

Nikolas Rose

*The value of life: somatic ethics  
& the spirit of biocapital*

What is the value of life?<sup>1</sup> This may seem a pretentious or a philosophical question. But it is the subject of much contemporary discussion. In August 2006, England's National Institute for Clinical Excellence (NICE), which advises on medicines available on the National Health Service (NHS) in England, ruled against two treatments for late-stage bowel cancer – Genentech's Avastin and ImClone Systems' Erbitux. Although these treatments were widely available in a number of countries, NICE declared that their use was not "compatible with the best use of NHS resources."

NICE estimated that treatment with Avastin would cost £17,665.65 a patient,

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Erbitux £11,739. On average, these treatments extend the lives of those with terminal bowel cancer by five months. NICE made its judgment using a model that estimates the costs per 'quality adjusted life year' (QALY) gained, and set a 'willingness to pay' cap of £30,000 per QALY. Each of the treatments exceeded that limit. Many cancers sufferers and their supporters contested this decision. It was, they said, a question of the value placed on their lives, the value of five months of life.

What, then, is the value of life? A Google search for 'the value of life' turns up 417,000 pages in 0.22 seconds. Among them, *Brainy Quote of the Day* gives us Michael de Montaigne's wise words: "The value of life lies not in the length of days, but in the use we make of them." But more generally, what one sees in these pages is an instructive intertwining of the ethical and the economic. Of course, many of the Google hits lead to the deliberations of bioethicists; in fact, *The Value of Life* is the title of a book by the prominent British bioethicist John Harris. But for those of us who are not bioethicists, current debates

<sup>1</sup> This paper draws on Nikolas Rose, *The Politics of Life Itself* (Princeton, N.J.: Princeton University Press, 2006).

over the value of life provide one way to explore the nature of contemporary biopolitics.

First in the Google listing is the Pope, or rather, the late Pope John Paul's encyclical letter of 1995, "*Evangelium Vitae*: On the Value and Inviolability of Human Life." In it, the Pontiff declares the incomparable worth of the human person, and expresses concern about the increase in threats to the life of individuals and peoples, especially where life is weak and defenseless. He is particularly troubled by the new threats opened up by biomedical progress; he believes that certain sectors of the medical profession, authorized by the state, are endangering the lives of the weakest, often with the free assistance of health-care systems.

The late Pope represents only one pole of the bioethical debate that now rages over the question of whether life can be subject to judgments of value – or, whether different forms of life can or should be valued differently. Could one ever legitimately say, 'My life has no value'? Could a life be of such little value that it might be a life not worth living, a life that should be ended?

That little phrase, 'life not worthy of life,' admittedly carries chilling overtones. It evokes the German debates on euthanasia that preceded the murderous eugenic regime in Germany from 1900 to 1945, so movingly analyzed in Michael Burleigh's book *Death and Deliverance*. And yet, today, it seems we cannot avoid this issue, especially at the start or end of life – in cases of severely disabled neonates maintained on life support, or those suffering from a painful and terminal disease who wish for physician-assisted suicide.

What is important for my analysis is not the answers given, but the way the

question itself is posed. Today, it is increasingly framed in terms of dignity. The U.K.'s Voluntary Euthanasia Society, for example, recently changed its name to Dignity in Dying. The value of life here seems to exist in a kind of transactional space between the claim that existence itself has some intrinsic value, and the claim that value should attach, not to life as vitality, but to life as a subjective state – to the 'dignity' of those who live it.

Second in Google's hierarchy are the economists, for whom life *can* certainly be given a precise value. Value of life, here, is usually calculated with the classical economic measure of 'willingness to pay.'

Since there are few ways to test how much individuals are, in reality, willing to pay for their life, health-care spending stands as the most popular proxy, in measuring the value accorded to increased longevity. One example of this calculation is evident in a paper by Robert Hall and Charles Jones, with the title "The Value of Life and the Rise of Health Care Spending." They point out the rise in the United States in the proportion of resources devoted to health care: "The share was 5.2 percent in 1950, 9.4 percent in 1975, and 15.4 percent in 2000. Over the same period, health has improved. The life expectancy of an American born in 1950 was 68.2 years, of one born in 1975, 72.6 years, and of one born in 2000, 76.9 years." Set the additional investment against the additional years of life, and one has a measure of the implicit value Americans attribute to life.

Others try to calculate the potential societal benefits, in financial terms, for reductions in mortality and morbidity. Kevin Murphy and Robert Topel estimate that, for the United States, "reduced mortality from heart disease alone

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has increased the value of life by about \$1.5 trillion per year since 1970 . . . . Even a modest 1 percent reduction in cancer mortality would be worth nearly \$500 billion.”<sup>2</sup>

Something similar is happening when health economists use measures like the QALY to evaluate the costs of disease or the benefits of treatments: it is an imperfect yet seemingly necessary technology to enable tragic choices, translating impossible moral judgments about suffering into a technical and calculable form.

