Book Review: The Global Genome: Biotechnology, Politics and Culture

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Book Reviews

The Genome as Intermediary

The Global Genome: Biotechnology, Politics and Culture
by Eugene Thacker
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The post-genomic era requires more than just a technical understanding of gene structure and function. New technological options cannot survive without being entrenched in networks of producers, users and various services. A new research system is coming into being centred on the production, use and commodification of genetic knowledge, based on new sets of knowledge, technologies and commodities, and embodying a new set of socio-technical relations involving new groups of actors. Innovation is a heterogeneous mix of knowledge, technology, organization and wider socio-political activity operating in the complex networks of this new research system. The governance of genomics is being reshaped by a new culture which reflects the changing relationships between government, industry and techno-scientific development.

The post-genomic social and scientific domain inhabits and constructs multiple global economies. Tissues circulate. Cells may be derived from 'spare' embryos in Asia and used for research purposes in Europe. DNA and cell-lines deposited in biobanks are intended to be withdrawn and used across multiple sites. Techniques and personnel circulate. The flow of ideas and research projects is global. The recent scandal relating to research practice in Korea has had international repercussions. The knowledge economy is but one aspect of a broader political economy of biological knowledge and practice. We are witnessing a 'biopolitical economy' that embraces science, technology, medicine, industry, the academy and regulatory regimes. Knowledge economies are paralleled by moral markets. Ethical and legal frameworks for the conduct of research and its applications – medical or agricultural – compete within a global marketplace. Nation-states and global companies can outsource their research activities by having off-shore moral regimes. Economies can be fuelled by permissive regulatory frameworks. These are in turn influenced by cultural differences that extend to the dominant faith-regimes of competing nations. The rise of stem-cell research in India, for instance, is intimately related to the fact that the embryo is not accorded the same special status there as it is in

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European–American Christian regimes. There is too a global economy of signs and representations. The genome and its derivatives are densely woven into fictional and factual representations across the media. From science journalism to science fiction, from print media to movies, DNA circulates as a powerful icon of contemporary culture.

These multiple economies of materials, morals and media deserve close attention. It would be unwise to assume that recent developments constitute a unique juncture, it is undoubtedly the case that they have received more attention from social and cultural analysts than any other scientific or medical phenomenon. With the possible exception of HIV/AIDS – and it was a rather short-lived commitment – no other biomedical topic has been used to enrol the social sciences in interdisciplinary collaborations than the human genome and its derivations. Thacker's book is one of many contributions to the collective analysis of the genome as a social object, and of genomic science as collective action. Thacker draws on now-classic sociological formulations to explore these phenomena, in a broad synthesis of Marxian and Foucauldian perspectives on the production, circulation and consumption of the genome in its multiple forms.

According to Thacker, the new biotechnologies are fundamentally constitutive of the biological in that they are both a *tool*, and a part of the *process* of biological development, resulting in unique configurations of (to follow Latour, 1993) hybrid formations. The accepted view of nature/society relations, that society is inherently plastic and pliable, while nature is remote and autonomous, is turned on its head. The new biotechnologies have made nature pliable and society remote and difficult to change. They are neither simply opposed to nature, nor even external to it. They are clearly still tools that are objects to regulate, produce or regenerate nature. But they are also constitutive of defining nature itself, framing it through active participation. In this sense they are part of the process Jasanoff (2004) describes as the co-production of nature and society. The ways in which the world is apprehended and represented by individuals is inseparable from the ways in which they inhabit it. Socio-technical knowledge thus both 'embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions'. Such an approach, while not a fully fledged theory, provides a useful way of organizing and interpreting complex phenomena in an area such as biotechnology which is rapidly changing, and has deep moral and ethical, as well as practical implications, for society as a whole.

Technosciences, such as the new biotechnologies, illustrate the extent to which the conceptual boundaries within which scientific disputes, including those presenting new moral and ethical problems, have conventionally been resolved are now obsolete. While objectivity, proof and verification continue to be valued, these are inextricably entwined with shifting local practices which value them differentially, and are more or less robust and reliable depending on context. Progress is no longer viewed as a linear phenomenon, but messily contingent, co-constructed and contextualized.

