

Biosocial Relations of Production

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INTRODUCTION

Nowadays, life itself is one of the most active zones of capitalist production. Not only has biology been upgraded to Big Science, biological material and information are increasingly the subject of engineering, banking, reproduction, and exchange. The description and broad implications of the refiguring of life itself and its intrusion into economics and politics represent some of the most important issues on the academic agenda at the beginning of the twenty-first century (Pálsson 2007). Foucault's works on biopolitics (see, for instance, Foucault 1994) have obviously contributed critical insights with respect to the current refashioning of the human body, illuminating the political and governmental dimensions of these developments (Inda 2005; Rose 2006; Gottweis and Peterson 2008; Nowotny and Testa 2009; Lock and Nguyen 2009). Recently, a series of scholars have revisited the early writings of Marx, sometimes in combination with Foucauldian perspectives, in their attempt to make sense of the political economy of modern biotechnology, including the fragmenting of body parts and the labor process involved. One of the emerging themes in current discussions relates to the conception and role of labor in the reproduction of bodies and body parts. While Marx may not be an obvious source of innovative perspectives on the modern production of

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human biovalue, a somewhat unique industry that had not arrived in his time, his early works offer useful insights into contemporary developments.

In this article I argue that the reality of “biosociality,” the conflation of the biological and the social through modern biotechnology, dissolves the earlier concept of the biosocial, the notion of the complementary spheres of biology and society usually seen to underlie the dualistic structure of the discipline of anthropology and, in fact, most academes. Secondly, and more importantly, I suggest an extended notion of social relations of production may be useful for capturing new hierarchies and articulations of the social and the biological in the reproduction of life itself, what might be called *biosocial relations of production*. Coupled with detailed ethnographies of biomedicine and the bioindustry, such an extension may serve to highlight the micropolitics of what Marx referred to as living labor. While Marxian rhetoric has often been at odds with ethnographic description (see, for instance, Bloch 1983), it seems to make good sense to apply Marx’s notion of mode of production to the fragmenting and co-constitution of bodies and the reproduction of bodily material. A Marxian approach along these lines is already in the air. Several important works have drawn upon Marx’s concepts of labor, estrangement, and species-being; see, for instance, Thacker (2005), Thompson (2005), Sunder Rajan (2006), Waldby and Mitchell (2006), Dickenson (2007), and Haraway (2008). Even Derrida, the arch-deconstructivist, conceded in his *Specters of Marx*: “The critical treatment to which . . . [Marx] subjects the abstract concepts of Nature and Man as man remains a rich and fertile one” (1994: 67). Some of Marx’s notions are surprisingly relevant, almost hyper-modern. Applying them to the novel domain of biotechnology, however, needs some qualifications and fine-tuning.

One of the hybrid developments that sparked the writing of this article was the birth of seven “sensational” pigs at the Foulum Research Center in Denmark, reported in the daily *Politiken* in August 2007. Apparently these were the first “Alzheimer’s pigs” ever (see Figure 1), the result of cloning and genetic manipulation, with an added human gene implicated in the onset of Alzheimer’s disease (Lenler 2007). The seven pigs (a magical number, indeed), it is hoped, will develop symptoms similar to those experienced by Alzheimer’s patients, providing new opportunities for researchers to explore brain tissue at different stages of development. Perhaps, the “dreaded comparison” (Spiegel 1988) of human and animal slavery, as a result, needs some rethinking. At least, the novelty of such cases would fly in the face of much classical social theory, for instance Durkheim’s thesis of totemic associations of animals and humans. For him, the totemism of Australian “primitives” represented dubious analogies between people and certain animals: “there is nothing in experience which could suggest these connections and confusions. As far as the observation of the senses is able to go, everything is different and disconnected. Nowhere do we see things mixing their natures and



FIGURE 1 The Birth of Cloned, Transgenic “Alzheimer’s Pigs” (Source: *Politiken*, 29 Aug. 2007, photo: Rasmus Baaner). Reproduced with permission of Polfoto.

metamorphosing themselves into each other” (Durkheim 1971: 235–236). We do, indeed, “see things mixing,” as the case of the Alzheimer’s pigs demonstrates. In Marxian terms, this is lively production, the collaborative project of pigs and humans.

The outline of the discussion is as follows. Drawing upon the works of Rabinow (1996), Rheinberger (2000), and some others, the following two sections discuss the dualism of nature and society and their conflation, as a result of modern biotechnology, in both theory and the ongoing refiguring of life, emphasizing the development and different connotations of the notions of “bio-sociality” and the “biosocial.” This is followed by a discussion of the concepts of labor and production and their current application with respect to bodies and body parts. I then move on to the extension of Marxian notions of alienation and estrangement, usually applied to the products of whole bodies, to the extraction and exploitation of body parts. The section that follows discusses human-animal relations and cross-species hybridities in bioindustries and biomedicine, emphasizing the importance of being attentive to the cultural variety of conceptions relating to what is usually referred to as life itself. There is good reason, I suggest, drawing upon Tapper (1988) and Haraway (2008), to extend the notions of production and estrangement to the realm of human-animal relations, in particular the role of non-human animals in experiments involving human diseases and the development of “spare parts” for human use. As

Haraway puts it, “What . . . if *human* labor power turns out to be only part of the story of lived capital? . . . [W]hat if the commodities of interest to those who live within the regime of Lively Capital cannot be understood within the categories of the natural and the social that Marx came so close to reworking but was finally unable to do under the goad of human exceptionalism?” (2008: 46). The concluding section sums up the discussion with some qualifications. Sensibility to the biosocial relations involved in the manufacture of lived capital, I suggest, is essential for meaningful understanding of ongoing developments in the bioindustries and for informed biopolitics and governance. This article should be seen as programmatic, fleshing out important contemporary issues that really need much more detailed analyses and discussion.

BEYOND DUALISM: FROM SOCIOBIOLOGY TO BIOSOCIALITY

The product of a long process of evolution spanning at least two hundred thousand years—a process nevertheless that is still a matter of academic debate and probably has always had some element of “messiness” (co-evolution, lateral gene transfer, niche construction, and co-production, in scientific jargon [Dyson 2007])—humans now reinvent themselves in a new sense and on a fundamentally new scale, deliberately altering their bodily constitution and development by exchanging genes, tissues, and organs with both conspecifics and other organisms. Often associated with “biosociality,” this turn of events suggests revised division of academic labor, across the now suspect nature-society divide. Some of the most recent spectacular promises on this score are designer babies and synthetic biology, aiming to design whole organisms practically from scratch. The tracing of the exact origin of the notions of “biosociality” and the “biosocial” is beyond the scope of this article. Before proceeding, however, it is useful to take a brief look at these concepts and the manner in which they are being used. While they may seem nearly identical, their histories and meanings are different.