Other experts estimate the value of life in terms of the money people are prepared to invest to reduce small risks of death.<sup>3</sup> The U.S. Department of Transportation, in a paper prepared just after September 11, calls this amount the ‘value of a statistical life’:

A defined value of life has been pursued by governmental agencies here and abroad for over thirty years. It is regarded as an essential element of cost-benefit analysis to guide public policy in the areas of regulation and investment in health and safety. Some measure is necessary to ensure prudent management of public and private resources. Although saving an identifiable life is often regarded as a moral imperative on which no monetary value can be placed, *prevention of every possible accidental death would be intolerably costly in terms of both money and the quality of life*. The term “value of a statistical life” (VSL) is widely used to emphasize that value is placed, not on a particular life, but on safety measures

that reduce the statistically expected number of accidental fatalities by one [emphasis added].<sup>4</sup>

In a related but different economic frame, one finds the debates over the compensation given by the government to victims of disaster. When the U.S. Air Force killed and injured a number of people in bombing the Chinese Embassy in Belgrade in May 1999, the U.S. government agreed to pay \$4.5 million in damages, which amounted to about \$150,000 per victim. On the other hand, when a U.S. Marine jet hit aerial tramway cables in Italy in 1998, the United States gave close to \$2 million to each Italian victim. Even this disparity in the value of life pales when one learns that when a U.S. gunship attacked and strafed four villages in Afghanistan in 2003, killing sixty people, the Karzai regime offered the Afghan wedding victims about \$200 on behalf of each individual killed.<sup>5</sup>

In the United States itself, the next of kin of each person who died in the September 11 attacks received some \$2 million, sparking an angry debate in the United States about the respective compensation to the victims of Hurricanes Rita and Katrina, and to the families of troops who have died in Iraq. Life, it seems, can be given a monetary value in compensation for its loss, yet that valuation depends upon the citizenship of those who have lost it, and the financial and political resources of those who contest that loss.

2 Kevin M. Murphy and Robert H. Topel, “The Value of Health and Longevity,” NBER Working Paper 11405, June 2005, <http://www.nber.org/papers/W11405> (accessed March 20, 2006).

3 For example, W. Kip Viscusi, “The Value of Life,” *New Palgrave Dictionary of Economics and the Law*, 2nd ed., 2005, <http://ssrn.com/abstract=827205>.

4 <http://ostpxweb.dot.gov/policy/EconStrat/treatmentoflife.htm#1> (accessed March 12, 2006).

5 <http://www.cursor.org/stories/afghandead.htm> (accessed March 12, 2006).

The lawyers come third in Google's listings. A host of papers dealing with the value of life considers the ways in which the courts measure compensation in wrongful death suits, where relatives sue doctors or others to recover damages from someone they hold responsible for a death. This is a fertile market for lawyers in the United States, judging from the numerous pages posted by law firms encouraging individuals to make such claims.

However, in the United States at least, such claims making has taken a different turn – in the form of claims for wrongful birth or wrongful life. Willy and Cynthia Fields won damages of \$1.7 million for the wrongful birth of their severely handicapped daughter Jade, on the basis that their doctor failed to pick up the signs of abnormality (in an ultrasound scan of the fetus) that would have prompted them to have an abortion.<sup>6</sup> This was a wrongful birth case, in which *parents* take action against a medical practitioner for failing to uncover information in genetic screening or counseling that would have enabled the mother to have her pregnancy terminated. Perhaps wrongful life cases are even more telling, for here the damaged, disabled, or terminally ill *child*, through his or her legal representatives, sues for having been allowed to be born – for example, a child with Tay-Sachs, condemned to a short life filled with suffering before an inevitable death. In effect, the child is claiming to have been damaged by having been allowed to live at all – for being condemned to a life not worth living. Of course, these cases are about raising money, for lawyers, for parents, for children; sometimes they are merely routes to obtaining the resources nec-

essary to provide care. But they reveal something about our contested politics of life.

On the one hand, then, all human life has a value beyond price, and every life is of equal value. And yet we know that in practice, some forms of life are judged more valuable than others. Every session of genetic counseling, every act of amniocentesis, and perhaps even every piece of cosmetic surgery embodies just such a premise: some forms of life, some ways of living, are worth more than others, and sometimes people are willing to pay for them. Every actuarial calculation for an insurance premium, every decision about health-care provision, is also based on such a presupposition.

My Google search did not really capture a fourth dimension – that of capital. By this, I mean the practice of expressing the value of a life – of an individual, family, lineage, nation, population, race, species or diversity of species – in terms of genetic or human capital.

