Hemel Hempstead: Harvester Wheatsheaf.
- Lock, M. (2001) 'The alienation of body tissue and the biopolitics of immortalized cell lines', *Body and Society*, 7, 2-3: 63-91.
- Rose, H. and Rose, S. (eds) (2000) *Alas Poor Darwin: Arguments Against Evolutionary Psychology*, London: Jonathan Cape.
- Rose, S. (1997) *Lifelines: Biology, Freedom, Determinism*, Harmondsworth: Penguin.
- Rose, S. (2000) 'Escaping evolutionary psychology', in H. Rose and S. Rose (eds) *Alas Poor Darwin: Arguments Against Evolutionary Psychology*, London: Jonathan Cape.
- Runciman, G.W. (1999) *The Social Animal*, London: Fontana Press.
- Sayer, A. (2000) *Realism and Social Science*, London: Sage.
- Soper, K. (1995) *What is Nature?*, Oxford: Blackwell.
- Spelman, E. (1988) *Inessential Woman: Problems of Exclusion in Feminist Thought*, Boston, MA: Beacon Books.
- Turner, B.S. (1992) *Regulating Bodies: Essays in Medical Sociology*, London: Routledge.
- Williams, S.J. and Bendelow, G. (1998) *The Lived Body: Sociological Themes, Embodied Issues*, London: Routledge.

Part I

Theorizing biology

Critical perspectives

1 Evolution and human disease

Bridging the biology/culture gap

Basiro Davey

The starting point for this chapter is a desire to ‘clear the decks’ of some old cargo concerning the antipathy between sociology and biology in the hope of not tripping over it later. Without this baggage, it becomes easier to make the case in what follows that an evolutionary perspective helps to integrate biological and sociological perspectives on human disease. The proposition that human culture (used here as a shorthand for human social interactions, structures and the products of social organization) cannot be split off from biological processes, except as a temporary act of mind, is supported by examples of interactions between biological and cultural evolution which have profoundly influenced patterns of human disease. The chapter ends with some reflections on how a biological perspective might inspire sociological interest in human evolution.

Biological determinism versus the anthropocentric universe?

One of the most impenetrable barriers to communication between sociology and biology continues to be the unflinching reductionism that characterizes many molecular biologists, summed up in a remark attributed to James Watson, co-discoverer of the molecular structure of DNA, that ‘there are only atoms. Everything else is merely social work’ (quoted in Rose 1988: 161). In the last two decades, molecular biology has come to dominate biological thinking about human disease, but the molecular revolution has reached evolutionary biology too. Nineteenth-century taxonomists classified organisms on the basis of similarities and differences in their physical structures, but in the twenty-first century evolutionary relationships are being reconstructed on the basis of similarities and differences in their DNA. This technology has also shed light on the origins of infectious diseases in humans and other animals – a subject discussed later.

In similar vein, Darwin’s recognition of the driving force of evolution as competition between variant *organisms* for the resources that support their reproductive success, has been challenged by the proposition that the *gene* is the agent of evolutionary change. Since *The Selfish Gene* (1976), Richard Dawkins has argued that organisms are complex ‘survival machines’

controlled by their genes to behave in ways that maximize the propagation of those genes in subsequent generations. Influential critics of Dawkins' version of evolutionary theory (Brian Goodwin, Steven Jay Gould, Richard Lewontin, Steven Rose, among others) have stepped forward from within biology to fight what has become known as the 'Darwin wars'. But the gene remains the dominant biological motif at the start of the new millennium. Dawkins' gene-dominated vision chimes with the sentiment expressed by Watson that everything beyond the molecular is *subsidiary* to the action of genes and that human culture is a *consequence* of genetic evolution. The main objective of this chapter is to present biological and cultural evolution as a two-way street.

The deterministic language with which biologists generally describe the body and 'disease' has come under much critical scrutiny from within sociology (for example, Martin 1987; Birke 2002; and Section III, this volume). Sociologists have sought to reclaim 'illness' or 'dis-ease' as the felt experience of an individual with a personal history unfolding in a dynamic social context. The body is envisioned as a socially constructed place under siege from a biomedical description that threatens to obliterate other perspectives. The focus on individual genes as the prime determinants of disease is refuted by social research revealing patterns of distribution along gradients of material circumstances. Comparative studies within and between societies consistently find evidence that health and illness are associated with cultural variables, for example in gender relations, self-esteem or social value, which cannot be explained by biological processes.