One of the early precursors to the concept of the biosocial is Mauss’ reference (1973) to the “biologico-sociological” in his classic essay “Techniques of the Body,” originally published in 1934. For Mauss, the “habitus” represented by acts like walking, swimming, and dancing was both a biological and a sociological phenomenon; movement was normative both because it was bodily inscribed and because it was informed by the traditions of the community involved. Since the 1960s, at least, following the launching of the *Journal of Biosocial Science* in 1969, which replaced the *Eugenics Review* published by the Galton Foundation, the concept of the “biosocial” has often been used loosely with reference to “the common ground between biology and sociology,” to quote the journal’s home page (2007). In a review of the first issue of the journal, published in *Man*, Roberts suggested the main problem for the journal would be to establish meaningful common ground, emphasizing that it was “not sufficient merely to put papers on human biology within the

same cover as others dealing with the social sciences” (1970: 133). A similar concept of the biosocial has been highlighted by *The Biosocial Society*, an international academic body which “aims to foster closer collaboration between those biological and social sciences engaged in exploring human biological and social diversity” (2007).

In these cases, the biosocial (and the “biologico-sociological”) refers to two separate relational systems, one biological and the other social, suggesting a dualistic division of academic labor. Inherited from Durkheimian theory, this dualism was underlined in Mauss’ work. For him, the notion of the “cogwheel” (1973), a reference to some kind of mediating psychological mechanism, ensured the coordination of the two spheres of the biological and the social.¹ While Mauss and several others drew attention to the body, it remained silent or absent-present in social thought; either it was marginalized or it was subjected to the reductionist gaze of the biological and medical sciences. Indeed, such a dualism has for long underlined the bipartisan approach of the discipline of anthropology to the being of *anthropos*, with its physical-biological and socio-cultural compartments (Pálsson 2008). This is what Ingold refers to as the “complementary approach,” which aims to “put together the partial accounts of human life obtainable to each of the two planes, of nature and society, to produce a complete ‘biosocial’ picture” (2001: 256). The alternative “obviation approach,” he suggests, would reject the complementarity assumption “not . . . by simply collapsing one side of the dichotomy into the other as in the more extreme forms of socio-biology and social constructivism, but by doing away with the dichotomy itself” (2001: 256–57). Franklin cautions, however, that while it is no longer possible to see the “natural” and the “social” as ontologically different, “the natural facts-social facts distinction may need to be reinvented, rather than discarded, in order to understand the kinds of connections and relations being produced in the context of the new genetics” (2003: 66).

The notion of “biosociality” arrived on the scene in 1992 in an important essay by Rabinow. In his vision, the conceptual division of nature and culture was about to collapse with the new genetics and the mapping of the human genome, eventually completed soon after the turn of the century. Not only was it likely, he suggested, that new group and individual identities would be formed on the basis of new truths generated by the genome project, but the genome itself would be known in such a way that it could be

¹ Mauss’ dualism and its Durkheimian roots were nicely illustrated in his analysis of the spatial and temporal shifts of the “morphology” of Inuit social life (Mauss 1979). During the summer, he argued, the Inuit would follow the game they hunted, more or less on their own, in their biological/individual/psychological mode of existence. In the harsh conditions of the winter, on the other hand, they would congregate in camps, reverting to their social/collective mode. The change of seasons, in other words, continually altered the relative significance of the natural and social spheres of Inuit identity.

changed: “If sociobiology is culture constructed on the basis of a metaphor of nature, then *in biosociality nature will be modeled on culture understood as practice*” (1996: 99; my emphasis). Life itself is increasingly modified and reproduced through artificial means, including cloning, genetic engineering, and synthetic biology.

Developing a similar argument, Rheinberger suggested that the molecular biology developed between 1940 and 1970 not only represented a paradigm shift founded on the notion of information; also gene technology facilitated “the prospects of an intracellular representation of extracellular projects—the potential of ‘rewriting’ life” (2000: 19). For Rheinberger, the key tools of recombinant DNA work are not “sophisticated analytical and electronic machinery” but “macromolecules that work and perform in the wet environment of the cell. . . . The scissors and needles by which the genetic information gets tailored and spliced are enzymes. The carriers by which it is transported into the cells are nucleic acid macromolecules” (2000: 24–25). Indeed, the root meaning of the word biotechnology is living technology, biological artifacts serving human ends (Russell 2004: 1). The traditional dichotomy between “nature” and “culture,” then, no longer makes much sense. Life, in Landecker’s terms (2007), has been “cultured.” Underlining the conflation of the social and the biological, Thacker has recently argued that with biotechnology human bodily material has been turned into machines: “Using the cut-and-splice techniques of genetic engineering, scientists can insert the human gene into the bacterial plasmid, thereby creating an *in vitro* database. As the bacteria replicates, so will the inserted human DNA, making for a kind of biological copy machine” (2005: 17).²

Rabinow seems to have suggested the concept of biosociality partly as a rhetorical device, to challenge the reductionism of the sociobiology popular in the 1980s. Like Rabinow, Lévi-Strauss was concerned by the sociobiologists’ colonization of human life, the neo-Darwinian reduction of social practices and institutions to evolutionary processes of selection, fitness, and the like. Given the enormous theoretical significance he attributed to the nature/culture divide, the key binary opposition in his structuralism, one might not, perhaps, expect Lévi-Strauss to be prepared to go beyond it. Nevertheless, he seems to have sensed the destabilization of the nature/culture divide itself in the wake of the new genetics. When pressed about the implications of genetic discoveries and the extent to which they might “eliminate the distinction between nature and culture,” he responded that the “distinction still maintains its methodological value” in that it “provides a barrier against those

² Knorr-Cetina treats laboratory mice used in the production systems of experimental science as “biological machines.” To her, the notion of the machine can be used as “a master analogy for the ontology of objects” in the experimental system of the laboratory: “The autonomous production units into which organisms are decomposed . . . are *molecular machines*. Other materials in the lab may not function on a molecular level, but they are still used and usable as *biological machines*” (1999: 149).

offensives, such as sociobiology, made by simplistic and limited minds, that would have cultural phenomena reduced to models copied from zoology.” However, he adds an important qualification: “If one day the boundary between nature and culture vanishes, it won’t be along what we refer to today as the interface between human and animal phenomena, i.e., there where certain human characteristics, such as aggression, seem to resemble what is observed in the behavior of other species. *If this change takes place, it will occur elsewhere, involving the most elementary and fundamental mechanisms of life and the most complex human phenomena.* If the boundary is to disappear it will be behind the scenes where partisans of culture and nature are presently debating” (Lévi-Strauss and Eribon 1991: 106, my emphasis).

