

Reinventing cyberfeminism: cyberfeminism and the new biology

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Abstract

This article argues for the reinvention of cyberfeminism in the context of the convergence between biology and computer science. Initially a response to cyberpunk and the colonization of the new final frontier by cyberspace cowboys, cyberfeminism was always already more than the essentialist and apocalyptic versions which gained popular appeal during the 1990s. Donna Haraway's more strategic cyberfeminism is articulated in relation to biotechnology and her conviction that biology – in its symbiotic relation with information systems – is an increasingly hegemonic discourse. The new biology extends its influence from health and food industries to environmentalism, management and intellectual property law and it is subsuming theories of life, mind and culture such as artificial life and evolutionary psychology. Through an analysis of these neo-biological discourses, I argue for a renewed cyberfeminist engagement with biology which does not rehearse familiar oppositional arguments but which recognizes that biology itself is a complex and by no means unified field.

Keywords: cyberfeminism; biology; computer science; artificial life; evolutionary psychology; Darwinism.

Is there a viable praxis of cyberfeminism at the turn of the new millennium, and, if so, what particular challenges does it face and what strategies might it best adopt? This paper highlights the challenges posed by biotechnology and specifically the 'return to Darwin' (Segal 1999) in the discourses of artificial life and evolutionary psychology. It argues that a pluralized cyberfeminism did

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survive its own millennium bug, and that viable strategies might best be organized around a more dialogic, less oppositional approach to the new biological hegemony (Haraway 2000). This risky approach reveals the complexity of a non-homogeneous biological discourse and offers concrete and conceptual opportunities for change, which are lacking in a rhetoric of resistance which has already been partially subsumed. The new biology is not only that which is inseparable from information systems (Haraway 2000), but that which has adapted, at least in part, to frameworks of opposition. A cyberfeminism reinvented in the context of the new biology must, then, in its turn adapt to this newly adaptive biotechnological environment.

Cyberfeminism is perhaps best defined in relation to its origins in feminist theory and practice of the late 1980s and early 1990s (Kennedy 2000: 285) that engaged with the emergent technologies of the information revolution. Cyberfeminism was in part a response to the anarchic politics of cyberpunk (Squires 1996), characterised by both Andrew Ross (1991) and Rosi Braidotti (1996) as a realm of middle-class adolescent male fantasies centred on a rebellion against the parent culture and a disdain for physicality, or the merely mortal. Computer hacking and science-fictional depictions of transcendence as 'getting out of the meat' (Springer 1996) are associated with the then 'new' technologies of the Internet and VR, and with the notion of cyberspace as, in Woolley's terms, the 'new frontier' (1992: 122). The new final frontier, rather like the old one, was swiftly colonized by cowboys and so cyberfeminism was in part a kind of Calamity Jane for the new media, creating anarchy more specifically within patriarchal culture and strategically employing anachronistic or essentialist images of women. There were the Riot Girls (Braidotti 1996: 14) and VNS-Matrix (1994) whose computer game heroine called Gen sabotages Big Daddy Mainframe and does for Circuit Boy ('a fetishised replicant of the perfect human HeMan') by bonding with DNA sluts and getting through plenty of G-slime (Braidotti 1994). Where parody and humour may have mitigated against the negative aspects of essentialism here, the same cannot be said for Sadie Plant's (1995) analogy of weaving, women and cybernetics in which a supposedly feminized technology is described as being autonomous, self-organized and imminently apocalyptic. Plant's work enjoyed popular appeal despite (or because of) its technologically determined apocalypticism and biological essentialism. This appeal was arguably part of a widespread millennium fever, the rather quiet passing of which may be said to have signalled the failure and obsolescence of the cyberfeminist project.

But this argument presupposes a degree of homogeneity within cyberfeminism which did not and does not exist. Where the dystopian spirit of cyberpunk sci-fi inspired some cyberfeminists to anticipate a sudden end to patriarchy, others remained grounded in the less fictional realms of science and technology studies and emerged with the more measured if somewhat utopian concepts of change exemplified in Haraway's figure of the cyborg and Braidotti's figure of the nomadic subject – or 'cyborg with an unconscious' (1994: 36). Haraway's hugely influential cyborg manifesto (1991) directed cyberfeminism towards the

impacted fields of science and technology (the inseparability of these historically distinct areas of theory and practice being captured in the term ‘technoscience’) and specifically identified biotechnology as a branch of technoscience where some of the most important political, ethical, social and economic issues of the day converged. Haraway’s concern with cybernetics, reproductive medicine, immunology and genetics is developed in subsequent work (Haraway 1997) and is contained within her conviction that biology is perhaps *the* hegemonic discourse of the late twentieth century. In *How Like A Leaf* she validates the argument that biology, ‘woven in and through information technologies and systems . . . is one of the great “representing machines”’ of the century, superseding film, or literature in the nineteenth century (2000: 26). From health and food industries to environmentalism, management and intellectual property law, ‘there is almost nothing you can do these days’, she says, ‘that does not require literacy in biology’ (2000: 26).

