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Ageing Contested: Anti-ageing Science and the Cultural Construction of Old Age

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ABSTRACT

Recent developments in the fundamental science of biological ageing have raised the possibility of extending the human lifespan. This article examines contests within bio-gerontology as to the nature of ageing, identifies the methods through which old age is constructed by reference to particular kinds of knowledge and thus considers the impact of the culture of science on the contemporary meaning of old age. Definitions of ageing and death that focus on biological failure lead to a cultural construction of old age whereby diversity across the life course is devalued.

KEY WORDS

anti-ageing medicine / culture / old age / science

Introduction

Ageing and death are biological universals which all cultures have methods of explaining and dealing with. In the modern West, the culture that performs that function is framed by science. Recent scientific interventions have achieved dramatically increased longevity in nematode worms, fruit flies and mice. It is suggested that these experiments open the possibility of a greatly extended human lifespan. This article examines contests within bio-gerontology as to the nature of ageing, identifies the methods through which old age is constructed by reference to particular kinds of knowledge and thus considers the impact of the culture of science on the contemporary meaning of old age. 'Bio-gerontology' is the science of the biological ageing (Post and Binstock,

2004: 2). The journal *Biogerontology* provides a reasonable descriptive definition of the field, stating that it will publish on:

Modulating the aging process by physical, chemical and biological means, including transgenic and knockout organisms; Cell culture systems to develop new approaches and health care products for maintaining and/or recovering the lost biochemical functions; Immunology, autoimmunity and infection in aging; Vertebrates, invertebrates, micro-organisms and plants for experimental studies on genetic determinants of aging and longevity; Biodemography and theoretical models linking aging and survival kinetics.¹

‘Age’ is both a verb and a noun: it stands for both a process and a set of categories. Some parts of the trajectory of social and biological change over time are identified as ‘ageing’. In social gerontology it is understood as a sequence of stages and statuses to which specific age-based normative expectations are attached. The specific content of those processes and categories are contested; their meanings are not fixed and they are not all necessarily negative (cf. Palmore, 1990). There is much useful historical gerontology that documents the changing understanding of old age and the rise of the modern dominance of medical definitions of the phenomenon (Achenbaum, 1978; Cole, 1992; Estes et al., 2003; Lupton, 2000; Thane, 2000; Van Tassel and Stearns, 1986). Katz historically locates the discourse of senescence: ‘In France in the late eighteenth and early nineteenth centuries, medical research developed what we have called a discourse of senescence: a new organization of associated ideas and practices that captured the aged body through three commanding perceptions’ (Katz, 1996: 40). He lists these as (1) ‘the aged body as a system of signification’ – now physicians examine bodies for indications that they mask ‘inner states of disorder’; (2) the aged body as having a distinct pathology requiring medical therapy; and (3) the aged body as dying. He argues that in pre-modern society, death was a mysterious external force, while the science of the early 19th century reconceptualized death as an internal phenomenon of the body. Foucault classically illustrates shifts in the understanding of death and their implications for old age:

The aged body became reduced to a state of degeneration where the meanings of old age and the body’s deterioration seemed condemned to signify each other in perpetuity. By recreating death as a phenomenon in life, rather than of life, medical research on aging became separate from the earlier treatises that focus on the promise of longevity. (Foucault, 1973: 41)

The method used in this article is usually called cultural analysis:

Regarding culture as an observable aspect of human behavior lays emphasis on the realities of symbolic boundaries. Not only do they exist as conceptual distinctions in persons’ minds; they are publicly visible in the manner in which social interaction occurs, in discourse, and in tangible objects. Resources are expended in creating and maintaining them and many social activities may be understood as efforts to sharpen eroded boundaries, to redefine cultural distinctions, or as symptoms of

ambiguous frameworks. Identifying these activities is a concrete task to which cultural analysis can be applied. (Wuthnow et al., 1984: 261)

It has its roots in cultural anthropology (Douglas, 1978; Geertz, 1973, 1983), the work of Foucault (1973, 1980) and critical theory (Habermas, 1990). It examines the language and rhetoric used by participants in a life-world and seeks to demonstrate how meaning is created and contested. If we examine the language and rhetoric of those involved in the world of contemporary bio-gerontology, we can see how the meanings they create are achieved, what kinds of distinctions are important, and which key categories are used (cf. Doyle, 1997). The contests within bio-gerontology have been characterized as a 'war against anti-ageing medicine' (Binstock, 2003; Lucke and Hall, 2005; Vincent, 2003b). These debates are about defining the boundaries of the subject, who can count as a *bona fide* scientist of old age, and who can claim knowledge about old age. Thus this article looks at old age as a cultural category and at science as a form of culture to see how, and with what consequences, that culture constructs what it means to be old.