For a long time, anthropologists have pointed out, drawing upon their ethnographies from non-Western contexts, that the nature/culture opposition is not a universal one. Although the Hageners of Papua New Guinea, Strathern argued (1980), *did* make a distinction between the wild and the domestic, that distinction did not seem to carry the main connotations usually applied to nature/culture discourse, including the idea of natural law and human mastery. More recently, some anthropologists have argued that while dualism may be evident in some non-Western contexts, it may take radically different forms. Thus, Viveiros de Castro (1998) suggests the term “multinaturalism” to capture the essence of Amerindian conceptions, in contrast to the *multiculturalism* of Western cosmologies. Amerindian concepts, Viveiros de Castro suggests, reverse the key axis of modernist thought by setting human culture, not nature, as the universal or the a-priori, assuming that *nature* is differentially constructed by cultural subjects. Perhaps, the Amerindian perspective of multinaturalism testifies to the resonance of many “indigenous” views with the recent notion of biosociality.

EMERGENT BIOSOCIALITIES

Rabinow did not elaborate on the meaning and potential usefulness of the biosociality concept. Whatever his original intentions and motivations, the concept took on a life of its own. While nowadays it has become an established part of the vocabulary of students of the humanities and the social sciences focusing on the new genetics, testifying to some kind of usefulness, different authors are not necessarily operating with identical ideas. For some, biosociality refers to changing notions of identity and belonging in the wake of the new genetics, in particular the ways in which people organize themselves into groups on the basis of emerging evidence on the genetic risk of developing a disease, tracking down relatives and people with a similar predicament, and lobbying for research and possibly the development of drugs or other remedies.³

³ Many people have no interest in risk analysis, refusing to think of their genetic bodies as potentially ticking time bombs. Wexler provides a vivid account (1995) of her family’s battle with

In Thompson's words, "The notion of peoplehood that scholars of medical technologies have coined and begun using is 'biosociality'" (2005: 252). Such forms of biosociality depend on a host of factors—among other things, access to the Internet and local notions of health, medicine, personhood, and expertise. As Rose points out, the kinds of biosociality found in the United States, Europe, and Australia reflect particular conceptions of citizenship and personhood: "Such forms . . . have no visible presence in many geographical regions. AIDS biosociality in sub-Saharan Africa is very different from that of Paris, San Francisco, or London" (2006: 147).

One rapidly expanding form of biosocial identifications is that of routine DNA analyses offered by private companies, partly through the web. In the fall of 2007, the company deCODE genetics launched its project deCODEme. Based in Iceland, the company invites people from anywhere in the world to send a cheek swab for analysis in return for a given fee (deCODEme 2008). On the one hand, it assesses the genetic risk for the person involved for twenty-nine diseases and traits based on current literature; the list, which includes Alzheimer's disease, Multiple sclerosis, Psoriasis, and Lactose intolerance, will expand as new discoveries are made. Consumers are promised updates on their genetic profile as new knowledge becomes available. On the other hand, the DNA of the mouth swabs is being analyzed with respect to ancestry, reconstructing the geography of ancestors back hundreds or even thousands of generations, estimating the extent to which the genome in question is derived from people from Africa, Europe, or Asia. Only a few days after deCODE genetics announced its scheme, another company, based in California, launched a similar project, 23andMe, offering practically the same services for a similar payment (23andMe 2008). Google invested \$3.9 million in the company. Clearly, this is a growing industry, responding to widespread demands for knowledge about risk, genetic relationships, and ancestry, the quest for what has been called "genetic citizenship" (Heath, Rapp, and Taussig 2004).

Hacking, no doubt, is right in suggesting that the notion of biosocial identities has appealed to many students of biotechnology in recent years: "Currently, the genetic imperative—the drive to find biological, but above all genetic, underpinnings for all things human, in sickness or in health, in success or in strife—is fueling fascination with this concept" (2006: 81). Then again, for a

Huntington's disease (an extreme case since it is caused by a single gene), with silence, the refusal to know, and the growing understanding of the genetics of the disease. Written only a few years after the discovery of the double helix, Canetti's play *The Numbered* (1984 [1964]) describes the tyranny of a society in which people do not bear names, only the number of years that they are to live. Some are "low" and others "high," depending on the number of years they have left. The play reflects on the implications of such a predicament, for human responsibility and social relationships. Perhaps it serves to outline some of the existential problems associated with genetic determinism.

growing number of scholars the usefulness of “biosociality” seems much broader, extending far beyond identity and belonging. In their examination of the literature, Gibbon and Novas (2007) both identify the key conceptual arenas where the biosociality concept has gained currency and explore how the concept may be put to work in new ways. While biosociality, they suggest, has often been used in reference to the identity practices already mentioned, it has also been applied both to the reframing of the nature/culture divide and in the context of emergent and unfolding arenas of scientific inquiry. It may be difficult to avoid the dualistic traps of the early language of the biosocial; thus, the twin notion of “biologies” and “socialities” seems to be a tempting alternative. However, the refiguring of life itself, the reality of biosociality, necessarily destabilizes such dualism.

Rheinberger argues that with molecular biology and gene technology we have become “aware that we live in a world of hybrids for the characterization of which we run short of categories” (2000: 29). I suspect that to many people the category of biosociality, along with several others, has served exactly that purpose, of capturing some of the hybrids of modern biotechnology. Indeed, reflecting on his concept fifteen years after its launching, Rabinow suggests: “the question was: how had sociality changed given the rise of the new understandings of genetics? Thus, the term biosociality was coined as an initial attempt at *framing the issue of re-problematization of ‘life’*” (2007: 188; my emphasis).

It seems pertinent to speak of biosocial relations of production to capture the biosocialities involved, the different materialities and hierarchies of the political economy of the fragmented body. As we will see, a somewhat similar idea is captured in the notion of “human animal relations of production” developed by Tapper (1998) and Haraway’s idea (2008) of the creation of “encounter value” when “making companions.” The point, of course, is not to construct a tidy and rigid classificatory scheme, but to facilitate sensitivity to differences and similarities.⁴ Such sensitivity, I suggest, is essential for “thick” descriptions of the new forms of life discussed here and, by extension, for informed biopolitics and governance. What, then, should the reference to biosocial relations of production be taken to mean and how might it be applied to bodies and their disembedded products?

⁴ The notion of relations of production, it may be noted, has been applied with somewhat similar aims in radically different contexts, for instance that of textual studies and translation theory. Thus, Lefevere and Bassnett emphasize the relation of power between source (original text) and receptor (translation): “although idealistically translation may be perceived as a perfect marriage between two different (con)texts, . . . in practice translation takes place on a vertical axis rather than a horizontal one. In other words, either the translator regards the task at hand as rising to the level of the source text and its author or . . . the translator regards the target culture as greater and effectively colonizes the source text” (1990: 11).