This alone would seem to indicate the need for a renewed and enhanced feminist engagement with biology which recognizes that biology itself is a complex and not a unified field, incorporating evolutionary, molecular, social and developmental discourses. Far from being unified, there would appear to be a deep division within biology between Darwinists of different hues. Andrew Brown points out that ‘scientific disputes have always been acrimonious’ but that ‘the Darwin wars – the disputes over the scope and importance of evolutionary explanations in the world – have been nastier than most’ (1999: ix). For him, the main reason for this is that they are about the nature and importance of human beings (more specifically, ‘mankind’) – an issue which has the status of a scientific (as opposed to Judaeo-Christian) belief. Darwinian beliefs may be malleable and have been used ‘to justify anarchy, fascism, liberal capitalism, and almost anything in between’, but they have the force of a moral imperative. All justifications, says Brown, agree that ‘the study of our evolution can help us discover how we ought to live’ (1999: ix). Being central to philosophy, ethics and a sense of personal salvation, the subject of Darwinism ‘is so important, getting it right is rewarded with great fame and large amounts of money’ (1999: x). Clearly, the scale of the prize is not unconnected to the scale of the dispute. There are those, such as Richard Lewontin (1993) and Steven Rose (1997), who argue that organisms result from the interaction between genes and the environment, and whose work discusses the relationship between biology and ideology. Then there are those, such as Richard Dawkins (1976) and Daniel Dennett (1995a, 1995b), who argue that organisms are no more than vehicles or ‘survival machines’ for their selfish genes, and that this may well have unpleasant implications but is just the way life is. There is no room for ideology in Dawkins’s biology, but he is at the centre of a vitriolic battle over significant ideological territory.

Andrew Brown narrates the Darwin wars of the past thirty years in terms of allegiances and oppositions to Dawkins and his apparent ultra-Darwinist genetic determinism established in *The Selfish Gene* (1976). Dawkins is regarded as the key representative or popularizer of the sociobiological arguments set out by E. O. Wilson in 1975. He examined the biology of selfishness and altruism and

argued that humans, like all animals, are machines created by selfish – autonomous, determinant – genes. In the preface to the 1989 edition of his most influential book, Dawkins clarified the ground of the dispute by suggesting that the ‘selfish gene theory is Darwin’s theory, expressed in a way that Darwin did not choose. . . . It is in fact a logical outgrowth of orthodox neo-Darwinism, but expressed as a novel image’ (ibid.: viii). Instead of focusing on the individual organism, the selfish gene theory takes a ‘gene’s-eye view of nature’, and this, for Dawkins ‘is a different way of seeing, not a different theory’ (ibid.: viii). While acknowledging that ‘a change of vision can . . . usher in a whole climate of thinking, in which many exciting and testable theories are born, and unimaginable facts laid bare’ (ibid.: ix) he disclaims ‘any such status for my own modest contributions’ (ibid.: ix). In other words, Dawkins retreats from the epistemological and ideological force of his own narrative not just in deference to the grand narrative of Darwinian evolution on which it depends, but because he seeks to evade the responsibility of a social Darwinist position: ‘I am not advocating a morality based on evolution. I am saying how things have evolved. I am not saying how we humans ought to behave’ (ibid.: 3). This revision of his original thesis precisely predicts the way in which the Dawkinsean discourse of the 1990s – evolutionary psychology – revises the Darwinian discourse of the 1970s – sociobiology. The argument at the turn of the century appears to be over what Darwin really said but is in fact about what Darwin really meant, and therefore what Darwinian ideology is. Where Dawkinsean scientists remain aloof from the concept of ideology, Dawkins’s opponents do not and their arguments insist on the materiality of his ‘novel image’ or metaphor (Rose 1997; Rose and Rose 2000; Lewontin 1993; Gould 2000). Stephen Jay Gould and Richard Lewontin led the critique of sociobiology and Brown points out the irony that the development of evolutionary psychology from sociobiology was, in ideological terms, ‘a triumph for Gould and Lewontin, who have seen almost all of their original objections incorporated’ (1999: 147). In as far as their incorporation serves to refine and purify sociobiology, Gould remains critical and reviled within the field of evolutionary psychology whose exponents then claim that ‘the central problem is that Gould’s own exposition of evolutionary biology is so radically and extravagantly at variance with both the actual consensus state of the field and the plain meaning of the primary literature that there is no easy way to communicate the magnitude of the discrepancy in a way that could be believed by those who have not experienced the evidence for themselves (Tooby and Cosmides in Brown 1999: 151).