The Basic Biology of Ageing

What does it mean to be 'anti'-ageing? (see Hayflick, 2004). What ageing processes are to become slowed, halted or reversed with anti-ageing medicine (Post and Binstock, 2004: 3–4)? The first two texts discussed below are articles by established academic scientists seeking to summarize current knowledge within their discipline and can be used to illustrate how mainstream bio-gerontology constructs old age. We can, by deconstructing the language used and the premises that inform their rhetoric, identify ways in which the cultural understanding of old age is framed. The third article is more polemical and designed to convince a bio-gerontological audience of the need for a specific research agenda designed to bring ageing under control.

Robin Holliday is a distinguished bio-gerontologist who has written both as an experimental scientist and as a commentator on the implications of gerontological research. Holliday (2000) attempts to summarize the state of research on the biology of ageing in an article in the journal *Biogerontology*. He starts from an evolutionary perspective, pointing out that different animal lifespans are an adaptive response to the hazards in their environment. Entropy leads everyone to age; thus 'the eventual failure of maintenance leads to senescence, death in old age and the return to disorder' (Holliday, 2000: 97). Ageing is failure to repair defects in 'DNA or protein molecules'. So ageing is to do with what goes wrong in old age, with failure. He suggests that gerontologists' objectives are to increase the human lifespan; he reports increases in life expectancy but states 'the maximum human lifespan of around 120 years has not changed in recent decades' (Holliday, 2000: 100). He raises the issue of the rising cost of healthcare in old age as a crisis. Perceptively pointing out that the

fragmentation into specialization on particular diseases prevents medical and biological researchers from cooperating to tackle the root causes common to most conditions that become problematic in old age, he suggests that unnecessary costs come from the expensive technologies used to tackle each 'age related pathology' separately, thus making the case for a unified fundamental biology of ageing. The social nature of old people rhetorically created in the article is stereotypical – implicitly, old people don't have friends and colleagues or make productive and useful contributions; rather they are characterized as having 'families and leisure' (Holliday, 2000: 101).

Suresh Rattan, based at the Danish Centre for Molecular Gerontology, summarized in a 2004 article what he saw as the biological consensus on ageing. He reports that 'the manifestation of aging and the limits to lifespan are primarily due to the failure of maintenance and repair mechanisms' (Rattan, 2004: 286), and argues that the links between genes and such ageing processes are complex and diverse and may include some species-specific mechanisms. While acknowledging that a history of pseudo-science has given the field a bad reputation, he suggests that a number of researchers have developed genuine laboratory-based procedures for the prevention of age-related diseases, the retention of functional abilities and the prolongation of lifespan. From a review of anti-ageing strategies, he selects 'hormesis' for more detailed consideration. 'Hormesis in aging is characterized by the beneficial effects resulting from the cellular responses to mild repeated stress' (Rattan, 2004: 287). He reports laboratory research that shows how mild stress of various kinds (including starvation) in *in vitro* cell cultures improves functional integrity without upsetting the normal cellular processes. He also reports an Indian finding in humans that undernutrition can be beneficial to DNA repair capacity. This last observation contrasts in a culturally revealing way with the reports by Lane et al. (2002: 36) that 'caloric restriction' was an effective anti-ageing strategy but that people would probably have to 'reduce their caloric intake by roughly 30 percent, equivalent to dropping from 2,500 calories a day to 1,750'. They reached the conclusion that 'few mortals could stick to that harsh a regimen'. Their response was the, as yet unsuccessful, attempt to produce a pill that would imitate in people the effect of nutrition levels common in the poorest nations of the world (World Resources Institute, 2003) without their having to give up food. This is a useful reminder that bodies are cultural, as well as biological, constructions.