PRODUCING BODIES

Marxian theory is very much an agrarian discourse extended to industrial, capitalist production. Underlining human dependence on the environment (usually the land) through the production process, Marx suggested that nature and humans formed a single “body”: “The life of the species, both in man and in animals, consists physically in the fact that man (like the animal) lives on inorganic nature; and the more universal man (or the animal) is, the more universal is the sphere of inorganic nature on which he lives” (Marx 1959: 275). In Marx’s view, during the period of agriculture the land was “still recognized as a phenomenon of nature independent of man—not yet as capital, i.e., as an aspect of labor itself. Nature appears rather as an aspect of the land” (ibid.: 292). With the introduction of capitalism, nature was redefined as the expanding space for alienated labor, as an “aspect of labor itself.” As Schmidt puts it in *The Concept of Nature in Marx*, in agricultural production nature is “absolutely independent of men, men are abstractly identical with nature. They lapse, so to speak, into natural existence. However, where men succeed in universally mastering nature technically, economically and scientifically by transforming it into a world of machines, nature congeals into an abstract in-itself external to men” (Schmidt 1973: 82).

Marx and several other commentators on the British “Factory system” discussed the key changes introduced by the mechanization of Victorian industries by means of prosthetic metaphors, in terms of relations between parts and wholes, organs and machines. In large-scale industrial production, Marx emphasized in *Capital*, each person was “bound hand and foot for life to a single specialized operation,” a labor process that converted the worker into “a living appendage of the machine” (1976: 614). While responses varied—some being paranoid and others enthusiastic—different commentators addressed fundamental questions about identities, priorities, and hierarchies: “As prostheses are grafted upon yet other prostheses, which entity takes the role of attachment and which of host? In these hybrid couplings, what is actually a part of what?” (Ketabgian 1997: 13).

What happens, then, when human mastery is turned inwards, extended to the bodies of the laborers themselves? Do they, perhaps, “lapse” once again into natural existence? Prior to the development of biotechnology and assisted reproduction, there was no place for human body parts in the Marxian scheme of the labor process although Marx did have something to say about *whole* bodies, estranged workers, and slaves in particular. Thus, Marx refers to “nature” as “inorganic body; that is to say nature, *excluding the human body itself*” (1959: 126–27; my emphasis). Given Marx’s framework, the dual identity of the human body as a laboring phenomenon and as an object of laboring activities is a contradiction in terms. While the extension of human mastery to the body itself complicates the Marxian scheme, it also

invites intriguing questions about labor, production, and ethics. As Dickinson emphasizes, “Modern biotechnology muddies the clear distinction between things external to our bodily selves and those intrinsic to us. . . . The notion of ‘external’ is problematized and problematic in modern bioethics and biolaw, and with that come difficulties that Marx did not have to confront about what is alienable and what is inalienable from the subject” (2007: 29). Clearly, with modern biotechnology the “natural” capacities of the body have been turned into instruments for production, redefining both human labor and human bodies.

When discussing the production and reproduction of body parts, it is essential, of course, to pay attention to differences in the material in question. The “candidacy,” in Appadurai’s sense (1986), of genes, cells, tissue, organs, and embryos for extraction, reproduction, commodification, and exchange is highly variable—depending on material properties, technologies of extraction, storage facilities, reproductive opportunities, and the cultural framing of human bodies—although candidacy has been extended to practically anything living. As a result, body parts bring “donors” and “targets”—persons and laboratories, people and markets, agencies and consumers—into different kinds of relations that ethnographers and theoreticians are busily exploring these days. Brief examples will have to suffice in this context. The general point to make is that extending the notion of relations of production to body parts—to the extraction, reproduction, and exchange of bodily material—may help to characterize the different arrangements involved in the production of biocapital, with their practices of ownership, relations of hierarchy, subjectivities, and sense of personhood and identity.

Human blood, to take one example, is routinely assembled and banked, for a variety of practical purposes, usually on a voluntary basis, within the framework of the gift. The Maussian gift, as Dickinson puts it, “is still in a sense alive—far more so than even [Mauss] . . . might have realised, in the case of biological tissue” (2007: 21; see also Schneider 2003). Some human biological gifts are considered “abandoned waste” (see, for instance, Waldby and Mitchell 2006: 85); human tissue samples are habitually extracted at hospitals for diagnostic testing and for material documentation of surgery.⁵ “Donors” are usually understood to have freely relinquished their samples, with or without informed consent, on the assumption that such tissue is of no practical use. New theoretical frameworks and advancing technology, however, may turn such “trivia” into gold mines.

Most extracted human biological material is neither waste nor a gift. Human reproductive material, in particular, is usually highly controversial, involving

⁵ One example is the Icelandic Human Tissue Collection (often referred to as the “Dungal Collection,” after the physician who launched it) that has routinely assembled tissue in Icelandic hospitals since 1934, for the purpose of materially documenting operations.

contested concepts, schemes, and relations. Thompson suggests that a move beyond production characterizes reproduction centered around the human embryo, a mode of reproduction that “has its own characteristic systems of exchange and value, notions of the life course, epistemic norms, hegemonic political forms, security, and hierarchies and definitions of commodities and personhood” (2005: 248).⁶ The practice of “surrogate” motherhood has received a fair amount of attention in both the media and academic works, partly because of the complications it invites for legal definitions of parentage and motherhood. To underscore the human labor and biosocial relations involved, Dickenson (2007: 54) applies the notion of “biological lumpenproletariat” (originally coined by Dorothy Nelkin in another context) to women who rent out their wombs.

While in a sense sperm and ova, the key resources for assisted reproduction, represent identical components, each of them contributing essential genetic material, in practice they seem to represent radically different regimes of bodily commodification. A recent study, for instance, of egg agencies and sperm banks in the United States shows how “the dynamic interplay between biological, economic, cultural, and structural factors differentiates the market in egg from that in sperm in each stage of the donation process” (Almeling 2007: 336). In particular, distinct contracts are applied to egg and sperm donations with different kinds of rewards and etiquettes and different concerns for privacy. Overall, there is a mounting demand for human ova in biomedicine. This is due to both the growth in assisted reproduction in many contexts and the escalating demand for ova available for enucleation in the rapidly advancing stem cell industry. Thus, Hwang Woo Suk is reported to have used no less than 2,200 eggs from 129 women for his infamous stem cells project (see Gottweis and Triendl 2006). The shortage of ova is exacerbated by the fact that harvesting requires invasive surgery. Women’s contributions not only invite a series of complications, including the risk of ovarian hyperstimulation syndrome, they are labor-intensive, productive work, not “merely” reproductive labor. As Dickenson argues, battling with the patriarchal position of Marx who tended to treat women’s domestic work as purely natural, not social, following an ancient, philosophical tradition: “It takes a great deal of intentionality and control to undergo the threefold processes of ova donation; of course it is labour, and hard labour at that. Women have a genuine Lockean property in the labour of ova extraction. . .” (2007: 68).