The internal debate within biology is over the existence and implications of linear cause-and-effect genetic determinism and the reductionist view of the organism as gene. Steven Rose attributes the tendency towards reductionism and genetic determinism in biology to the hegemonic status of physics within science as a whole, and specifically to the quest within physics for universal laws expressed in simple (and/or mathematical) terms. According to Rose, physics facilitated the technological metaphor in biology ‘whereby living systems became analogized to machines’ and hearts were seen as pumps, brains as

computers and so on. He goes on to state that the reverse influence, the biologization of technology has happened relatively recently and is illustrated by parallel computer processing or neural networking which is based on 'analogies with the organization of the brain' (1997: 19).

ALife

It is with relation to the convergence between the biological and computer sciences that I make my case for the reinvention of cyberfeminism, because this is where life itself is reckoned to be computable and the universal law is evolution – that is, Darwinian evolution through competition, selection and survival of the fittest. The convergence of biological and computer science may be said to have produced two related disciplines of artificial intelligence (AI) and artificial life (ALife). One way to describe ALife would be to say that it is an attempt to literalize the machine/organism analogy which is prevalent within biology and technoscientific culture as a whole. The discipline was developed in the late 1980s and its stated aims are twofold: to create viable computer simulations of biological forms and processes as a method of studying 'natural' life (simulation of 'life-as-we-know-it') and to synthesize new forms of artificial life in both hardware (as robotics) and software (as computer programmes). This is about creating 'life-as-it-could-be' (Langton 1996: 40). Synthesized artificial life forms are not deemed to be metaphorically alive, but literally so, as the definition or criteria for life are limited to self-replication, self-organization, evolution, autonomy and emergence. Emergent life is that which is not programmed in, but which evolves spontaneously and from the bottom up through interaction with the artificial environment.

At the heart of ALife is the concept of life as information, and this is derived from molecular biology's notions of the genetic code, and its fetishization of the gene as the fundamental unit of life. Life is a property of form not matter, or as Christopher Langton (the originator of ALife) put it, 'life is a kind of behaviour, not a kind of stuff' (1996: 53). No stuff, no matter, no bodies, no experiences associated with physicality and nothing beyond the one-dimensional functionality of information processing. There is, as Alison Adam points out, 'no room for passion, love and emotion' (1998: 155) because passion is subsumed by sex, sex is conflated with reproduction and reproduction is reduced to competition, survival and the evolution of (genetic) information. ALife is concerned with evolving new life forms, new species in autonomous artificial environments or worlds where the laws are prescribed by biology. It is sometimes tempting to dismiss it as the frustrated endeavour of alien-loving scientists brought up on science fiction and disappointed by the failure of NASA to provide specimens from outer space. For Thomas Ray, 'a truly comparative natural biology would require interplanetary travel', and, failing that, 'a practical alternative to an interplanetary or mythical biology is to create life in a computer' (1996: 69). Langton takes a similarly pragmatic view (1996: 39),

thereby installing a particularly 'Boys' Own' approach to engineering at the heart of ALife.

A decade after Langton and Ray set this agenda for the discipline, its remit has both broadened to incorporate a consideration of other evolutionary and engineering approaches to life (namely evolutionary psychology and genetics) and narrowed to a renewed emphasis on biology rather than engineering, science rather than fiction. The new agenda, set by a new generation of 'ALifers' seeks to secure the credibility of the field partly by subsuming it within biological discourse: 'Artificial Life is foremost a scientific rather than an engineering endeavour' (Bedau *et al.* 2001: 364). Software projects designed to evolve artificial cultures and societies (Gessler 1994; Epstein and Axtell 1996) are primarily a scientific means of studying human life-as-we-know-it while having the potential – the emergent potential – to engineer human-life-as-it-could-be. For Alison Adam, they signal the danger of 'sociobiology in computational clothing' (1998: 151).