The phrase 'genetic capital' was, perhaps, first used by modern-day proponents of eugenics, such as the authors of *The Bell Curve*, who drew on the more respectable use of the notion in evolutionary biology.<sup>7</sup> Some transhumanists have now taken up the phrase to argue for a new kind of eugenics for improving the genetic capital of the nation.

Sarah Franklin has suggested that it was first in the area of stockbreeding that the idea of genetic capital took shape – the capital that was not so much in each member of the flock but in the heritable characteristics of the lineage.<sup>8</sup>

7 Richard J. Herrnstein and Charles Murray, *The Bell Curve: Intelligence and Class Structure in American Life* (New York: Free Press, 1994).

8 Harriet Ritvo, "Possessing Mother Nature: Genetic Capital in the Eighteenth Century,"

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6 <http://www.cbsnews.com/stories/2003/06/19/60minutes/main559472.shtml>.

The idea of a kind of value inherent in the hereditary quality of one's stock originated before modern genetics. But in its modern form one can see it in an invitation issued by the Kansas-based Decatur Beef Alliance in 2000: "The Alliance gives progressive cattlemen a way to cash in on their genetic capital and their management expertise . . . . Any cattleman with superior genetic cattle meeting the [defined] live animal specifications . . . can get involved."<sup>9</sup>

The idea of genetic, or biological, capital has now become central to the language of those seeking to protect the planet and its biodiversity. Thus, in January 2006, *The Hindu Times* reported S. Kannaiyan, chairman of the National Biodiversity Authority of India, as saying, "Biodiversity represents the very foundation of human existence; yet, by our heedless actions, we are eroding this biological capital at an alarming rate."<sup>10</sup>

The idea of genetic capital resonates with that of human capital, which has emerged in the writings of Chicago School economists such as Gary Becker, for whom all choices that individuals make about matters like education or medical care are seen as investments in their own human capital. This notion of human capital links to the ways in which, in advanced liberal ethics, each individual is urged to live his life as a kind of enterprise to maximize lifestyle

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in John Brewer and Susan Staves, *Early Modern Conceptions of Property* (New York: Routledge, 1996).

9 "An Invitation to Join the Decatur Beef Alliance" (speech, Commercial Agriculture Producer's College, Oberlin, Ky., November 14, 2000), <http://agebb.missouri.edu/commag/inst/decbeef.htm>.

10 <http://www.thehindu.com/2006/01/16/stories/2006011600810200.htm> (accessed March 20, 2006).

or potential, to become a kind of entrepreneur of oneself and one's family.

What is one to make of this intertwining of economic and ethical concerns, these complicated relations among different registers of value? What can it tell us, if anything, about contemporary biopolitics?

Certainly the practice of medicine has become infused with these ways of thinking about the value of life.<sup>11</sup> Belief in the value of a healthy life, and of one's right to control and shape that life, has become central to the ethical self-management of many individuals and families, and underlay many challenges to the paternalistic power that doctors exercised over their patients. Attempts to 'empower' the recipients of medical care, to emphasize 'active citizenship,' and to transform patients into 'consumers' were underpinned, in part, by the hope that each individual would act to protect and enhance the value of their own life and that of their family, because they were committed to a secular value of health.

From another direction, the practice of medicine has become saturated with issues of financial value. This phenomenon is evident, not just in the growth of private health insurance and the commoditization of health it entails, but also in the regulation of prescriptions or reimbursements for medical activity by health management organizations (HMOs) and National Health Services. As we have seen, these organizations base many of their judgments on the cri-

11 Richard Horton, editor of the influential medical journal *The Lancet*, provides an overview of some of the key issues; R. Horton, *Health Wars: On the Global Front Lines of Modern Medicine* (New York: New York Review of Books, 2004).

teria of value for money, and the costs and benefits of different forms of medical intervention captured in measures such as QALY.

Further, medical knowledge, indeed medical truth itself, has become subject to intense capitalization. Basic and applied biological research – whether conducted in biotech companies or in universities – has become bound up with the generation of intellectual property, and illness and health have become major fields for corporate activity. This is largely because contemporary molecular biomedicine requires the investment of resources over long periods – for equipment, laboratories, clinical trials, and regulatory compliance – before it can achieve a return. Increasingly, such investment comes from venture capital provided to private corporations, who also seek to raise funds on the stock market. Hence, biomedicine has become subject to all the exigencies of capitalization, such as the obligations of profit and the demands of shareholder value.<sup>12</sup>

A path-dependent perspective on biomedical truth is necessary here. Biotech companies do not merely apply or market scientific discoveries: the pharmaceutical industry has been central to research on neurochemistry, the biotech industry to research on cloning, and ge-