⁶ In his discussion of the repair of diseased sites in the body through transplanted, self-generating tissue, Thacker uses similar terms: “When looked at as a mode of production, regenerative medicine relies a great deal on the ability to define biology in relation to techniques for working on biology and in relation to the economic valuation of such techniques. In this sense, we might describe regenerative medicine not as a mode of industrial production or as a mode of information, but as a *mode of regeneration*” (Thacker 2005: 299).

The market for human body parts is increasingly a global one (Scheper-Hughes 2000). Both so-called reproductive tourism and international trafficking in organs point to a North-South division of labor, the people in the South generally offering cheap sources for the rest—as biological lumpenproletariat. Gibbon and Novas argue that a “pressing issue for sociological and anthropological analysis is whose bodies are open to genetic and molecular remedies,” pointing out that in some contexts (in India, for example) there is “great disparity over the social position of those whose bodies’ embryos, cells and tissue are extracted, in contrast to the persons into whom they are inserted” (2007: 13). Clearly, the North-South division underlines particular kinds of biosocial relations of production.

The human body, it needs to be emphasized, is not only being refashioned through the fragmenting, reshuffling, and hierarchies that characterize the bio-social relations of production discussed here. Taking a broader perspective, it is also the object of a rapidly expanding production system—a global body shop, if you like—involving the manufacture and marketing of drugs and food products, including genetically modified food. Here, perhaps, Marx’s later works on the “structures of capital” might be more relevant than his early works on alienation and estrangement. Increasingly, the activities of multinational corporations affect the *environment* from which human bodies receive their energy and nourishment no less than their internal constitution. What Marx would refer to as “man’s metabolism with nature” is saturated by biopower of one form or another. This is one aspect of the New Economy of Late Capitalism, an economy characterized by, among other things, venture capitalists, virtualism, fluctuating markets, Internet technology, knowledge production, and digital trading, with important implications for biopolitics (Fisher and Downey 2006).

ESTRANGEMENT AND SPECIES-BEING

The preceding discussion indicates that the trafficking in body parts is highly gendered, women’s business.⁷ The tide, however, is turning. Dickenson reasons that with the “new enclosures” of the human body as a result of advances in biotechnology “some aspects of objectification which were previously limited to women’s historical experience are now being extended to biologically male bodies as well” (2007: 32). Perhaps this is why there is renewed interest in early-Marxian notions of alienation and estrangement. The prospects of objectification concern everyone.

For Marx, a series of concepts served to highlight the worker’s loss of control and self under the labor conditions of capitalism: estrangement, embodiment,

⁷ Sharp emphasizes that while commodified male virility is clearly an object of desire and reproduction, it has been less carefully problematized than the objectification of the female body (2000: 294). Men, in other words, are almost invisible in the literature.

and externalization (*Entfremdung*, *Verkörperung*, and *Entäusserung*, in German). Given the relations of production involved, the terms of trade associated with private ownership of the means of production, the worker's labor appears as something external to him- or herself, as belonging to someone else: "The external character of labour for the worker appears in the fact that it is not his own, but someone else's, that it does not belong to him, that in it he belongs, not to himself, but to another" (Marx 1959: 274). The external character of labor and the loss of self implies that the end products of laboring activities, the goods embodying a part of the worker, are separated from the person: "The *alienation* of the worker in his product means not only that his labour becomes an object, an *external* existence, but that it exists *outside him*, independently, as something alien to him, and that it becomes a power on its own confronting him" (Marx 1959: 272). Rather than affirming themselves in their work, Marx suggested, workers *deny* themselves, undermining their integrity, agency, and personhood. Human labor, in other words, is being reduced to an "inorganic" condition, much like the labor of the "natural beings" of the agrarian project, including slaves and cattle, usually regarded as appendages of the earth.

To fully understand the implications of the Marxian concept of estrangement and its relevance for the analysis of the current fragmenting and realignment of bodies, it is pertinent to attend to the idea of species-being. For Marx, each species has its own species-being manifested through its engagement with the environment, reflexivity being the key character of *homo sapiens*: "The whole character of a species—its species-character—is contained in the character of its life activity; and free, conscious activity is man's species-character. Life itself appears only as a *means to life*" (Marx 1959: 276). One of the key paragraphs in the *Economic and Philosophical Manuscripts of 1844*, which is worth quoting at some length, elaborates on the idea of "character" by underscoring Marx's pragmatist take on human consciousness and its firm grounding in the "life-activity" of the real world: "It is just in his work upon the objective world . . . that man really proves himself to be a *species-being*. This production is his active species-life. Through this production, nature appears as *his* work and his reality. The object of labour is, therefore, the *objectification of man's species-life*; for he duplicates himself not only, as in consciousness, intellectually, but also actively, in reality, and therefore he sees himself in a world that he has created" (1959: 277).

