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Investigating Emerging Biomedical Practices: Zones of Awkward Engagement on Different Scales

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Abstract

This special issue of *Science, Technology, & Human Values* critically explores a new stage in which the life sciences and biomedical practices have entered. This new stage is marked by postgenomic developments and an increased interest of life sciences in the everyday lives of people outside laboratories and clinical settings. Furthermore, particular attention is given to many chronic and degenerative disorders such as cardiovascular disease, Alzheimer's disease, or developmental disorders. These developments coincide—or have become entangled—with a new set of interests that an anthropologically inclined science and technology studies (STS) is bringing to the analyses of biomedical practices. An increased interest is observed in the anthropologically inclined STS in studying phenomena on different

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scales and in exploring fields that are not readily dominated by technoscientific rationality in practice. The introduction to the special issue examines briefly these developments and situates them in a broader genealogy of different movements that have taken place in the anthropologically inclined subfield of STS since the late 1970s and early 1980s.

Keywords
epistemology, methodologies, methods, academic disciplines and traditions, other

Analyzing Anthropology, Science and Technology Studies (STS), and Emerging Biomedical Practices: From Science as Practice to Zones of Awkward Engagement

In 1929, Ludwik Fleck wrote: "There are cultures, as for example the Chinese culture, which in important fields, such as medicine, arrived at quite different realities from those of us Westerners. Shall we punish them for this with pity? They have had a different history, different aspirations and demands that are decisive for their cognition." This statement is symptomatic for his way of working and remarkable in many ways. That Fleck essentially expounds a constructivist position at a time when the logical positivism of the Vienna Circle is the dominant style of thinking about science and medicine, has received much attention from historians and philosophers of science, and need not receive further attention in this context (see, e.g, Löwy 1988; Hacking 1999; Hess 1997). The anthropological nature of Fleck's *mode of inquiry*, however, has received less attention. We use the term "mode of inquiry" to distinguish it from research method. Methodically, Fleck is in many ways much closer to sociology, history, or psychology than to anthropology. His notions of "denkhistorisch," "denkpsychologisch," and "denksozial," which programmatically detail his investigative routes into thought styles, are rooted in the writings of Ludwig Gumplowicz and Franz W. Jerusalem. Yet his analyses are carried out in a mode of inquiry that bears anthropological marks in at least three respects:

(1) Throughout his work, he draws heavily on comparative analyses—between cultures, between practices, and between thought styles.
(2) Developing his concept of epistemology as an inherently social process against the dominant psychologistic and normative

approaches of his time, Fleck does not restrict his analyses to established sociological categories of structure but rather adds a practice-oriented perspective with considerable historical and cosmological depth (Herzfeld 1987; Sahlins 1996).

(3) As a medical practitioner and immune biologist, Fleck himself operated as a para-ethnographer (Marcus 2008) able to reflect his own patterns of practice to an unusual degree.

The special issue "Investigating Emerging Biomedical Practices: Zones of Awkward Engagement on Different Scales" brings together articles that follow in a similar vein. At one level, their respective inquiries may be read as historical or sociological. At another level, however, they go beyond disciplinary inquiry and bring to bear a specific sensitivity toward *practices* and toward practices and concepts in their *manifold contexts*. This appreciation of the work of knowledge practices in multiple contexts can be felt more in the style of analysis and writing than in methodology. It becomes tangible in a specific kind of involvement in the case in hand that stems predominantly from the back and forth between, on one hand, committed, local, and intimate analysis with a significant degree of excitement for the scientific developments observed; and, on the other hand, theoretical work always with an appreciation of the contingency of practices in the field and "at home" thinking and writing (cf. Geertz 1973).

The special issue brings together six different critical analyses about the post-genomics of Alzheimer's disease (Lock), the epigenetic framing of developmental deviance (Rapp), the neuroscientific narratives about the "social brain" (Young), the heterogeneous engineering of cardiovascular disease and prevention (Niewöhner et al.), the ordering of realities of life and death in dementia care (Moser), and the politics of global health in vaccine development (Stephenson). Most of the contributors of this special issue happen to have a background in anthropology. Yet, we have emphasized in the opening paragraph anthropology as a mode of inquiry rather than a discipline, because our argument and purpose is not disciplinary in any simple sense—or at least this is not our intention. We are not interested in pitching anthropology against sociology or history of science. While STS has witnessed many of these openly disciplinary debates and often benefited from them (e.g., Daston 2009; Martin 1998; Layne 1998), we take a different direction.