ALife's universal Darwinism heralds the renewed potential of sociobiology which might be realized in its guise as evolutionary psychology. The Darwinian basis of ALife research is naturalized and applied in the contexts of the military, medicine and the entertainment industry where, for example, computer games such as *Creatures* have become popular and artificial life forms known as autonomous agents are being researched for use on the Internet. One of the leading figures in autonomous agent, or adaptive autonomous agent, research is MIT's Pattie Maes, who states that an agent 'is a system that tries to fulfil a set of goals in a complex, dynamic environment', and that an agent is autonomous 'if it decides itself how to relate its sensor data to motor commands in such a way that its goals are attended to successfully' (1997: 136). An agent is adaptive if it can improve its goal-orientated behaviour over time, or, in other words, learn from experience. The main goal of autonomous agent research reflects the main goal of ALife in general: to increase understanding of the principles of life-as-we-know-it and to use those principles to create life-as-it-could-be. The principles in this case are specified as 'adaptive, robust, effective behaviour' which is embodied and emergent. Agents are situated in an environmental context and this leads to the possibility of emergent complexity. Embodiment, in this context, refers to the 'architecture' (the tools, algorithms, techniques) for modelling autonomous agents either in hardware or in software. Where agent architecture is uniquely flexible and there has been some success in modelling autonomous behaviour, Maes also points to some problems with 'scaling-up' to higher degrees of complexity and realizing emergent potential. She has outlined her attempts to build agents 'that perform a practical purpose and really help people deal with the complexity of the computer world' by 'foraging' for interesting documents for a particular user on the world wide web (Dennett 1995b). These agents would watch and learn from the user and would reproduce and evolve according to their usefulness. Mutations which occur in reproduction produce offspring agents which look for different kinds of documents than their 'parents'. The documents they obtain may be more or less interesting than those

of others and 'if they're less interesting then that offspring won't survive'. Fitness is then determined by usefulness. At the Artificial Intelligence and Darwinism Symposium (Tufts University 1995), Maes's work raised questions of control, ethics and evolution and led Kevin Kelly to reflect that, although 'there was probably a wider agreement that evolution was a way to do things than I thought . . . I wonder if we can get everything we want by evolution?' (Dennett 1995b).

Dialogue as risk

Examples such as these demonstrate that ALife does not simply have cultural implications but is already part of the cultural discourse of evolution, information and the manufacture and manipulation of life. This makes the case for a critical cultural and feminist intervention important if not urgent. The nature of such an intervention requires debate, but might usefully be guided by Haraway's commitment to strategic refiguration alongside a more hands-on involvement in what is, at least at the level of entertainment and aesthetics, a relatively open and unfinished project. ALife's dissensions (Derrida 1978) operate within and across the boundaries of science, technology, philosophy, aesthetics, politics and ethics. It is part of a post cold-war discourse of globalization centred on the problematic of information, and, in this case more specifically, life as information. This equation or reduction is premised on Langton's Platonic distinction of form from matter, a distinction which is disputed internally and which because of this invites a more dialogic than oppositional intervention. Stefan Helmreich draws on the work of Judith Butler to suggest that 'what life is or becomes is materialized – comes to matter (in the sense of becoming important and becoming embodied) – in such practices as describing and fabricating machines and organisms' (Helmreich 1998: 22). N. Katherine Hayles (1999) also calls for practices of re-embodiment to be established at the 'critical juncture' presented by the production of post-human life forms. Helmreich refers too to Haraway's standpoint feminism by suggesting that an intervention might incorporate the standpoints of those who have, perhaps, the greatest investment in constructing a view of 'life-as-it-could-be' which does not rely exclusively on an evolutionary epistemology.