12 Once more I must stress that there is nothing novel in itself in close relations between industrial corporations and the development of scientific research, outside and inside universities. The image of scientific knowledge as developing within the sequestered space of the university laboratory, funded by public moneys, detached from commercial imperatives, mobilized only by Mertonian norms of disinterestedness applies, if at all, only to a few disciplines during an exceptional period in the mid-twentieth century. Novelty, today, lies in the particular configuration taking shape around the life sciences.

conomic corporations to the sequencing of the human genome.<sup>13</sup> In contemporary biomedicine, the laboratory, the factory, and the stock market are interlinked. Where funds are required to generate candidates for truth in biomedicine, and where the allocation of such funds depends upon a calculation of financial return, commercial investment shapes the very direction, organization, problem space, and solution effects of biomedicine as well as the basic biology that supports it. In an era in which biotech enterprises such as Genentech proclaim that they are “in business for life,” biopolitics has become bioeconomics.<sup>14</sup>

13 I have argued elsewhere that images of the development of scientific disciplines that portray a path from the laboratory to society, described in the language of ‘application,’ are misleading, especially in those domains that have what Michel Foucault termed a “low epistemological threshold.” The psychological sciences, for example, were ‘disciplined’ around their fields of application – in industry, the schoolroom, the military, the courtroom – and only later established in the university. Nikolas Rose, *The Psychological Complex: Psychology, Politics and Society in England, 1869 – 1939* (Boston: Routledge & Kegan Paul, 1985). The impact of military priorities and funding should not be underestimated, in even the most apparently theoretical of disciplines such as mathematics.

14 The collection edited by Sarah Franklin and Margaret Lock made significant advances in our understanding of biocapital, pointing to the new hybrids of knowledge, technology, and life involved in patenting, sequencing, mapping, purifying, branding, marketing, and publicizing new life forms: these studies contributed to my own less ethnographic approach to these issues; S. Franklin and M. Lock, eds., *Remaking Life and Death: Toward an Anthropology of the Biosciences* (Santa Fe, N.M.: School of American Research Press, 2003). I am grateful to Franklin for letting me read her own development of these ideas in advance of publication; S. Franklin, *Dolly Mixtures* (Durham, N.C.: Duke University Press, 2006).

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Catherine Waldby initially proposed the term ‘biovalue’ to characterize the ways that bodies and tissues derived from the dead are redeployed to enhance the health and vitality of the living.<sup>15</sup> The Organization for Economic Cooperation and Development developed a similar idea in its ‘foresight’ exercise to explore the potential of economic activity that “captures the latent value in biological processes.” More generally, we can use the term to refer to the many ways in which qualities or capacities inherent in vitality have become a potential source for the production of value.

We should not overstate the novelty of these developments. Humans long ago put the vital properties of the natural world into service, with the domestication of animals and plants. They turned these properties into technologies when they, for example, harnessed the milk-producing capacities of cows and the silk-producing capacities of silkworms for the generation of biovalue.<sup>16</sup> Contemporary projects to embody human desires and aspirations within living entities – organisms, organs, cells, molecules – in order to extract a surplus – be it food, health, or capital – can be traced to these early events.

15 C. Waldby, *The Visible Human Project: Informatic Bodies and Posthuman Medicine* (New York: Routledge, 2000).

16 In volume 3 of *Capital*, Marx points to the significance of the capitalization of cattle and sheep breeding in enabling capital to become an independent and dominant force in agriculture. Franklin argues that the cloning of Dolly the sheep – made possible by the investment of venture capital in the hope of creating transgenic ‘bioreactor’ sheep to produce marketable enzymes for treating human diseases – binds the oldest definitions of capital as ‘stock’ to the newest forms that it takes in contemporary biocapital. Human aspirations become literally ‘embodied’ in living capitalizable entities; *ibid.*

Yet something has changed. The very emergence of the language of bioeconomics brings into existence a new space for thought and action. The bioeconomy has appeared as a space to be mapped, managed, and understood; it needs to be conceptualized as a set of processes and relations that can be known and theorized, that can become the target of programs that seek to increase the power of nations or corporations by acting within and upon that economy.

The normalization of the term ‘biocapital’ is one indicator of this new turn. March 2005 saw the third annual conference of BioCapital Europe in Amsterdam – an event for pharmaceutical and biotech companies across Europe.<sup>17</sup> In Australia, around the same time, the state of Queensland established a AU\$100 million biocapital fund to establish globally enduring biobusinesses. In May 2005, BioSpace, a leading online information source for the biotech and pharmaceutical industry, published the fifth edition of *BioCapital*, which showcases a variety of biopharmaceutical companies located within the Mid-Atlantic region; it includes an interactive BioCapital Hotbed map that also highlights research institutes, non-profit organizations, and universities within the area.<sup>18</sup> Moreover, ‘biocapi-

17 The conferences of BioCapital Europe enable biotech companies to present themselves to venture capitalists, institutions, and other biotech and pharmaceutical companies looking for investment opportunities within the biotechnology market. See [www.biocapitaleurope.com](http://www.biocapitaleurope.com) (accessed November 25, 2005).