Less mainstream but nevertheless highly influential, Aubrey de Grey is a flamboyant entrepreneurial academic based in the Genetics Department at the University of Cambridge. In a critical review, Nuland (2005: 40) describes him as having:

achieved international renown and more than a little notoriety in the field of aging, not only for the boldness of his theories, but also because of the forcefulness of his proselytizing on their behalf. His stature has become such that he is a factor to be dealt with in any serious discussion of the topic.

In 2002, de Grey and a distinguished list of co-authors published 'Time to Talk SENS: Critiquing the Immutability of Human Aging'. The article sets out an optimistic case for anti-ageing medicine, and reads as a polemic for 'engineered negligible senescence'. Significant changes to longevity have been achieved in animal models and, while these cannot yet be achieved in humans, de Grey sees no fundamental reason why they cannot happen in the future. The authors state:

Aging is a three-stage process: metabolism, damage, and pathology ... Interventions can be designed at all three stages ... intervention to remove the accumulating damage would sever the link between metabolism and pathology, and so has the potential to postpone aging indefinitely ... ways exist in all cases, implying that indefinite postponement of aging – which we term 'engineered negligible senescence' – may be within sight. (de Grey et al., 2002: 452)

This argument starts by making an explicit equivalence. It defines 'aging' as 'a three-stage process: metabolism, damage, and pathology'. Then these three processes by which we age are elaborated. Living produces toxins that damage us. Some of the damage is irreparable, which produces 'age-related degeneration'. In other words, the end condition of ageing – old age – is a condition of degeneration.² The rhetorical question is then asked whether metabolism or damage can be changed to prevent ageing. The question contains the implicit assumption that ageing is undesirable – degeneration is after all by definition undesirable. The answer is 'no'. However, the repair of the resulting damage is seen as having the potential to remove ageing. The last part of the quote equates old age and damage, the postponement of which is 'in sight' – a metaphor which conjures the voyage of discovery, the route of progress to the promised land of 'engineered negligible senescence'. It is clear from this abstract that old age is thought of as a pathological condition, one which science has the imminent prospect of curing.

It may be argued that this kind of linguistic deconstruction is inappropriate, that bio-gerontology like other scientific disciplines has developed its own specialist language and that terms such as 'senescence' and 'immortality' have their own specific meanings within that discipline. However, words also have histories:

Senectitude in 1481 originally meant old age; *senescence* was used in 1695 to mean growing old; and *senile* was used in 1661 to signify what was suited to old age. The term *senility* was used in 1791 to mean a state of being old or infirm due to old age. But by 1848 *senile* meant weakness, and by the late nineteenth century it indicated a pathological state (Covey 1988, 294; Haber 1983, 73–74; Kirk 1992, 491). The term has taken on greater medical negative connotations ever since. (Katz, 1996: 41)

A scientist in a biomedical laboratory may well use 'immortal' to name the characteristic feature of a cell line engineered to (potentially endlessly) divide and thereby repeatedly multiply the same type of cell (Hauskeller, 2005), but the way that meaning is established is not independent of the broader linguistic and cultural group of which bio-gerontology is part. There is intermediation

through which the repertoire of analogous properties is embedded into the meanings of a language. It is precisely in the embedded meaning of 'senescent' and its use not only in the laboratories and journals of bio-gerontologists and in the wards and clinics of clinical gerontologists, but also in the Houses of Parliament or the columns of *The Times*, that the issue lies. Culture is embedded in language, even that used by scientists (cf. Haraway, 1991, 1997; Martin, 1989). Bio-gerontologists or clinicians can no more escape their culture than can politicians or journalists. However, science can give power and legitimacy to particular ways of understanding old age (Gieryn, 1999).

The War on Anti-ageing Medicine

There is a widespread debate on 'anti-ageing' medicine to be found in gerontological journals and conferences and in the journals of popular science such as *Science*, *Nature* and *Scientific American* and the journals of the bio-gerontologists themselves (Juengst et al., 2003a, 2003b). There have been many position statements – short articles signed by many authors summarizing their view of the state of knowledge (Butler et al., 2004; de Grey et al., 2002; Olshansky et al., 2002a). There have been special editions of key journals – *Journal of Gerontology: Biological Sciences* (Olshansky et al., 2004), *Mechanisms of Ageing and Development* (Halliwell and Wong, 2004), *Scientific American* (2004), *The Gerontologist* (2002) etc. – devoted to the topic.