My argument is that, in the context of the new biology, cyberfeminists schooled in the standpoint epistemologies of Harding (1986, 1992; Harding and Hintikka 1983) and Haraway (1991, 1997) face the challenge of recognizing heterogeneity within biotechnology as well as within feminism, and of adopting more dialogical, less oppositional strategies which necessarily entail risk (Stengers 1997). What cyberfeminism risks in a dialogue with ALife is not complicity but the complacency of a well-rehearsed rhetoric of resistance. Cyberfeminism risks its anti-biologism (and residual bio-technophobia) by entering a more dynamic relationship based on contest and consent, on centrifugal and centripetal forces (Bakhtin in Holquist 1981). Since these forces are at play

internally, they may be made available to what Haraway terms ‘diffraction’ (1997), or, mechanisms for making a difference. ALife’s dissensions concern the re-inscription or re-negotiation of: top-down masculinist AI and bottom-up feminized ALife programming; physics and biology; hard and soft epistemologies; Cartesian and anti-Cartesian philosophy; form and matter; embodiment and disembodiment; creation and evolution; holism and reductionism. These binaries are culturally productive and have more than local significance. Primarily they correlate with the end of the cold war, the displacement of the arms race by ideologies of greater co-operation, de-centralization and globalization. The global bio-culture is that which is evolving, emergent, self-organizing and informational. Within it, the individual (and species) self is in the process of becoming artificial.

ALife and evolutionary psychology: bio-cultures of subsumption

A reinvention of cyberfeminism in the context of the biological and computer sciences would necessarily look beyond specific disciplines or areas of research such as ALife to the wider technoscientific and cultural context of genetic and evolutionary determinism. Genetic engineering produces artificial life in wetware (entities such as transgenic, cloned and xenotransplanted organisms) and evolutionism has penetrated not just computer science but the academy, industry, management, law and the media (Brown 1999: x). An apparently random example goes some way towards illustrating this point. In the year 2000, MIT published a book by Randy Thornhill and Craig Palmer entitled *A Natural History of Rape: Biological Bases of Sexual Coercion*. The authors sought and achieved a great deal of media exposure so that they could ‘change the way people think about rape – from a social to an evolutionary context – and therefore effect a better method of rape prevention’ (Dano 2000: 2). Their campaign is detailed on Thornhill’s website, which contains letters for and against the book by students and colleagues at the University of New Mexico, as well as the outline of a course entitled Darwinism Applied. The book opens with a criticism of established feminist and sociological theories of rape on the grounds that they are scientifically illiterate and purely ideological. In a quite Dawkinsean tautological move which sets out to demonstrate ‘scientific truth’ having already defined it, the authors state that existing theories of rape are ‘uninformed about the most powerful scientific theory concerning living things: the theory of evolution by Darwinian selection’ (2000: xi). They go so far as to suggest that non-evolutionary approaches may have increased rather than prevented incidences of rape by teaching men and women that the causes are social rather than sexual. Some of the negative publicity around the book has seized on the more obviously contentious arguments, for example, that boys should complete courses in evolutionary biology before being granted a driver’s licence and girls should be ‘made aware of the costs associated with attractiveness’ and advised to dress

conservatively in order to attract 'good investors' (2000: 180). Sociobiology made these kinds of arguments familiar and it may be tempting to dismiss them on this basis, but the references to current evolutionary as well as sociological theory are present and the authors are unfortunately right to claim that there is a renewed climate of interest at least in the theoretical basis of their work. This is why I argue that the most effective response may not be simply to reassert feminist and sociological arguments about rape (although this may inevitably be part of it) but to explore the wider social and scientific environment which makes a return to sociobiology through evolutionary theories of rape possible. This environment is alternately referred to as being 'neo-Darwinian' (based on a Darwinism informed and reinforced by the discovery of DNA and development of modern genetics) or 'ultra-Darwinian' (employing a Darwinism which places greater emphasis on the role of adaptation and natural selection in the process of evolution than Darwin himself – arguably – did). Where neo-Darwinism is a characteristic of ALife, ultra-Darwinism is a key characteristic of evolutionary psychology (Gould 2000: Rose and Rose 2000).