18 See [http://www.biospace.com/news\\_story.aspx?StoryID=20035520&full=1](http://www.biospace.com/news_story.aspx?StoryID=20035520&full=1) (accessed November 25, 2005). There are now many such Hotbed Maps, which can be found at <http://www.biospace.com/biotechhotbeds.aspx> (accessed November 26, 2005). The original 1985

tal' is used in the title of numerous investment and consultancy organizations worldwide. Marxists and post-Marxists may disagree about whether biocapitalism is a novel mode of production, but they cannot dispute the existence and significance of *biocapital* as a way of thinking and acting.

Projects to govern the bioeconomy sometimes involve surprising alliances between political authorities and promissory capitalism.<sup>19</sup> A number of 'strong state' bioeconomies – most famously illustrated in Iceland and Sweden – decided to license private companies to undertake the genetic sequencing of their populations and to combine this with publicly held genealogical and medical records, in the hope that they would be able to identify the genomic bases of common complex disorders. In the case of deCODE in Iceland these hopes were

not fulfilled, at least in the short term.<sup>20</sup> UmanGenomics in Sweden sought to use bioethical shields to insulate itself from some of the criticisms; but it too found that its business model was not viable.<sup>21</sup>

The 'ex-socialist state' bioeconomies, such as Lithuania and Estonia, emerged from Soviet domination with comprehensive medical and genealogical records, together with relatively stable populations and some unusually prevalent medical conditions: these seemed to provide a favorable point of entry to a future in which biotechnology would generate employment, boost industry, and promote both public and shareholder value.<sup>22</sup>

Meanwhile, 'developing state' bioeconomies have turned claims about

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Biotech Bay™ Map for the San Francisco Bay Area hangs on permanent display in the Smithsonian Institution's National Museum of American History. BioCapital was first launched in 1996.

19 Franklin and Lock, in 2003, attributed the term 'promissory capitalism' to Charis Thompson's then-unpublished work on what she termed "the biotech mode of (re)production"; S. Franklin and M. Lock, "Animation and Cessation: The Remaking of Life and Death," in Franklin and Lock, eds., *Remaking Life and Death: Toward an Anthropology of the Biosciences*. See C. Thompson, *Making Parents: The Ontological Choreography of Reproductive Technologies* (Cambridge, Mass.: MIT Press, 2005), especially chap. 6. The idea that speculative, risk, and venture capital depend upon issuing promissory notes against the hope of future returns has long had a central place in studies of the rise of capitalist economies. I draw on arguments made in my Clifford Barclay Memorial Lecture at the London School of Economics and Political Science in February 2005.

20 G. Palsson and P. Rabinow, "Iceland: The Case of a National Human Genome Project," *Anthropology Today* 15 (5) (1999): 14; H. Rose, *The Commodification of Bioinformation: The Icelandic Health Sector Database* (London: Wellcome Trust, 2003). See also <http://sunsite.berkeley.edu/biotech/iceland/new.html>. In a press release of August 2, 2005, deCODE Genetics put a brave face on their progress but nonetheless reported losses in their second quarter. See <http://www.decode.com> (accessed August 11, 2005).

21 A. Abbott, "Sweden Sets Ethical Standards for the Use of Genetic 'Biobanks,'" *Nature* 400 (July 1999): 3; K. Høyer, "Conflicting Notions of Personhood in Genetic Research," *Anthropology Today* 18 (5) (2002): 9–13; K. Høyer, "'Science is Really Needed That's All I Know.' Informed Consent and the Non-Verbal Practices of Collecting Blood for Genetic Research in Northern Sweden," *New Genetics and Society* 22 (3) (2003): 229–244; A. Nilsson and J. Rose, "Sweden Takes Steps to Protect Tissue Banks," *Science* 286 (1999): 894; S. Rosell, "Sweden's Answer to Genomics Ethics (letter)," *Nature* 401 (September 16, 1991).

22 For the Estonian Genome Project, see <http://www.geenivaramu.ee/index.php?show=main&lang=eng>.



the diversity of their populations into exploitable resources. Thus, in China (which has emphasised gene testing, biobanking, and stem cells) and India (which points to the diversity of its gene pool, developed pharmaceutical industry, CROs, and ‘good subjects’ for trials), local and national state authorities have focused on the development of biotech as a driver of economic development, inward investment, and international competitiveness.