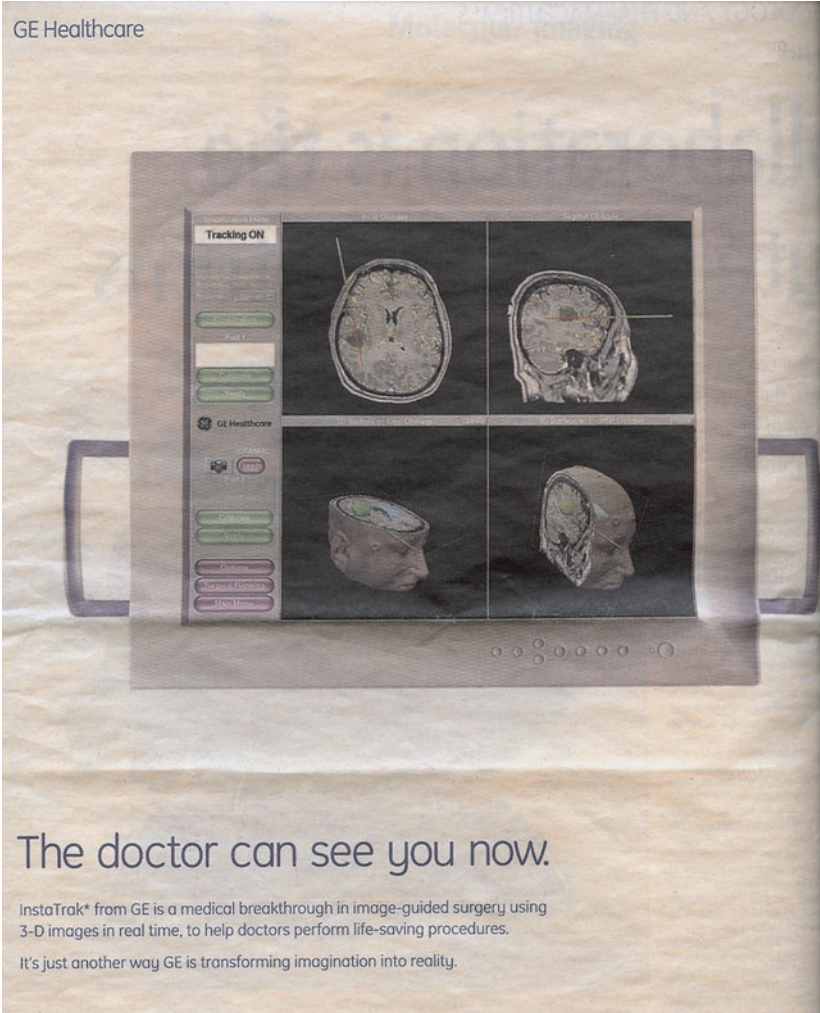
Emphasizing the species boundary and the uniqueness of *Homo sapiens*, Marx's anthropocentrism is rather problematic; modern readers are unlikely to restrict agency to humans the way Marx did. For Marx, however, the contrast with non-human animals was useful in hammering home the central point about estrangement and the associated reshuffling of nature and society under particular conditions of production. "In tearing away from man the object of his production," therefore, Marx went on, "estranged labour tears from him his

species-life, his real objectivity as a member of the species, and transforms his advantage over animals into the disadvantage that his inorganic body, nature, is taken away from him” (1959: 277). It is precisely here, as several authors have pointed out, that early Marx becomes particularly pertinent for analyses of the condition of the biosocial. The estrangements represented by the biotech mode of production—the fragmenting, trafficking, and hybridity of body parts and the biosocial relations in which they are embedded—mirror, up to a point, the objectification and alienation of “species-life” addressed by Marx. As Thacker puts it, “Marx’s species being is transformed into a ‘molecular species being,’ a species being in which labor power is cellular, enzymatic, and genetic” (2005: 40).

The alienation of persons from their body parts, as we have seen, takes many forms, depending on a host of factors. The *bio-graphies* of fragmented bodies, in the literal sense, their life-courses, unfold through the agency of a series of actors and actants, in the Latourian sense, who both constitute and are constituted by particular biosocial relations of production. Thacker suggests that fields such as tissue engineering offer “the prime context in which to investigate the extent to which our own bodies—as biologically constituted—are deployed as actants. . . . The tissues are my own, yet they exist outside of and separate from my body” (2005: 308). Ethnography is of critical importance for charting biomedical practices and accounts, the ways in which people understand the production and exchange of body parts and what this implies for subjectivities. Genes, stem cells, DNA collections, and embryos do not speak for themselves, nor do non-human animals. On the other hand, the producers, custodians, and beneficiaries of body parts often do—blood donors, providers of ova and sperm, surrogate mothers, and (live) donors and recipients of organs. As Lock has shown through her ethnographic work on organ donation, “organs very often represent much more than mere biological body parts; the life with which they are animated is experienced by recipients as personified, an agency that manifests itself in some surprising ways and profoundly influences subjectivity” (2007: 225). Such experiences resonate with the popular idea of a firm union of body and person often underlined in studies of brain scans. A recent advertisement for image-guided brain surgery says it all, “The doctor can see you now” (see Figure 2), presumably with the emphasis on “you”—the self and the person.

It may be tempting to read Marx as an essentialist, assuming preformed character for each species and every organism along the lines of current gene-centrism. While the notion of species-being clearly introduces some kind of biology into political economy, it is a relational notion emphasizing the co-production of the organism and its “inorganic body,” the environment. Marxian theory on this score, therefore, can easily be reconciled with epigenetics and developmental systems theories underlining mutual interactions in the constitution of life (see, for instance, Neumann-Held

GE Healthcare



The doctor can see you now.

InstaTrak* from GE is a medical breakthrough in image-guided surgery using 3-D images in real time, to help doctors perform life-saving procedures. It's just another way GE is transforming imagination into reality.

FIGURE 2 The Union of Body and Person (Source: *The Financial Times*). Reproduced with permission of GE Healthcare.

and Rehmann-Sutter 2006). Had he witnessed the arrival of molecular biology, Marx would probably agree with Strathern (2005: 47) that a description of species-being would be lost in attention to the structure of genetic material.⁸

⁸ In Strathern's words: "A description of an organism is lost in attention to the molecular characteristics of its genome" (2005: 47).

HUMAN-ANIMAL RELATIONS OF PRODUCTION

Non-human animals play an increasing role in the biotech mode of production, mainly in the context of biomedical experiments and the production of organs for human use. How should one typify human-animal relations in this context? While Marx did address the work carried out by animals at several points, some of his characterizations, as already suggested, are likely to sound anthropocentric, narrow, and outdated to many modern readers. Reluctant to allow for the possibility itself, that animals might “produce,” he was at pains to make a radical distinction between humans and animals in this respect: “In creating a *world of objects* by his practical activity, in his *work upon* inorganic nature, man proves himself a conscious species-being. . . . Admittedly animals also produce. They build themselves nests, dwellings, like the bees, beavers, ants, etc. But an animal only produces what it immediately needs for itself or its young. It produces one-sidedly, whilst man produces universally. . . . An animal produces only itself, whilst man reproduces the whole of nature” (1959: 276).

Drawing upon Marx’s critique and at the same time going beyond his anthropocentrism, Haraway’s work *When Species Meet* is a major treatise on many of the issues invited by the biomedical mode of production—the equivalent, perhaps, in the domain of human-animal relations to Marx’s *Capital*, vol. 1 (appropriately, early on Haraway seems to have used the working title of “Bio-capital, vol. 1” for her work). Haraway emphasizes that humans and their “companion species” emerge as “mutually adapted partners in the naturecultures of lively capital” and that it is time to think hard about the “encounter value” generated by such mutual adaptation (2008: 62). This encounter value, she suggests, remains under-analyzed and might be more fruitfully addressed by returning to Marx than by attending to the now fashionable bioethics of animal rights: “The Marx in my soul keeps making me return to the category of labor. . . . My suspicion is that we might nurture responsibility with and for other animals better by plumbing the category of labor more than the category of rights, with its inevitable preoccupation with similarity, analogy, calculation, and honorary membership in the expanded abstraction of the Human” (2008: 73).