The 'Position Statement on Ageing' by Olshansky et al. (2002b) in *Scientific American* was a declaration signed by 51 leading gerontologists that presents a warning that no currently marketed therapy had yet been proved to slow, stop or reverse human ageing. While they accepted that, in the future, work by biomedical scientists would bear fruit and postpone infirmity and improve quality of life, they stated that 'anyone purporting to offer an anti-ageing product today is either mistaken or lying' (Olshansky et al., 2002b: 92). The *Scientific American* article was a campaigning document and followed from a popular-science book, *The Search for Immortality* (Olshansky and Carnes, 2001), that is a more developed account of contemporary knowledge of ageing. In this volume they systematically debunk sensationalist accounts – including medical and demographic accounts – of claims to defeat death and prolong life. Another precursor of the declaration is a review by the International Longevity Center, which sought to assess the biological research evidence on which extension to human longevity might be based and to define the discipline of 'longevity medicine'. It was chaired by Robert N. Butler and Dr David Rothman, and Olshansky was one of 10 participants. Its report entitled *Is There an Anti-Aging Medicine?* (International Longevity Center, 2002), recommended a concentration on the extension of the 'health span'. These publications can be seen as an attempt to demarcate real professional science of old age from pseudo-science and to define a link between ageing research and the promotion of good health through medical intervention (Binstock,

2003; Vincent, 2003b). Excluding some anti-ageing activities from science is hard fought not only in the academic and popular-science press but also in the US courts.³

De Grey (2003) stands opposed to the assertion by Olshansky et al. (2002b) that there is no elixir of life; de Grey argues that the knowledge currently exists that will produce an indefinite postponement of ageing in the future. In September 2003 he used the opportunity of the International Association of Biomedical Gerontology's 10th Congress, entitled 'Strategies for Engineered Negligible Senescence: Reasons Why Genuine Control of Aging may be Foreseeable', at Queens' College, Cambridge, to push for his research programme. A fascinating set of articles (subsequently published in *The Annals of the New York Academy of Sciences*, Vol. 1019, June 2004) from a distinguished list of contributors, including Jay Olshansky and Arthur Caplan, was produced. The clear commercial potential of anti-ageing medicine was also strongly represented at the conference. However, the use of 'genuine' in the conference title is revealing, indicating concerns about legitimacy and authenticity. It is reported (de Grey, 2004) that, in the debates within this bio-gerontological community, opposition to speculating on the timeframe necessary for the development of effective therapies was strong. De Grey argues that this attitude is dangerous and could form a barrier to effective research funding.

Old Age as a Disease

A key disciplinary rift within gerontology lies between medicine and biology. Contesting this boundary has importance for the way old age is understood. There is a long-standing debate as to whether ageing should be considered a disease. This issue can be illustrated by the online debate titled 'Is Ageing A Disease?' (Sage Crossroads, 2004) between two of America's leading ethicists, Harry R. Moody of the International Longevity Center and Arthur Caplan of the University of Pennsylvania. The significance of this debate centres on the meaning of a search to 'cure' ageing. Caplan suggested that ageing is not called a disease because it is thought of as universal and natural. He contradicts this naturalness, feeling rather that ageing is 'something that just got designed into us' by evolution but that has no contemporary significance. He argued that if it is not natural and is a disease, then it is possible to try to cure it. However, without the label 'disease', research projects to discover successful interventions are unlikely to be funded. 'The more aging fits a disease model', the more money is spent on it. He concluded that 'if we could get it into the disease category, we could do something about it and we might actually liberate ourselves' (Sage Crossroads, 2004: 4). From this perspective, then, old age is something from which people need to be liberated.