This collective edition has gathered articles dealing with life scientific research and biomedical practices in a broad sense. They all pick up on issues that involve practices on different *scales*. The practices under

investigation do no longer attend only to the somatic or the molecular. They are increasingly concerned with the understanding and modeling of processes that unfold on different levels of analysis (Anderson 1998): organismic, environmental, and social. They increasingly express an active interest in the everyday lives of people outside laboratories and clinical settings. They are producing "embedded" rather than molecular bodies (Niewöhner et al., this issue) and they are fostering a multiple politics of life itself (Raman and Tutton 2009) with manifold consequences for life *as such* (Fassin 2009).

We argue that STS in its anthropological mode of inquiry is only beginning to respond in a concerted fashion to these developments. In many ways, of course, the analysis of the entanglements of knowledge practices on multiple scales has long been advocated by those who understand science as culture (Martin 1998). So while the contributions to this special issue point to significantly different entanglements, we nevertheless want to situate them within this intellectual tradition rooted in the borderlands of anthropology, science studies, and the history of science—altogether heavily influenced by feminism. In order to do so, we briefly sketch four movements that have occurred in these borderlands and that have contributed significantly to the current mode of concerning ourselves with life scientific and biomedical practices. We ask our readers to understand these movements as a way of situating and introducing this collective publication rather than as a genealogical attempt at a periodization of STS.

The First Movement: Ethnographies of Research Spaces and Science as Practice

The first movement in an anthropologically inclined STS covers the late 1970s and early 1980s. A Mertonian sociology of science is still present, when Knorr-Cetina, Latour, Traweek, and others begin to enter physics and biology research centers—the sanctuaries of natural science (Knorr-Cetina 1981; Latour and Woolgar 1986; Traweek 1988). It is clear by then that knowledge itself, that is, the product of science, as well as knowledge making need to become objects of social inquiry and that analyses must not remain restricted to institutional structure. Yet, scientific knowledge and its associated spaces of knowledge production are certainly still "other" to social inquiry. It is thus perhaps not surprising that anthropologically inclined inquisitors are first to venture into the new territory to return with exciting stories of unknown worlds. The ethnographic method enables STS research to gather the empirical material and the insight needed to

demonstrate just how knowledge practices are social practices in relevant ways. The investigation of scientists as a community like any other (Traweek 1988) helps to focus attention on the folds and crevices of science in action.

While these early ethnographic investigations of research spaces go far beyond mere fact-finding missions, it is significant that the investigators set out to the heartlands of natural science: for example, particle and high-energy physics and molecular biology. Of further significance, the increasing challenges to the integrity of science as an institution in the 1950s and 1960s triggered not only a passionate plea for science's independence (Feyerabend 1976; Polanyi 1962); it also raised the need to better understand how science operates, how it conducts its everyday business, and how this affects its output: knowledge. Where better to conduct such investigations than right at the epicenter of scientific inquiry? In this first movement, the focus is firmly on the modus operandi of science itself, rather than on its multiple interactions and exchange processes with other communities, practices, and concepts.

The Second Movement: Bodies, Technologies, and Science as Material-Semiotic Practice

The mid-1980s and 1990s witness a second movement in anthropologically inclined STS: the transformation of molecular biology into big science (e.g., Rabinow 1999) and the arrival of the first relevant inklings of *technoscience* in clinical settings (Star 1995; Casper and Berg 1995). Both, the industrialization of biological research and the increasing biologization of medicine, corresponds with a shift in STS toward an increasing interest in materiality, namely, in the form of the human body itself as well as technology. This is not the space to detail this development or situate it in its wider context. Suffice to outline three important strands that fuel this transformation in the problematizations STS brings to the life sciences: (1) Critical medical anthropology emerges as a field of work at the intersections of anthropology, STS, and medical sociology initially through a critique of too narrow a concept of medicalization (Lock 1982; Young 1980). This line of work quickly extends its scope and toward the late 1980s uses exactly the fruitful engagement between STS and anthropology to bring (back and) to the fore the material dimension of the human body (Lock and Scheper-Hughes 1987). (2) This line of inquiry supports a broader shift that drives the constructivist feminist critique of the 1980s into a new phase of analyzing material-semiotic practices (cf. Haraway 1989, 1991, 1997). (3) Away from questions of body, embodiment and difference and derived from a different