There is no good reason, indeed, for excluding the generative powers of animals from the production process. Many foragers present their prey as benefactors engaging in mutual collaboration with humans, in a somewhat Marxian fashion: “Marx could hardly have imagined an Algonquian labor process in which humans and animals successively participate as producers of the other, the animals willingly surrendering the ‘product’ of their own bodies and the hunters returning it to them as cooked food, all figured in the idiom of ‘love.’ But his reflections on an authentically social labour process are evocative of the benefactive model of Cree-animal relationships” (Brightman 1993: 188). In fact, the Marxian approach to human production systems

has sometimes been applied in an extended sense to “human-animal relations of production.” Such an approach was developed by Tapper (1988) to illuminate both the different ways in which animality and humanity are socially constructed and the different hierarchies involved in human-animal production systems: “A Marxian classification of social and economic systems by *mode of production* is not apposite, since its central component, comprising *human social relations of production*, does not take account of relations of production between humans and animals. . . . More useful . . . is to cast a Marxian frame around the classic typology of production systems, which *are* characterized by specific human-animal relations of production. These systems are hunting and gathering, pastoralism, agriculture and urban-industrial production” (Tapper 1988: 52).

Tapper’s comparison of these systems emphasizes that hunter-gatherers, unlike most other producers, typically live in complementary relations with the other animal species in their environment, often describing exchanges with them in terms of an ethos of reciprocal, cooperative exchanges (see, for instance, Bird-David 2008, on the Nayaka notion of “living together”). Sometimes, hunters tame particular animals (such as reindeer), taking individual animals out of their natural species community to provide labor for humans and treating them as slaves. In such “ancient” systems of production, which also characterize cultivators who use draught animals, the reproduction of the animals is under the control of their human masters. Among pastoralists, in contrast, production is based on animals that are not tamed but are herded in communities; while the herds are monitored and managed by their human masters, the relationship is “like a contract or transaction in which the masters ‘protect’ the herds in return for a ‘rent.’ This resembles the Marxian conception of feudal relations between lord and serfs” (Tapper 1988: 53). In the modern form of pastoralism, in ranching, to provide one more contrast, animals are herded in large numbers with no personal relations with the owner of the ranch: “These seem . . . to be typical—paradoxically for a modern offshoot of capitalism—of Asiatic-Oriental relations of production. Indeed, the cattle ‘barons’ of the Texas ranges should perhaps be termed ‘sultans’—or ‘moguls,’ like their oil-rich successors” (ibid.). Finally, in urban-industrial society, in battery- or factory-farming, animals are reduced to machines and exploited along classic capitalist lines. Such an approach highlights the hierarchies of human-animal production systems, using a variety of terms—reciprocity, cooperation, slavery, contract, protection, and exploitation—that focus on one or more aspects of the system: the human producer, the animal, and the relation involved.

An extension of Tapper’s original thesis beyond its “natural” production domain to that of cross-species projects in biomedicine and biotechnology seems pertinent. Not only are xenotransplantations routine operations, with humans on the receiving end for organ transplants, human genes are nowadays increasingly introduced into alien bodies, in particular pigs, for the purpose of

studying the onset and development of “human” diseases. One example is the “Alzheimer’s pigs” of Figure 1. While laboratory animals are subservient to humans in both xenotransplantation and gene transfer, these two contexts position pigs in radically different kinds of biosocial relations to humans. In the former they are raised to produce “spare parts” to be inserted into human bodies for repair (Papagaroufali 1996), while in the latter their bodies operate as both surrogates for human body parts and living laboratories for exploring malfunctioning human bodies. Presumably, the former are manufactured on a rather large scale, by some kind of “sultans” or “barons,” while the latter are produced and raised in small numbers with greater attention to individuality, care, and detail. At any rate, while the animals employed by biomedical laboratories may produce “one-sidedly,” for a specific *human* purpose, they hardly do so in the Marxian sense of producing only themselves.

With advances in functional genomics, cross-species research has reached new levels, manufacturing animals that serve as substitutes for human experimentation, testing the limits of anthropocentrism and posing engaging questions about liminality and ethics (Squier 2004). As Hoeyer and Koch point out (2006: 387), cross-species research in genetics “erodes” the distinction between humanity and animality, challenging the notion of unique human worth, one of the fundamental notions of bioethics frequently introduced in debates on research and experiments involving human embryos. Here, as elsewhere, it may be essential to relax or destabilize some of the ethnocentric assumptions of the grand narratives of Western biology and bioethics. Drawing upon her ethnography from a Papua New Guinean context, Bamford argues, “If ‘crossing’ species boundaries is threatening to the social order of the West, for Kamea, by contrast, it is constitutive of it” (2007: 27).

CONCLUDING REMARKS: THE MOTHER-COUNTRY OF BIOCAPITAL

At one point Marx speculated on the production zone most likely to generate dynamic economic developments, comparing the tropics and temperate regions: “A too prodigal nature,” he suggested, “fails to make man’s own development a nature-imposed necessity. It is not the tropics with their luxuriant vegetation, but the temperate zone, that is the mother-country of capital” (1976: 513). The “mother-country” of modern biocapital, of course, is nothing less than life itself. Such a notion, in fact, is more pertinent than Marx could possibly have anticipated, given the central importance of the human body in modern bioindustries, the relative role of life, in contrast to the dead labor of machines. Thus, Thacker suggests that “Marx’s distinction between living labor and dead labor be taken quite literally. Living labor in the biotech industry is, quite simply, ‘life itself’” (2005: 182).⁹

⁹ Dickinson’s notion of the “feminized body” underlines the same point, emphasizing the reproductive labor of women in research and development involving ova and stem cells: “Everyone has a

I have suggested, partly with reference to the early writings of Marx, that it may be useful to speak of biosocial relations of production to capture the biosocialities of modern bioindustries and science, to facilitate sensitivity to differences and similarities in hierarchies involving the reproduction and exchange of bodies and body parts. My discussion has sought to outline in fairly general terms an important territory for further theoretical exploration and empirical description, drawing upon the insights of several scholars representing several disciplines. At this stage, some qualifications are needed. For one thing, the Marxian notion of labor may be extended too far in some of the recent works experimenting with Marxissant vocabulary. Thacker argues that “Marx’s conditions of labor power have been rewritten by the biotech industry”; now, he suggests, it is not “the human worker, who views his or her labor power as property to sell, exchange, and circulate” but “a nonhuman biological network of cell lines, tissue cultures, and genomic databases. Labor is not, then, real-time labor of the physical body; instead it is the archival labor of cell cultures, databases, and plasmic libraries” (2005: 300). Clearly, cell cultures, databases, and plasmic libraries do valuable work, but to see such work as “labor” seems to presuppose consciousness of a relationship to that which is being produced, given Marxian theory (see, for instance, Arendt 1958: 96–101), which is hardly the case for biosocial assemblies of this kind. Perhaps it makes sense in some contexts to speak of “production” rather than “labor.”