Moody responds by pointing out that there is a social-construction element to what is thought of as disease – 'a disease is something that we can change and redefine'. He sees ageing as a natural process analogous to childbirth or

adolescence. However, these processes too can be targets for medical intervention. He argues that medicalization of old age makes people feel guilty for being the cause of their own ageing – not taking the anti-ageing pills, etc. He concludes that:

we should be very cautious about either advocating vast sums of public money for this research, or permitting people, encouraging people to pursue the agenda of anti-ageing medicine ... Instead we should begin to celebrate growing older and looking for the assets in that and not just the deficits. (Sage Crossroads, 2004: 6)

Kirkwood (2004) argues that the distinction between ageing and disease is breaking down. Holliday (2001: 70) also considers that this distinction is losing its meaning. They share an evolutionary perspective which sees evolution as playing a limited role in determining ageing – in the wild, creatures do not die of old age; they die largely from predation, accident or starvation (Kirkwood, 1999). Mammals in an environment protected from these hazards die of failures of the internal mechanisms of self-maintenance. For example, there is no meaningful boundary between cancer as a disease and cancer as linked to age-related failures of cellular regulation. However, this disease/ageing distinction is a key part of the rhetoric used by those contesting funding priorities. Both Kirkwood and Holliday want more of the large sums that are spent on disease-specific research spent instead on fundamental biological research into ageing. We can identify these boundaries as part of claims about specialist disciplinary knowledge. Depending on what old age is, different scientists can make claims to study and control it. The biology/medicine boundary is one such frontline.

Four Kinds of Anti-ageing Mean Four Kinds of Old Age

Binstock (2003, 2004) argues that the bio-gerontologists fear that the contemporary prominence of pseudoscientific anti-ageing medicine could threaten the status and funding of their own research.⁴ There is a developed literature in the sociology of science about the establishment of scientific legitimacy. Barnes et al. (1996) also give historical and sociological accounts of professional, institutional, and knowledge regulation. The burden of these studies is that such boundary work is constantly required, fraught with difficulty and historically and socially contingent (Gieryn, 1983, 1999; Taylor, 1996). Science does not change simply by the weight of the truth generated by scientific practices, but rather is embedded in active social contests as to meanings, over resources and between vested interests and ideologies and is made plausible by particular procedures and practices (Gieryn, 1999; Habermas, 1990; Merton, 1973).⁵ Thus the debates in the journals and at conferences of the key professional associations reveal a number of boundary-making processes. These processes are discourses that separate out some professional activities and knowledge as scientific and disciplinarily appropriate. Implicit within these discourses are definitions of the essential nature of old age. If, following Gieryn (1999), we try

to map the cultural space of anti-ageing science, four types can be identified from the debate. These are 'symptom alleviation', 'life expectancy extension', 'lifespan extension' and 'abolition'. I deal with each of these in turn, concluding on how each constructs old age.

Symptom Alleviation

For scientists to be taken seriously by state funders and to attract prestige within the scientific world, they must be seen to do serious fundamental work. Hence the literature demonstrates a strongly felt need to differentiate the symptoms of ageing from the fundamental biological process of ageing. However, the methods of science can be applied just as much to anti-wrinkle cream or hair loss as they can to intra-cellular enzyme pathways or the genetics of longevity in mice. Thus one type of anti-ageing medicine that the scientific biogerontologists separate themselves from might be called symptom alleviation. These are attempts to hide, postpone or relieve the effects of biological ageing. While such techniques have been practised for most of history, new methods can be devised using the knowledge, experimental method and technical sophistication of modern science. These new techniques are subject to an enormous commercialization potential (Estes, 1979; Estes et al., 1984). Three sub-categories of this type of anti-ageing medicine can be identified: (1) cosmetic – powder and paint, anti-wrinkle cream, etc., to disguise the signs of ageing; (2) prophylactic – exercise and diet or vitamin pills to stave off the onset of physical ageing and its signs; and (3) compensatory – Viagra and HRT, designed to re-invigorate 'failing' functions to a youthful standard. These symptom-alleviation strategies have to be understood in the context of a society that has come to understand body image as the key component of personal identity (Faircloth, 2003; Giddens, 1991; Hallam et al., 1999; Shilling, 1993; Turner, 1984). Thus the implicit definition of old age in this form of anti-ageing medicine is that of appearance. To look old is to be old. The boundary between youth and old age in this way of looking at the world is marked by physical appearance. However, some medics seek to exclude such activities from 'anti-ageing' medicine because they do not consider them to be therapeutic interventions, while many 'anti-ageing' scientists exclude them as essentially trivial and not part of the fundamental science at the root of the biology of cellular ageing.