Many Western and other First World economies have also stressed their potential competitive advantage in what enthusiasts like to term ‘the knowledge-based bioeconomy.’ In 2003, the U.K. House of Commons Trade and Industry Committee *Report on Biotechnology* identified biotechnology, especially biomedicine, as a key economic driver. It estimated that, in 2002, the U.K. biotechnology industry had a market capitalization of £6.3 billion, accounting for 42 percent of the total market capitalization of European biotechnology, with pharmaceutical biotechnology as the dominant branch.<sup>23</sup>

In the United States, Ernst & Young reported that the biotech sector, in 2003, was a \$33.6 billion industry, with a total of 1,466 companies, 318 of which were public.<sup>24</sup> It also revealed that “in Australia . . . total revenues among publicly traded companies increased 38 percent from \$666 million in 2001 to \$920 million in 2002. The number of . . . people employed in the industry jumped 24 percent from 5,201 to 6,464.” And in Japan, the “government anticipates the nation’s biotech workforce will surge to

1 million by 2010, an enormous increase over the estimated 70,000 today. Government officials plan to double their investment in biotechnology in the next five years.”<sup>25</sup>

This is not simply another case of predatory Western capitalism plundering the resources of the poor. A report of a U.K. government mission to India in 2003 was headed with a quote from then-Indian Prime Minister Atal Behari Vajpayee: “Biotechnology is a frontier science with a high promise for the welfare of humanity.” At that time India had 160 biotechnology companies with combined revenues of \$150 million, driven by developments in the health-care sector; the industry was expected to grow to \$4.5 billion by 2010 and to generate a million or more jobs.

In China, the government spent about \$180 million building a biotech industry from 1996 to 2002. By December 2006, total R&D spending in China exceeded that of Japan for the first time, and China became the world’s second-highest R&D investor after the United States: spending by central government in 2006 reached 71.6 billion RMB, or almost \$10 billion, a considerable portion of which was directed to biotechnology and biomedicine. Government funds were directed to basic science, leaving the spin-out to the clinic and the manufacturing to the growing private biotech industry. And before the Hwang debacle, the Stem Cell Research Centre in South Korea had guaranteed government funding of \$7.5 million for ten years.

In each region, political investment to support the development of the biotechnology sector is driven, in part, by fears of losing out in an intensively com-

23 See U.K. House of Commons Trade and Industry Committee, *Report on Biotechnology*, 2003.

24 Ernst & Young, *Resilience: America’s Biotechnology Report*, 2003.

25 Ernst & Young, *Beyond Borders: Global Biotechnology Report*, 2003.

petitive global bioeconomy. Ernst & Young's *Global Biotechnology Report 2005: Beyond Borders* argues that "from Malaysia to Michigan, governments are developing strategic plans with ambitious goals for biotech" and points out that "the global industry raised a whopping \$21.2 billion in 2004" from private capital for early-stage development.

Yet even this was not enough to meet the challenge of finding early-stage capital.<sup>26</sup> The global biotechnology industry's revenues grew by 17 percent in 2004, to \$54.6 billion, but it was still making net losses of \$5.3 billion, and many companies seeking to raise funds from IPOs did not obtain the valuations they sought and suffered falls in share prices. Times were 'challenging,' especially in Europe and the United States, partly because of developments in regulation and legislation: the U.S. debates over the ethics of stem cell research, and the tendency of key policymakers to "scrutinize research agreements between academic medical centers, clinicians and biotech/pharmaceutical companies," and to question "potential conflicts of interest."<sup>27</sup>

The Asian biotech sector meanwhile continues to grow aggressively ("biotech companies in the region increased their top-line revenues by 36 percent in 2004"), although they too face 'challenges': worries over IP protection have hampered investment from Western

26 And, especially in the United States, one should not neglect the "opportunities and challenges in biodefense" following the terrorist attacks of September 11, 2001: Department of Health and Human Services spending on biodefense increased almost fourteenfold from 2001 to 2005, and the Bioshield Act of 2004 earmarked £5.6 billion for U.S. countermeasures against pathogens.

27 Ernst & Young, *Beyond Borders: Global Biotechnology Report*, 2005, 35.

companies, and governments and non-biotech industrial conglomerates have to provide the capital that, in the West, would be raised in other ways.<sup>28</sup>

Nevertheless, the allure of biocapital remains strong. Politicians in countries across the globe continue to foster the growth of a biotech sector and to seek a niche in this global bioeconomy by emphasizing the features that make them particularly attractive, whether these be genetically stable populations, a skilled and cheap labor force, or a range of significant diseases. They attempt to map the potential of this biotechnological revolution through exercises in foresight, and formulate strategies to develop it: targeted research funding, technology transfer, support for start-up and spin-out firms, tax breaks for research and development, low regulatory hurdles, and much more. These local intensifications of biocapital are linked into transnational circuits of capital, knowledge, researchers, techniques, and also material artifacts – tissues, cell lines, reagents, DNA sequences, organs, and the like. Such circuits of vitality are not themselves new – consider the long-standing practices of ethnobotanical collections of seeds and plants, or of the exchange of biological material and model organisms such as fruit flies, which were central to modern genetics.<sup>29</sup> But today, a kind of disembedding has occurred. Molecularization strips tissues, proteins, and molecules of their specific affinities – to a disease, to an organ, to an individual, to a species – and

28 *Ibid.*, 67.