Darwin@LSE is a research programme on evolutionary theory with a leading interest in evolutionary psychology and the links between Darwinism and social policy. The programme has produced a series of books, under the heading Darwinism Today, which claim to introduce 'the Darwinian ideas that are setting today's intellectual agenda' (Browne 1998: vii). The series editors, Helena Cronin and Oliver Curry, are seeking to popularize evolutionary theory and maintain that the Darwin@LSE programme 'is having an enormous impact' (Curry and Cronin 1996: vii). The website promotes *Demos Quarterly*, published by what Segal terms 'the Blair government's favourite think-tank' (1999: 80), *Demos*. In a special issue (edited by Cronin and Curry), John Ashworth (former Director of the LSE) hails Darwinism as 'An "ism" for our times' (1996: 3), which displaces Marxist philosophy at the (supposed) centre of the social sciences. Ashworth locates evolutionary theory between right-wing individualism and the 'communitarian' left, gently promoting the 'tentative' and apparently middle-ground suggestion that 'evolutionary theories might work where both individualistic and group (or class) based explanations of behaviour have proved unsatisfactory' (1996: 3). Success, in his account, seems to rest on the 'sensitive' re-packaging of the old sociobiological conflict between altruistic behaviour and the doctrine of the selfish gene. Herbert Spencer at the turn of the twentieth century and E. O. Wilson in the 1970s, lacking a sufficiently sophisticated genetics, were too 'assertive' where the new Darwinists can afford to adopt a more conciliatory tone which 'might now lead to something other than a dialogue of the deaf' (1996: 3). The olive branch offered by evolutionary biologists to social scientists takes the form of a non-deterministic morally corrected Darwinism in which genetic programming does not preclude social conditioning, universality is mediated by degrees of variation and the way things are is not at all synonymous with the way things should be. The big stick not waived by evolutionary biologists at social scientists takes the form of memetics (in which society is an effect of biology and culture's 'memes' are analogical with

nature's genes) and risk management (where the cost of correcting or containing anti-social impulses might well outweigh the cost of indulging them). Proferring the branch instead of the stick, Ashworth hopes that a fruitful dialogue will take place.

In 'The dissent of woman: what feminists can learn from Darwinism', Robert Wright prefers didacticism to dialogue. He begins by asserting that 'history has not been kind to ideologies that rested on patently false beliefs about human nature' (1996: 18). Feminism is aligned with the decline of communism on account of the false beliefs feminists have about gender and Marx had about the inheritance of acquired characteristics: 'the falseness of the doctrine is increasingly evident and its adherents can admit as much only at some risk, if not of imprisonment, then of an extremely chilly reception from fellow feminists' (1996: 18). Wright's argument proceeds with fictional caricatures of 'difference feminists', 'radical feminists', 'liberal feminists' and 'assorted others' homogenized and contained through their supposed ignorance of modern Darwinism: 'none is interested in the well-grounded study of human nature' (1996: 18). The Darwinian theory of natural selection is not so much 'grounded' empirically (Segal 1999: Gould 2000) as normalized within the 'science' of evolutionary psychology, which establishes innate but not immutable differences between the minds of men and women. Mutability or the effect of culture is, however, limited and so, therefore, are the realistic goals of feminism: 'many of the differences between men and women are more stubborn than most feminists would like, and complicate the quest for – even the definition of – social equality between the sexes' (Wright 1996: 18). This tendency to recuperate culture within biology might lead to the suspicion that evolutionary psychology subjects sociobiology to a notion of complexity which ultimately strengthens and reinforces it. Wright rehearses the natural history of rape (in which the cost to women is ultimately genetic) in order to argue for more effective laws and policies of protection that recognize 'female vulnerabilities' (1996: 20). He revisits the Madonna-whore dichotomy as an effect of genetics rather than patriarchy (men do not marry promiscuous women because their children may not be carrying the right genes) and co-opts essentialist arguments within 'radical' feminism. Men are 'by nature oppressive, possessive, flesh-obsessed pigs' but they are not beyond cultural improvement 'thanks to the fact that love, compassion, guilt, remorse and the conscience are evolved parts of the mind, just like lust and jealous rage' (1996: 22). Culture, then, is an effect of nature and by definition constrained and limited. Ultimately, it does a 'lacklustre job' of improving men. What evolutionary psychology contributes to social policy is not (quite) a sanctioning of the 'natural order' which underlined critiques of sociobiology, but a heightened awareness of the costs and benefits of 'alternative norms' and of where (on whom) those costs and benefits fall. It is no coincidence that feminism is simply not needed in the pursuit of answers to these rhetorical and implicitly gendered questions, since evolutionary psychology absorbs many of its concerns and feminists, according to Wright, should 'know their enemy' as their friend.