Yet biologists generally ignore the social perspective and focus solely on *proximal* causes of disease, i.e. those operating on, within or between material bodies (of other species as well as ourselves). The *distal* causes are situated further back in a web of undifferentiated 'factors' willingly conceded to the social sciences and thereafter disregarded. Most sociologists have accepted this mutually convenient arrangement, inhabiting an anthropocentric universe in which biological influences do not intrude on analyses of disease patterns based on material deprivation or the failure of entitlement to goods and services. The impact on human societies of other life forms as sources of food, transport, traction, clothing and shelter has, until recently, been conceded to anthropology.

However, biological perspectives have begun to be welcomed into the social arena, as this book demonstrates. Biologists and sociologists have united to oppose the 'armchair theorizing' of evolutionary psychologists who deduce that human acts such as rape and infidelity evolved in our hunter-gatherer ancestors as adaptations to ensure species survival (Rose and Rose 2000; Higgs and Rees Jones, Section I, this volume). The disciplines have joined forces to research the interaction of stress and nutrition during pregnancy on foetal 'programming', and to begin unravelling how low social value or lack of control in the workplace might lead to degenerative diseases in later life (Section II, this volume). The conviction that human

disease cannot be divided into biological and cultural components forms the jumping off point for the next section of this chapter.

Biology/culture interactions and the evolution of infectious disease

Language that suggests ‘intentionality’ often contaminates discussions of evolutionary theory, particularly where infectious disease is involved. Bacteria and viruses are described as though they had foresight and could work out which adaptations of form or function would be a ‘good bet’ and worth the effort of evolving. This error obscures the *random* generation of variation between individuals, regardless of species, which is one of the necessary conditions for biological evolution. Without it, nothing more complex than a single cell could have evolved and every cell would be a member of an identical clone.

Evolutionary theory counsels that modern humans and their pathogens (a collective term for all kinds of infectious agents) are only the *current* versions of life forms that remain subject to random variation among their members, and on which natural selection continues to act, as it has done since the first cells evolved 4,000 million years ago. There is no progress towards perfection. HIV is not the ‘cleverest’ virus ever to infect us, but only the current and *temporarily* the best-adapted version of billions of less successful variants, any of which might become dominant in the future if altered environmental conditions increase their reproductive success. This proposition can be most powerfully illustrated by examining the origins of most human infectious diseases.

Agriculture, pastoralism and human disease

The agricultural revolution began around 8,000 BC in a few scattered places in present-day Iraq, Iran, China, Mexico, the Andes and coastal West Africa. The replacement of nomadic hunter-gatherer populations by largely settled communities subsisting on locally-grown crops and the products of herded livestock (pastoralism) occurred so slowly that 4,000 years later it had not reached most of Western Europe (including the UK), South-East Asia, the Americas or Africa south of the equator. Even at the end of the fifteenth century AD, when agricultural wealth funded the start of European colonization of other continents, the indigenous peoples whose lands were appropriated still lived mainly as hunter-gatherers.

The reason for emphasizing the slow pace at which agriculture and pastoralism spread from its origins is that this cultural shift had the necessary *time* to impact on the gradual evolution of humans and their pathogens for reasons outlined below. The domestication of poultry and large mammals for food and clothing, the building of shelters from skins and thatch, and the storage of surplus provisions in defended settlements, stoked the

population explosion that followed the agricultural revolution wherever it spread. However, it also brought humans into contact for the first time with the microbes, parasites and vermin that were an inevitable consequence of fixed habitation and close proximity with domesticated livestock (for an unrivalled account, see Diamond 1998). Even as the fertility rate increased due to improved food security, the upsurge in infectious and parasitic diseases drove infant mortality rates to unprecedented heights and reduced the expectation of life at birth – a position that barely changed in Europe until the middle of the eighteenth century. The impact of infection can also be traced in the decline in average adult height that followed the adoption of agriculture, and which has still not been entirely recovered in European populations despite post-war improvements in nutrition.