A variety of new decision-making structures have been harnessed by governments and NGOs to involve the 'public' over the last 50 years. These include, among others, deliberative polls, citizens' juries, consensus conferences, science courts, and focus groups. However, society has developed a number of ways of translating the goals of those in authority into the choices of individuals, effectively acting as a form of social control and a legitimation for commercial interests. In the case of citizens' juries for example, a combination of transposing the symbolic baggage associated with the legal framing of the judge and jury system to debates about innovative technologies, and introducing rituals of precision which inadequately mimic those in Courts of Law, serve only to give the appearance of accommodating non-experts into the decision-making process. In effect, these trappings sit comfortably within the existing relations of production and so do little to co-construct a socially robust techno-science (Glasner and Rothman, 2004).

In part this is due to the creation of an 'imagined' public, rooted in persistent concerns about public ignorance, and the public mistrust, of science. The continuing reinvention of the 'deficit model' depends on the myth that because publics mistakenly expect certainty and risk from science, science

is obliged to delete reference to these in policy debates and focus instead on imagined and unacknowledged audiences. It is also due to agencies within science where, following the mapping of the human genome, turf wars continue. These actors are competing not only for positions on the reductionist /determinist and holistic/functionalist spectra, but also for regulatory freedom and financial support. Together, it can be argued, the real character of innovative trajectories has been masked through intermediaries embedded in the public involvement over the introduction of GM food or crops, or the development of downstream therapeutic applications from pharmacogenetic or stem cell technologies (Wynne, 2005).

Globalization has highlighted the need to recognize that markets in scientific and technological downstream applications from genomic innovations exhibit similar characteristics to existing markets in the wider knowledge economy (Glasner and Rothman, 2004). There has been an enormous increase in the codification of knowledge, which together with networks and the digitalization of information, is leading to its increasing commodification. There is increasing interdependence of international flows of goods and services, direct investment, and technology and capital transfers associated with increasing specialization, and chains of production crossing international boundaries (Appadurai, 1996). There is a substantial national and regional structural adjustment, with an emphasis on flexibility and networking built through. Time has now become, alongside knowledge, a new factor of production essentially compressing and reordering existing conceptions of what is understood by the production process as shown in the freezing or banking of 'immortal' stem cell lines (Glasner, 2005). Together, these elements suggest that the transition to a knowledge-based economy is so fundamentally different from the resource-based system of the last century that conventional economic understanding must be re-examined (Barry and Slater, 2005).

Styles of practice in the investigation of research problems, the results that are generated, and the ways in which the process is regulated, produce distinctive and novel institutional, epistemic and material configurations. Thacker concentrates more on bioinformatics without sufficient consideration of the other factors at play. In the case of biomedical advance, Keating and Cambrosio (2003, 2004) have suggested the term 'biomedical platform' to cover the range of activities in contemporary biomedicine ranging from laboratory research to clinical trials and routine diagnosis. In a study of changing diagnoses of lymphoid tumours, for example, they show how three distinctive approaches (the morphological, immunophenotypic and molecular genetic) emerge chronologically, but do not result in the replacement of an earlier by a later platform. New platforms are integrated into an expanding set of clinical-biological strategies through complex realignments and articulations with earlier ones. However, the key to how a new diagnostic platform is held together in practice is to be found in the protocols that specify *inter alia* sufficient sensitivity, specificity, reproducibility, robustness, reliability, accuracy, precision and clinical relevance – or more broadly regulation. The development and approval of a regulatory protocol is itself a highly political process almost as complex as the application of the protocol itself. Bioinformatics then becomes another actor in this complex political process.