On a related score, the issue of alienation and estrangement needs to be theorized and explored more closely in the context of biotechnology, given the different mediations and circulations of bodily material in the biosocial process of production. While the extension of such notions, I suggest, to the extraction of some bodily material (organs, for instance) is obviously illuminating, with increased distance from the production site (in the case of tissues, cell lines, and databases, for instance) claims about alienation and estrangement become progressively less persuasive (Lock and Nguyen 2009: ch. 8). Arguably, moreover, the biosocial relations of production sometimes *render* a “thing” as “mine” that was not property in the first place, resulting in a subjective feeling of alienation and estrangement. This seems to hold, for example, for the collection of cell lines from “indigenous” communities, sometimes resulting in charges of biopiracy. Some scholars have theorized, one may add, that with the New Economy “we may be witnessing the end of property in the person, that is, the end of modern notions of personhood” (Adkins 2005: 126). Such an argument seems to have important implications for the understanding of a number of aspects pertaining to the kinds of biosocial relations

‘female’ body now, or, more properly, a feminised body: while men do not have bodies that are biologically female, both male and female bodies are now subject to the objectification that was previously largely confined to women’s experience” (2007: 8).

discussed here, including those of the concept of labor, gender identities, and notions of alienation and estrangement. If it no longer makes sense to speak of property in the person, does it make sense to speak of the alienation and estrangement of body parts?

A further qualification relates to the temporality of biotechnology. Focusing on the industrializing of organisms, the evolutionary history developed by Russell and some others emphasizes the similarities of biotechnologies and workers in factories; some biological artifacts manufactured to serve human ends are “macrobiotechnologies” (whole organisms, such as traditional breeding of animals) and some are “microbiotechnologies” (cells and molecules), but their capacity to work, Russell suggests, much like that of the human laborer, is always limited by particular lively properties and particular biographies (2004: 9). While this is an interesting and potentially useful perspective, it obscures an important aspect of certain kinds of biotechnologies. As Landecker emphasizes (2007: 11), the development of laboratory tissue culture implies *regulating* cellular time, manipulating biographies: “Cells freed from the bounds of the body are also freed from the limits of the originating organism’s lifespan.”

Finally, the juxtaposition of human and animal production systems should not blind one to important differences between such systems. For one thing, human-human hierarchies are usually more unstable and shifting than those involving humans and animals. Sometimes slaveholders lose their wealth and become enslaved and, likewise, a slave sometimes becomes the master of an interpersonal regime with a dramatic shift in power relations. This is what Davis refers to as the “problem of slavery” arising from the humanness of the slave: “This interchangeability of power and status is one of the characteristics that differentiates the oppression of human slaves from the oppression of animals” (2001: 135, n. 9).

Inevitably, the acceleration of human intervention into the genome has contributed to the destabilization of essences and identities. Anticipating some of the emergent aspects of the post-modern body—of biosocial relations, fleeting subjectivities, and hybrid cyborgs—such issues have, somewhat surprisingly, gained a second life. With the development of the biotech mode of production, humans have found themselves implicated in a new kind of biosocial network, an interactive “web of life,” in Darwin’s terms. Thus, reproductive technology, genetic engineering, and regenerative medicine have revolutionized our capacity to analyze and reproduce bodily material, raising new and fundamental questions as to what constitutes “life,” “nature,” the “human,” and “animal.”

Given the spectacular advances in travels in outer space over the last fifty years or so following the launching of Sputnik, it is quite conceivable that in the future life will be “edited” for outer space, inviting new kinds of citizenship and new kinds of hybrids of technologies and organisms, new kinds of celestial bodies (Pálsson 2009). In fact, many scholars have drawn attention to parallel imageries relating to the celestial world and human fetuses: “Planets,

supernovas, and galaxies have been showing up alongside fetuses, embryos, and blastocysts during the past twenty-five years, and their visualization occasions comparable journalistic indulgences and epistemic quandaries” (Michaels 1999: 125). While such issues have for long been relegated to fiction (for recent examples, see Moseley 2002; and Crichton 2006), now they are very much on the academic agenda. As Rabinow argues, the contemporary needs systematic theoretical reflection and ethnographic documentation: “The *logos* of *bios* is currently in the process of rapid transformation. A central question before us today therefore is: given a changing biology, what *logos* is appropriate for *anthropos*? And how should that *logos* be practiced so as to increase our capacities without intensifying the myriad relations of brutalization that are so pervasive unto our times?” (2008: 14).

Decades ago, Bennett suggested that the concept of “human ecology” was a myth; due to the “growing absorption of the physical environment into the cognitively defined world of human events and actions,” he reasoned, “there is (or shortly will be) only, and simply, Human Society: people and their wants, and the means of satisfying them” (1976: 4). The recent development of biotechnology and the industrializing of organisms make such a statement even more pertinent than before. Not only is the “physical environment” increasingly rendered as human construction, life itself is a biosocial artifact. The mother country of biocapital, as we have seen, is characterized by the manufacture of many kinds of “natures” involving a variety of bodily exchanges among humans and between humans and other animals. Several social theorists have argued for a constitutive model of the “person,” underlining that individuality necessarily presupposes involvement in social relations. For Marx, for instance, the individual is “an ensemble of social relations” (Marx and Engels 1970: 122). Likewise, drawing upon Melanesian ethnography, Strathern has theorized the notion of the “dividual” person, an aggregate of networks and relations (1996). Perhaps it makes sense to talk about the modern person as an ensemble of *biosocial* relations.

It would be too idealistic, however, to say that humans, at last, are mastering nature; this would mean lapsing into the modernist framework that seems to have more or less crumbled under the pressures of biosociality. Surely, however, life itself is being intentionally refashioned, possibly relegating evolution to the back seat. This turn of events not only suggests revised division of academic labor, post-disciplinary collaboration across the now-suspect nature-society divide; it also demands new kinds of concepts, politics, and ethics. For a growing number of scholars, the notion of biosociality captures these developments, undermining early dualistic notions of the bio-social. The task remains to systematically chart the bewildering complexity of relations, hybrids, and hierarchies in the making with modern biotechnology, to explore how they are understood by the agents involved, and to unpack what they might mean in the broadest sense for both contemporary and future biosocial life.

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