At first sight it may appear obvious why settled communities are more subject than nomadic peoples to infectious disease. In the absence of modern sanitation systems, waste accumulates and makes food-borne diseases inevitable; it leaks into streams and spreads water-borne infections such as cholera and typhoid. The fleas of vermin attracted to stored food bring plague and typhus; flies that also take blood from livestock transmit sleeping sickness. Malaria and schistosomiasis extend their range because the mosquitos and snails that transmit them breed in irrigation ditches.

Yet this analysis ignores one important factor: some major pathogens that cause human infectious diseases originated in *animals* brought into domestication during the agricultural revolution. Genetic comparison of human pathogens and their counterparts in domestic species reveal that tuberculosis, diphtheria, smallpox and measles originated in cattle. Pathogens of pigs, ducks, dogs and horses adapted to give rise to several other human infections, including influenza, pertussis (whooping cough), polio and the common cold. Worms and flukes that infest humans depend on pastoralism because they complete their lifecycles by circulating between people and their cattle, pigs and sheep. Of the 1,415 species of infectious and parasitic organisms currently known to cause human diseases, over 60 per cent have already been identified as originating in other animals (Taylor *et al.* 2001).

For 10,000 years pastoral communities have been continuously exposed to pastoral pathogens as people milked, slaughtered, skinned and ate their livestock and fertilized crops with animal manure. They also acquired pathogens from non-domesticated species, including primates, as forests were cleared for agriculture and grazing land. An evolutionary perspective explains how a system of cooperative social organisation (agriculture and pastoralism) enabled pathogens from domesticated species to adapt to life in human hosts. The speed with which pathogens reproduce holds the key to this first ‘epidemiological exchange’ and to our inability to prevent it.

Bacteria take as little as twenty minutes to replicate by cell division, viruses can reproduce billions of times in a few hours, and parasites reproduce in a few days. When any organism replicates, small random changes occur in its genes, which are passed on to its progeny, creating endless

variation in the fine details of physical structure and biochemistry between individuals. Genetic variation is created when humans (and all other organisms) reproduce, but pathogens replicate so much faster than humans that they can generate vastly more variants than we can. Additionally, bacteria can transfer genetic material 'horizontally' between neighbouring cells; and when two different strains of virus infect the same host their genes can sometimes combine, creating a virus with novel properties. If a variant of a 'pastoral' pathogen is generated that can survive long enough to reproduce in a human, the disease it causes can cross the species barrier. In the new host, natural selection winnows out the least-adapted pathogens, leaving the best-adapted to expand their numbers. Over thousands of years, some become totally adapted to infecting people.

However, the evolution of new pathogens also acts as a selection pressure on human populations. Although there have only been around 400 human generations since the agricultural revolution began, a degree of resistance to animal-derived pathogens evolved in human populations where pastoralism was established at an early date. The European continent was swept by infectious diseases derived from other species, for example, losing 25 per cent of its population to plague in the fourteenth century as rats spread along trade routes from China to the English fens. The 'more resistant' individuals survived to produce more children than the 'susceptibles', passing on the genetic trait for infection resistance, so the proportion who could survive these epidemics increased in each generation. These complex evolutionary relationships exerted a profound influence on the globalization of infectious diseases in human populations.

European colonialism and the second epidemiological exchange

The accumulation of wealth from trading the products of agriculture and livestock enabled hierarchies of ownership to develop across Eurasia. There is no 'social gradient' in entitlement among hunter-gatherers, but material inequality is an insidious feature of settled cultures, evident in the current social patterning of disease and disability. Agricultural wealth created the social stratification and the distribution of political power in the ancient civilisations of Egypt, Greece and Rome. It supported the rise of medieval European societies and fuelled their colonial ambitions, which have shaped the global political economy of the modern world.

Biological influences on the current ethnic distribution of populations has received little attention compared with the impact of socioeconomic, cultural and political forces. Yet it is significant that more than 5,000 years of co-existence had already taken place between Europeans and their domestic livestock before they attempted to colonize the Americas. The first voyage of Columbus in 1492 began what the American historian Alfred Crosby has termed the 'Columbian exchange' (Crosby 1986). Within 100 years of Columbus landing in Hispaniola, the indigenous population of

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