Thacker is keen to include media accounts of what is described in the Foreword by Roger F. Malina as the 'goo of life'. Studies drawn from such areas as literary theory, deconstructionist methodologies and the sociology of scientific knowledge have shown how scientific rhetoric and forms of discourse contribute to legitimating scientific authority in complex social contexts (Lewenstein, 1995). In tracing the patterns of representations of genomics across a range of media forms, and reviewing and reassessing broad conceptualizations concerning science on/and in the media, it is possible to identify specific patterns with regard to genomics. This involves consolidating insights about key nodes of media theory, pertaining to textual analysis, including: genre, narrative continuities and transformations across media forms, iconic imagery, spectacle and national and international specificities. It also involves explorations of the production and consumption of representations, where theories of media production, identification, audience and risk come into focus. Theories of globalization and the internationalization of

media forms therefore also come under scrutiny, with explication of some national issues that are crucial in understanding contemporary public science.

The mapping and sequencing of the genome of human beings and other forms of life in the first decade of the new millennium is leading to a reassessment of genomics as systems biology, with a new emphasis on function rather than structure. The result of this development has been the formation of new kinds of knowledge about living things (sometimes described as the 'omic revolution') with the establishment of new disciplinary boundaries (as for example in proteomics), and, significantly, with the development of new intellectual and social spaces within which these events occur. This text in reconstructing the debates and issues from a post-genomic standpoint contributes as a useful defining intermediary. It also plays a significant role particularly as resource for graduate students on STS and related courses in the co-construction of the social scientific hybrid viewing biotechnology embedded in the global context.

Thacker's contribution provides relatively few novel insights, perhaps, and the value of his book resides in its synthesis of a variety of well-established analyses. It is, however, a useful addition to the rapidly growing literature on the political economy of biomedicine and biotechnology. The exponential growth of research and development in these areas means that there is a continuing need for such *tours d'horizon*. Indeed, it is worth reflecting on the irony that the global significance of the political economy of 'life itself' is simultaneously bestowing value on the work of social analysts.

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Aged by Culture

by Margaret Morganroth Gullette

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This is a welcome book because it calls for the study of ageing to be incorporated into the mainstream of cultural studies. Sociologists will also find much to interest them because it argues for age to be considered as a key factor – on a par with gender and ethnicity – in the determination of social location. Gullette deploys her usual verve and eloquence to bring off a valid argument about the state of age in contemporary society – well, actually in the USA, although British and other European readers will find that many of her observations resonate with what they know about the state of age this side of the Atlantic. She starts off her analysis with an anecdote – a style also employed by Woodward (1991) more than a decade ago – designed to expose everything that is wrong with our contemporary attitudes to age and ageing and to embark on a search for solution.

Woodward was describing the attitudes of middle-aged gerontologists, gathered for a conference on ageing, towards the picture of a naked old man. She found that this stark depiction of decrepitude evoked fear, resentment and disgust in the onlookers. The picture unsettled a group of experts gathered to talk about ageing and old age in contemporary culture. And yet in their reactions they exhibited the same fears as non-experts. Gullette chooses an example which is just as telling. The Boston Museum of Science have as an exhibit a booth equipped with machinery designed to simulate the ageing of the faces of visitors to the booth, most of whom were children:

> In seconds the computer added grotesque pouches, reddish skin, and blotches to their familiar features; the faces became elongated and then wider and then saggy; lines became more heavily rutted. Boys lost hair. Hair turned gray. The heads of both boys and girls grew and then shrank. (pp. 4–5)

The impact on the children was predictable: most reacted strongly and negatively. Crucially, most of the children had faith in the 'truth' of ageing presented by this medium which focused solely on the look and fleshiness of ageing.

For Gullette this exhibition embodies all that is wrong and worrying about contemporary attitudes to ageing and the old. Her principal thesis is that we are aged by culture. What she means is that much of what we experience as we get older is not the ineluctable consequence of biological ageing – as the museum exhibit would seem to suggest – but is socially and culturally contingent. American society, she contends, has become a rich terrain on which the social and cultural exclusion of people as they age can take place and where the ideology of ageing can flourish. Age has become a key determinant of cultural and social value and what we tend to associate with ageing is part of the master narrative of age. The more age we have, the more value we are deprived of over time. Age has become a symbol of decline and failure in a society which is built on the belief in progress and the American Dream. Age is being used as a weapon against cohorts of people who are seen to pose problems for the pursuit of this dream. In other words, age is the scapegoat for the economic downturn which has apparently