Life Expectancy Extension

A key boundary process highlighted in the literature is between the medically oriented activities to cure the diseases associated with old age – particularly carcinoma and cardiovascular disease – and the fundamental biological processes of ageing. Research into such readily recognized killers is well funded – 'defeating cancer' and 'winning the war on heart disease' have become national government priorities in Britain and America. Many commentators believe that an increase in life expectancy of approximately three to six years can be achieved

in a relatively short time. These are based on successful new attempts to treat or eliminate the diseases which are the proximate causes of death in old age, in particular, cancer and heart and lung disease. Thus it is a key aim of much of the debate to establish the *bona fides* of anti-ageing medicine with respect to this established medical/scientific hierarchy. Claims are made that it is 'our science' which has the key to understanding and thus creating a healthy old age. Bio-gerontologists feel that the political advantage lies with the disease specialists; hence a crystallization of controversy around the issue of future life expectancy. It can be argued that advances in disease therapy can readily be anticipated and form just another step in the march of scientific progress, which has seen life expectancy rise systematically over the last 150 years. However, the question can be posed: by how much would life expectancy increase if a 'cure' for cancer were found or if all deaths from heart disease were eliminated? Some argue powerfully that such medical intervention will not change the human lifespan; people may be more likely to reach their full lifespan, but that will not produce ever-increasing longevity. At best, life expectancy gained through such means would be measured in years, not decades. There follow debates as to whether there is a 'natural' limit to human lifespan, whether lifespan was determined by evolution, whether any modification is needed to the human organism to change our lifespan. Thus the dominant view of old age that comes from this discourse sees it as a stage in life medically defined wherein people are in the first instance 'at risk' from a set of specific diseases and thereafter afflicted by them.

Old age from this perspective is not fundamentally about appearance of the body *per se*, but about the diseased condition of the human body. What distinguishes old age from youth is its disease status. Thus people no longer die of old age but of a specific disease. These days most gerontologists, whether biologists, medics or social scientists, tend to define their objectives in terms of 'health span', that is to say the extension of illness-free years of life. Such consensus nevertheless leaves a serious unresolved ambiguity about extending life for its own sake. This dilemma is hidden if old age is simply thought of as a disease; ill health is by definition bad, but wanting to be healthy is not the same as wanting to live forever. New claims from bio-gerontology to understand and control ageing open a new contest as to whether ageing is a more fundamental biological process than disease. Such claims implicitly undermine the 'health span' consensus by separating ageing from disease.

Lifespan Extension

Combating disease may increase life expectancy, but some bio-gerontologists make claims to increase the lifespan. These disputes as to whether there is a natural lifespan that is independent of death from specific diseases are about establishing scientific credibility for anti-ageing science in the specific form of research into genetics and cellular senescence. Key issues in the control of ageing are identifying genes for ageing, limiting metabolic and oxidation damage, removal of worn-out or damaged cells, cell replication and protection, use of

stem cells for replacement therapies and combating the reduced efficiency of the immune system with age. The understanding of the genetics and the biochemistry of cellular ageing has progressed to the point where the lifespan of worms, fruit flies, mice and other creatures can be manipulated. The microbiology of ageing is being understood with a greater precision and degree of control. In a debate at the Gerontological Society of America in 2003, James Carey, professor of entomology at the University of California, Davis, and senior scholar at the Center for the Economics and Demography of Aging at the University of California, Berkeley, said, referring to fruit flies, 'You tell me how long you want it to live and I will make it for you.' There is a 'Methuselah mouse' competition, to see who can produce the mouse that lives longest. It is suggested that these experiments open the possibility of greatly extended human longevity. The point of the competition to produce the Methuselah mouse is to demonstrate the new dominance of nature that can be achieved by investment in this field. It is a vehicle for those attempting to establish a dominant discourse about possibilities of an increased human lifespan. This kind of science produces research and intervention designed to increase longevity by between 20 and 60 years by fundamentally changing the ageing process, perhaps through genetic manipulation or chemical interventions, perhaps to increase the duration and efficiency of cell maintenance mechanisms over such a period. From the perspective of the bio-gerontologists, old age is a fundamental biological process applicable to all life, not just humans. Hence old age is the end stage of a sequence of biological developmental processes. Old age is cellular senescence. It is distinguishable from youth by biological markers such as shortened telomeres or less-efficient apoptosis.