Lynne Segal argues that the goal of the current 'return to Darwin' is not only

the 'conceptual containment of potentially unlimited shifts in gender beliefs and practices' but also the 'return to the allegedly more rigorous authority of the biological sciences of much that has recently been understood as cultural' (1999: 78). The aim is to silence or 'defeat' feminists and other theorists who perpetrate 'the idea that gender is essentially a construct, that male and female nature are inherently more or less identical' (Wright 1996: 18). This aim is certainly clear in Wright's combative evolutionary theory and Segal's counter-argument constitutes a sceptical response to any invitation to dialogue within a discipline which has been characterized as fundamentalist (Gould 2000). Nevertheless, her exploration of the 'enemies within' both feminism and biology (which, in a properly situated reading, includes Darwin himself) opens up spaces of contestation and 'epistemic diversity' (Segal 1999: 111), which, I would argue, are possible spaces for change. The heterogeneity of biological discourse de-stabilizes both evolutionary psychology and artificial life where the goal might be said to be the conceptual containment of the diversity of life itself. Life has no cultural meaning or dimension in ALife and is epistemologically and ontologically contained within the notion of information processing and replication. ALife, like evolutionary psychology, ascribes to the memetic theory of culture established by Richard Dawkins in his influential treatise on the selfish gene. Here Dawkins puts forward a theory of cultural transmission which is analogous to genetic transmission 'in that, although basically conservative, it can give rise to a form of evolution' (1976: 189). Dawkins simultaneously deposes and reinstates the gene as an agent of cultural evolution. He recognizes that a basic genetic determinism does not account for the complexities of modern culture and society and states that 'as an enthusiastic Darwinian, I have been dissatisfied with explanations that my fellow-enthusiasts have offered for human behaviour' (1976: 191). But genes re-enter his account through the back door as analogical units of replication which he calls 'memes'. Seeking 'a monosyllable that sounds a bit like "gene"', Dawkins shortens the Greek 'mimeme' (meaning imitate) to arrive at his new cultural replicator, examples of which include 'tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches' (1976: 192). Memes pass from brain to brain, just as genes pass from body to body and by a similar process of imitation. Memes, like genes, are subject to the laws of natural selection. A meme, such as the idea of God, may acquire a high survival value because of its 'great psychological appeal' (1989: 193), but, in general, memes, like genes must display qualities of 'longevity, fecundity, and copying-fidelity' (1989: 194). Another common feature of genes and memes is agency: 'Just as we have found it convenient to think of genes as active agents, working purposefully for their own survival, perhaps it might be convenient to think of memes in the same way' (1989: 196). In other words, the designation of agency to memes may only be a convenience and a metaphor but it may well be one with a rather high 'survival' value – 'we have already seen what a fruitful metaphor it is in the case of genes' (1989: 196). What is more, because memes, like genes, must compete, they may also be said to be selfish. Competition in this case is enforced by

conditions of scarcity (of time if not space) in the environment of the human brain: 'the human brain, and the body that it controls, cannot do more than one or a few things at once. If a meme is to dominate the attention of a human brain, it must do so at the expense of "rival" memes' (1989: 197). So, memes, like genes, are necessarily selfish replicators and 'blind' or without foresight – the ability to think long term. However, Dawkins retreats from the consequences of genetic and memetic determinism by suggesting that our unique capacity for conscious foresight 'could save us from the worst selfish excesses of the blind replicators' (1976: 200). Dawkins uses the *metaphor* of genetic and memetic agency as a loop-hole in the law of his 'ultra'-Darwinism. It allows him to escape to safer ideological territory. Genetic agency and its cultural analogue is not a metaphor that he, at least, wants to take responsibility for: 'We have the power to defy the selfish genes of our birth and, if necessary, the selfish memes of our indoctrination' (1976: 200).