29 M. J. Balick and P. A. Cox, *Plants, People and Culture: Science of Ethnobotany* (New York: Scientific American Library, 1996); R. E. Kohler, *Lords of the Fly: Drosophila Genetics and the Experimental Life* (Chicago: University of Chicago Press), 1994.

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enables us to regard them as manipulable and transferable units, which we can move from place to place, from organism to organism, from disease to disease, from person to person.

Vitality has been decomposed into a series of distinct and discrete objects that can be rendered visible, isolated, decomposed, stabilized, frozen, banked, stored, commoditized, accumulated, exchanged, and traded across time and space, organs and species, and diverse contexts and enterprises, in the service of bioeconomic objectives. Whether it is the transfer of genes, and their properties (e.g., luminescence, salt tolerance), from one species to another; the transfer of treatments from one disease to another; or the transfer of tissues, blood plasma, kidneys, and stem cells, molecularization is conferring a new mobility on the elements of life, enabling them to enter new circuits – organic, interpersonal, geographical, and financial.

And along with this ‘flattening’ goes another – the attempt to flatten the transnational circuits themselves, to construct one of those level playing fields, in which standardized intellectual-property regimes, forms of ethical governance, standards and regulations, and information allow distinct and widely separated economic actors to trade with one another, and yet upon which each local actor seeks to gain competitive advantage.

Max Weber famously argued that there was an ‘elective affinity’ between a certain religious ethic of worldly asceticism that he saw in Calvinism and the early emergence of capitalism in Europe and North America. His thesis has been the subject of extensive debate, interpretation, and empirical refutation. But it was grounded in his more profound insight that central to the ways in which

human beings conduct their lives is a ‘soteriology’: a way of making sense of one’s suffering, of finding the reasons for it, and of thinking of the means by which one might be delivered from it.

I suggest our own soteriology increasingly takes a somatic form. Human beings identify and interpret much of their unease in terms of the health, vitality, and morbidity of their bodies; they judge and act upon their soma in their attempts to make themselves not just physically better, but also to make themselves better persons. This is what I call a ‘somatic ethic.’

Is there a relationship between the birth of the bioeconomy and the emergence of the living biological body as a key site for the government of individuals – as the contemporary locus for so much of our unease and discontents, as the site of hope and potential overcoming? What are the links between the modern salience of biocapital and the ethical work that human beings are doing upon themselves in the name of health, longevity, and vital existence?

To address this, we need to distinguish this sense of ethics from that entailed in the idea of bioethics. Bioethics can operate as a legitimation device within the regulatory technologies of government, as they deal with highly controversial issues of life and its management.<sup>30</sup> It can serve to insulate researchers from criticism, and from the detailed examination of the nature and consequences of their activities, by bureaucratizing the processes whereby they obtain ‘ethical clearance’ for what they do. Crucially,

30 B. Salter and M. Jones, “Human Genetic Technologies, European Governance and the Politics of Bioethics,” *Nature Reviews Genetics* 3 (10) (2002): 808–814; B. Salter and M. Jones, “Biobanks and Bioethics: The Politics of Legitimation,” *Journal of European Public Policy* 12 (4) (2005): 710–732.

bioethics also provides the essential ethical guarantees that enable elements – tissues, cells, eggs, sperm, embryos, body parts – to move legitimately around the circuits of biocapital so that they can be combined and recombined in settings from laboratory to clinic. Franklin coined the term ‘ethical biocapital’ to draw attention to the way in which biotech corporations themselves now seek to internalize these ethical considerations in their business models and their artifacts. Bioethics thus often seems to arise from an alliance between those who want or need an ethical warrant for their commercial or scientific activities – whether they be pharmaceutical companies or those whose careers depend upon research with human subjects – and those who see here a potential locus for grants, recognition, a professional vocation, and a public role – philosophers, theologians, ethicists, and others. And as some critics claim, there are certainly moments when bioethicists, and the clean bill of health they can offer, seem to be for sale: when bioethicists, in taking subsidies for their educational activities, accepting grants, and acting as consultants to biotechnology and pharmaceutical companies, may have betrayed the trust vested in them, legitimating the unacceptable at the cost of human lives.<sup>31</sup>