This view detaches old age from the level of the organism and the level of humanity. It is worth noting Rose's (1997) criticism that modern biology does not pay sufficient attention to the whole organism, in this case the whole human being (cf. Dupré, 2002). He powerfully argues that biology neglects the totalizing, broader picture of the whole organism, concentrating instead on cells, genes and biochemical processes. In the literature considered above, there is a fuzziness about the human identity of the phenomena which age. There is a whole unspoken level at which people's identity and their values and motivations are simply taken for granted. Many scientists portray society as a personified entity with an individual will, but in the same discourse older people are rarely specific living human beings and are often merely 'redundant soma' – purposeless evolutionary residuals hanging on in an increasingly decrepit state because they have not been eliminated by natural predation. From this point of view the essence of old age is technical failure, a bodily function at the cellular level preventable by suitable scientific intervention.

Abolition

There are anti-ageing scientists in the debate who warn of over-optimism. They are concerned not to claim more than can be delivered. This is because to assert

that it is possible to change the fundamentals of biological ageing is to make a claim for eliminating ageing and for the creation of immortality. Up until recent times all 'scientific' claims to control ageing have been proved false, which has not stopped many 'quacks' and 'charlatans' from attempting to sell 'snake oil' or its equivalent for a quick profit. Modern bio-gerontology therefore works within a framework of some scepticism by scientists towards claims to control ageing. Thus much attention is directed to distancing bio-gerontology from the many historical unscientific attempts to find the elixir of life. De Grey's own ambiguous disciplinary position as a self-taught biologist and 'scientific advisor' to the Alcor Life Extension Foundation, which practises cryogenics, makes him a target of this kind of scientific boundary work (cf. Nuland, 2005).

Some bio-gerontologists do indeed make the explicit claim that it will be possible to reverse ageing or to create immortality (cf. Shostak, 2002). However, many participants in such research deny this and profess not to see the connection (de Grey, 2003; Turner, 2004). The boundary problem for them is to position modern bio-gerontology outside the realm of fantastical claims discredited in the past, and limited to a technical debate rather than an ethical or 'sociological' agenda. Immortality is not a new objective. It has been the implicit goal of post-Enlightenment science and its aim of perfecting humans through progress. It is subject to not only biological speculation but also philosophical and cultural debate. Most thought experiments with immortality portray it as a dystopia (e.g. Raikhel, 2000). It is seen as a technical nightmare (pollution, poverty or pain from unanticipated effects), an aesthetic desert (nothing new or valuable) or a spiritual void (against nature or God) – hence the attempts to portray 'Immortalists' as overstating claims and moving beyond the realms of legitimate science. Turner (2004) critiques those in the bioethics literature who leap from anti-ageing interventions to considering the banalities of immortality (cf. Williams, 1973). However, even though he advocates concentration on the small steps of progress, Turner marks no boundaries to the onward march of science. Constructed, even from an implicit perspective that science will cure death, old age becomes an unnecessary burden; it is a result of an unnecessary failure technically to control a biological process. Immortality sees the boundary between old age and death removed, leaving the boundary between youth and old age problematic.

Cultural Problems with the Different Types of Anti-ageing Medicine

Obviously, the lifespan must be seen as something more than a biological fact; it is a discursive or imagined production, symbolic of a culture's beliefs about living and aging, and thus serves as a conceptual window onto the large social and epistemological orders from which such beliefs derive their significance. (Katz, 1996: 39)

By adopting this perspective, we can place the current anti-ageing debate in a cultural context and examine its significance for older people. What are the implications of the bio-gerontological claim to extend the human lifespan? The most efficient way with currently available technology to extend human *life expectancy* would be to devote resources to reducing infant mortality in the developing world. This, of course, would do nothing for the human *lifespan*. Within the framework of a culture that equates science with progress and human domination of nature with success, old age will forever be condemned as the failure of scientific modernity. Implicitly, we have only to wait a bit longer or devote some more resources in order for the 'problem' of old age to be solved. But, however long old age were postponed, it would be seen in terms of bodily decline and not as a valued life stage in its own right.