The materiality of Dawkins's metaphors have been noted in cultural theory (Hayles 1994; Fox Keller 1992), which nevertheless, and with few exceptions, remains dismissive of them, missing an opportunity to contest the meaning of agency and autonomy within biological and social discourse. This currently remains an internal debate, fought principally through the concept of autopoiesis (Maturana and Varela 1971). Autopoietic organisms have limited agency and are not determined by internal or external environments. They are more than the sum of their genes. Steven Rose uses the concept of autopoiesis to oppose Dawkins's construction of 'lumbering robots' or gene/meme machines (1997: 245). Margaret Boden (2000) uses the concept of autopoiesis to highlight a similar division within the field of ALife where the contest is not only over the terms 'agency' and 'autonomy' but also 'situatedness' and 'embodiment'. Autopoietic artificial life forms have simulated physical environments and bodies – they are embodied *forms* of artificial intelligence. Some have a degree of complexity which – at least according to their creators – might approximate to intelligence and anticipate the emergence of artificial cultures and societies (Cliff and Grand 1999). Since such creatures already populate computer games (such as *Creatures*) and (as autonomous agents) constitute immanent network identities, the exact 'nature' of their existence – hyped or otherwise – ought perhaps to be of wider concern. The world described by evolutionary psychology and the 'worlds' prescribed within artificial life run solely on Darwinian principles which *seem* to resolve complexities of mind and matter and to dissolve pluralism into fundamentalism, heterogeneity into homogeneity, questions into answers which constitute a social scientific theory of everything. The quest for a theory of everything, the *raison d'être* of the physical sciences (from Newton to chaos to superstrings), transfers to the life sciences through molecular biology, where endgames such as the discovery of DNA and sequencing of the human genome (unravelling the secrets of life itself) are staged. Drawing their inspiration from molecular biology, evolutionary psychology and ALife have taken the stage with the 'eternal principle' of natural selection. For Dorothy Nelkin, the theory of everything is the religion of non-theistic scientific cultures and, within

the new life sciences, ‘the gene appears as a kind of sacred “soul”’ (Nelkin 2000: 15). The quest for a theory of everything follows ‘a religious mindset that sees the world in terms of cosmic principles, ultimate purpose and design’ (2000: 16) and both evolutionary psychology and artificial life have their ‘missionaries’ (2000: 19). As a religion, evolutionary psychology seeks to guide not only moral behaviour but also social policy in areas such as law, welfare, education and equal opportunities (Curry and Cronin 1996). Offering seemingly simple and universal answers to complex social problems guarantees media attention and wide publicity. Evolutionary theories shore up the credibility of science by returning to ‘old seeming certainties’ reflected in a widespread ‘resurgence of fundamentalist religions, Islamic, Jewish and Christian, with their enthusiasm for militancy and their beliefs in creationism’ (Rose and Rose 2000: 3). For Nelkin, evolutionism is ‘especially convenient at a time when governments faced with cost constraints, are seeking to dismantle the welfare state’ (2000: 21). Why, asks Nelkin, ‘support job training, welfare or childcare programmes when those targeted are biologically incapable of benefiting from the effort?’ (2000: 21). Whether or not Nelkin is right in asserting that evolutionary psychology, just like sociobiology simply naturalizes the status quo, its uniquely direct challenge to the social sciences ‘demands a reply’ (Rose and Rose 2000: 8) and perhaps even some alternative explanatory perspectives: ‘It’s an old academic adage, but nonetheless true, that bad theory can never be driven out solely by criticism. A better alternative has to be offered’ (2000: 9).

Dialogue as strategy

The reinvention of cyberfeminism in the context of the new biology is one possible means of offering a better alternative to bad theory based on neo- or ultra-Darwinism. In order to make a difference in the manufacture of post-human identities and environments which constitute life-as-we-know-it and life-as-it-could-be, cyberfeminism must extend into the diverse and divided field of biology, engaging strategically with the differences within it. Here lies the real opportunity for collaboration (Hayles 1996), or affinity (Haraway 1991), which results in more than a successor, or good science (Stengers 1997). This, what I have called (after Bakhtin), ‘dialogic’ strategy is especially pertinent given the tendency of the new biology to subsume cultural into biological models, and therefore render resistance futile. It is important to acknowledge that few if any biological ‘determinists’ actually maintain that, because human behaviour is *ultimately* natural, it is therefore inevitable, unaltered and unalterable through socialization and education. The problem here, as Haraway points out, is not so much the science but the way in which it is misrepresented by scientists and non-scientists with a primary interest in obtaining funding, status, sales or publicity (2000). Thornhill and Palmer use evolutionary theory in place of (in the same place as) social theory to argue that current rape law works more in the interest of husbands, fathers and other dominant investors in genetic capital than

in the interest of women victims and should be changed accordingly. Addressing the social environment of actual and potential offenders amounts to a biological intervention for them, and it is this tendency to subsume rather than ignore the social which marks the new biological hegemony. The task for feminism is to address what motivates and mitigates this, and to explore the representational, epistemological, ethical and political dimensions without, as Haraway claims that she appeared to do in *Primate Visions*, ‘a kind of hands-on-your-hips negative critique where you are just standing there shaking your finger, going “this is a racist, sexist, colonialist enterprise”’ (2000: 56).

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