But alongside the urge to critique, we need to attend to what this demand for bioethics manifests. Perhaps, at the simplest level, we need to distinguish between two general senses in which the biological and the ethical are intertwined. On the one hand stand those practices and ways of thinking that

might more accurately be termed ‘biomorality,’ whose aim is to develop principles, and promulgate codes and rules, as to how research or clinical work in biomedicine might be conducted. At a time when the somatic, the bodily, the ‘bio,’ have become so central to our forms of life, we should not be surprised that one response is to try to discipline these difficulties: to find some algorithms to adjudicate them, to standardize procedures for the potentially conflictual decisions concerning them. In this way, problematic issues can be transformed into technical questions: Have the proper procedures been followed? Have the proper permissions been obtained? Is confidentiality assured? Has informed consent been obtained? Bioethics, here, like accountancy, legal regulation, and so forth, has indeed become an essential part of the machinery for governing the bioeconomy; for facilitating the circuits of biological material required for the generation of biocapital; and for supervising all those practices in which life itself is the object, target, and stake.

But I am more interested here in another sense in which we can think of the ethics of the bio. This concerns the ethical considerations deemed relevant by participants – not just patients and their families, but also researchers, clinicians, regulators, and even those working in the world of commerce – in their actual conduct in relation to the dilemmas they face and the judgments they must make. Many detailed ethnographies of biosocial communities demonstrate the ways in which today’s biological citizens are reformulating their own answers to Kant’s three famous questions: What can I know? What must I do? What may I hope? We also see this in studies of the ethos of the authorities and professionals enmeshed in contemporary vital pol-

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31 C. Elliot, “When Pharma Goes to the Laundry: Public Relations and the Business of Medical Education,” *Hastings Center Report* 34 (5) (2004): 18–23.

itics, in those working in and for commercial biotechnology and pharmaceutical companies, and perhaps even in those investors whose concerns seem purely financial. While they may have their own share of cynicism, pragmatism, ambition, greed, and rivalry, they are also searching for, assembling, and inventing ways in which they might evaluate, adjudicate, and justify the decisions they must make when human vitality is at stake.

It is this sense that is closest to my notion of a somatic ethic. I use 'ethic' here to refer to ways of understanding, fashioning, and managing ourselves in the everyday conduct of our lives.<sup>32</sup> If our ethic has become, in key respects, somatic, this is because it is our soma – our genome, our neurotransmitters, our 'biology' – that is given salience. It is also because the authorities that articulate the rules for living now include not merely doctors and health promoters, but so many other somatic experts: genetic counselors, support groups, projects for the public understanding of genetics, and bioethicists. And it is because the forms of knowledge that are shaping our understandings of ourselves are themselves increasingly 'biological' – medical, of course, but also coming more directly from genomics and neuroscience, in their popular presentations, their scientific elaborations, and in the hybrid forms they take within lay discourses of everyday life. Finally, it is because our expectations for our lives –

32 I have discussed the way of thinking about ethics and self-technologies developed by Michel Foucault and Giles Deleuze elsewhere: G. Deleuze, *Foucault* (Minneapolis: University of Minnesota Press, 1988); M. Foucault, *The History of Sexuality*, vol. 2, *The Use of Pleasure* (London: Penguin, 1985); N. Rose, *Inventing Our Selves: Psychology, Power, and Personhood* (New York: Cambridge University Press, 1996).

our hopes for salvation, for the future – are themselves shaped by considerations about the maintenance of health and the prolongation of earthly existence.

The management of health and vitality, once derided as narcissistic self-absorption, has now achieved unparalleled ethical salience. The tensions between the intensifying demand for the products of the bioeconomy – organs, embryos, pharmaceutical products, and the like in the West – and the inequities and injustices of the local and global economic, technological, and biomedical infrastructure required to support such a somatic ethic seem to me to be a constitutive feature of contemporary biopolitics – and one in which the differential value of life is very much at stake.

What I have tried to do, in a schematic and provisional manner, is to sketch the somatic ethical economy, which perhaps has an elective affinity with a certain form of capital – biocapital – and with the capitalization of life itself. To paraphrase Max Weber, we do not have to decide between a materialistic and a spiritualistic interpretation of these developments.<sup>33</sup> Somatic ethics and biocapital have been locked together since birth. For only where life itself has achieved such ethical importance, only where the technologies for maintaining and improving it can represent themselves as more than merely the corrupt pursuit of profit and personal gain, only when they can place themselves in the service of health and life, is it possible for biocapital to achieve such a hold on our economies of hope, imagination, and profit. In this sense, I suggest, somatic ethics is intrinsically linked to the spirit of biocapital.

33 M. Weber, *The Protestant Ethic and the Spirit of Capitalism* (London: George Allen & Unwin Ltd., 1930), 183.