Wherever bio-gerontologists are positioned in the fourfold classification outlined above, they all start with the view that human ageing is primarily a biological process capable of technical control. The modern dilemma involved in constructing nature as separate from humanity and subject to its control leads to cultural ambivalence towards scientifically engineered life extension (Bauman, 1991). Could life without limits, with no end, be meaningful? The absence of death, or its postponement into a distant future, devalues old age as a final coda to life. For some, death is valued as a 'natural' event, and from this perspective the moral logic is that we should not interfere with the natural order. For others the natural order is God given. But it is not necessary to adopt the 'natural' or 'God-given' position to question the benefits of eliminating death. Our lives are made meaningful by cultural categories that regularize our world – organize and shape it and make it predictable enough to live in (Douglas, 1978). Fundamental categorical distinctions such as male/female, old/young, nature/culture, and perhaps most importantly life/death lie at the core of culture, the consequence being that without death, life loses meaning (cf. Baudrillard, 1993; Bauman, 1992). Without a point at which life is brought to a close, there can be no evaluation, summation, rounding off – no ritual demarcation to mark the transition. If we lived forever, we could never graduate from the university of life and would be left as permanent students, always failures and never able to complete the syllabus.

Gerontology is faced with a crisis provoked by an unprecedented understanding of the biological mechanisms of ageing (Benecke, 2002; Fukuyama, 2002). However, the crisis is not technological but cultural. It lies with modernist ideologies and the use of science as culture. The belief in the infallibility of science sets aside the issue of technical competence; it assumes *by definition* that life extension (and even immortality) can be achieved. The belief is that if science cannot at present dramatically extend life, it will do so in the future. The consequence of this pattern of belief is that science as culture misdirects the way in which old age is understood. Rather than valuing life in all its diversity, including its final phase, it leads to misguided devotion of resources to solving the problem of death. The focus on biological failure sets up a cultural construction of old age which leads to the low esteem in which it is currently held.

There is an irredeemable cultural logic – if death is a solvable problem, then old age will be a failure. Only by re-naturalizing the idea of a ‘healthy death’ can we reconstruct a positive old age. It is a tribute to the power of the biomedical model of old age that many find it difficult to think of such a phrase as meaningful, or misconstrue it as a euphemism for euthanasia. However, for old age to be seen as a successful conclusion to life requires life to be defined culturally in other ways than as the continuation of bodily functions (Vincent, 2003a). The issue is not whether the claims of modern bio-gerontology to extend the lifespan, indefinitely or otherwise, are true, rather that such aspirations remain no less morally and philosophically problematic than they have been throughout human history. Locating the meaning of death in biochemical processes and striving for ever-longer lifespans denies the possibility of old age as a valued final part of the life course.

Notes

- 1 This extract is reproduced on the cover of every issue of *Biogerontology*.
- 2 The Merriam-Webster Online Dictionary definition: ‘**de·gen·er·a·tion** *noun* **1:** degenerate condition **2:** a lowering of effective power, vitality, or essential quality to an enfeebled and worsened kind or state **3:** intellectual, moral, or artistic decline **4 a:** progressive deterioration of physical characters from a level representing the norm of earlier generations or forms **b:** deterioration of a tissue or an organ in which its function is diminished or its structure is impaired.
- 3 The American Academy of Anti-Aging Medicine and its founders, Drs Robert Goldman and Ronald Klatz, are suing Jay Olshansky and Thomas Perls for \$150 million because of accusations that the Academy’s claims are ‘the most ridiculous, outrageous, scientifically unsupported or exaggerated assertions’ (Moody, 2004).
- 4 There are insider accounts by which gerontologists provide manuals for boundary maintenance. The Gerontological Research Group website article entitled ‘A Brief Word about Charlatans’ suggests:

Consumers should shy away from sites that: (1) Advertise a product as a quick and effective cure-all for a range of ailments; (2) Shout phrases like ‘scientific breakthrough,’ ‘exclusive method,’ or ‘secret ingredient;’ (3) Include impressive-sounding terminology to disguise a conspicuous lack of scientific proof; (4) Claim the Government or other groups have conspired to suppress their product; (5) List *undocumented* case histories claiming amazing results. (Gerontological Research Group, 2002)

- 5 It is not appropriate here to rehearse the ‘science wars’ debate (for two accounts in a voluminous literature see Fuller, 1999, and Gieryn, 1999: 336–62). The purpose of this article is not to assess the veracity of science, but rather to observe how the terms in which the ‘scientific’ meaning of old age is contended reflect, in the West, a dominant discourse that creates problems for living with death and old age.

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