line of thinking altogether, technology also receives renewed attention as an important actant in processes of knowledge production (Callon and Latour 1992; Latour 1996; Law 1992).

This new movement in the study of the life sciences enables an escape from the shortfalls of social constructivist critique. The early ethnographies of research spaces had acted as a proof of principle that science and scientific knowledge could be meaningfully understood in terms and as results of social practices. While this *Entzauberung* of the sciences prepared the ground for the science wars to come, scholars at the intersection of STS and anthropology had moved on already and opened up two agendas in line with the new interest in materiality: (1) Research in laboratories and research spaces moved to a higher resolution trying to better understand the destabilizing forces in particular fields of work in their manifold dimensions, for example, cancer biology (Haraway 1993). The extraordinary capacity of science to configure and order epistemic spaces attracted many scholars (e.g., Lindenbaum and Lock 1993; Martin 1994; Rabinow 1992). (2) These ordering capacities began to have very tangible consequences in clinical and other fields of applied biomedical work. In a second focus, STS thus began to analyze the fate of scientific, that is, biomedical knowledge outside of the protective confines of the laboratory. Processes of translation, recontextualizations, and contestation thus moved to the fore in investigations of particular diseases (e.g., Epstein 1995), different clinical contexts (e.g., Hogle 1995), or the role of biomedical knowledge in more remote fields of expertise (e.g., Johnson-McGrath 1995).[1]

The Third Movement: Multisitedness and Science as Culture

Throughout the 1990s and through the turn of the millennium, this early trend manifests and centers particularly on the New Genetics (Franklin 2003). As life scientific research translates into concrete medical applications, that is, predominantly diagnostic technologies, a wider political and economic interest develops that brings bioethics and technology assessment to the scene. STS becomes involved in this new wave of work and contributes its methodological and theoretical expertise to research under the heading of ethical, legal, and social aspects of the life sciences. Yet, intellectually, it has once again moved on (cf. Rabinow 2002). Science has been established as a material-semiotic practice and two further transformations usher in the programmatic of *science as culture* (Martin 1998; Franklin 1995; Franklin 2001)[2].

The first transformation concerns a new quality of relevance of life scientific research findings for specific aspects of social life. The most striking example for this new relevance arises in the field of human genetics. New genetic diagnostic technologies are beginning to challenge notions of individual autonomy, personhood, and identity deeply rooted within Western modern cosmology (e.g., Beck and Niewöhner 2009; Novas and Rose 2000). The combination of diagnostics and engineering capabilities in the field of assisted reproduction develops perhaps the most tangible and far-reaching transformation of actual everyday social practices (Strathern 1995). The multiplication of reproductive processes and choices mediated by biomedical technology challenges established notions of biological and social kinship among modern families (Beck et al. 2007) and installs a new market for biomaterial.

It also raises important questions about the commoditization of biological material and initiates a new field of health and reproductive tourism thus putting pressure on national as well as supranational regulators and legislators to consider their position toward these transformations as well as their options to intervene. Science as culture here refers to the impact of scientific practice on concepts and practices of family life and self-hood perceived to be fundamental to and shared across Western modernity. On a more abstract level, this line of work feeds into the fundamental debate about the ongoing transformation of "nature" and "culture" (Franklin 2003; Rabinow 1992). It is worth noting that this work in anthropologically inclined STS has a profound effect in anthropology itself by producing a wave of new kinship studies—an old topos in anthropology that had been all but forgotten (Beck et al. 2007; Strathern 1995).

In a second, closely related transformation, biology and the life sciences themselves are understood to be *cultured* (Franklin 2001; Martin 1998). This has at least two dimensions: a first, perhaps "thin" meaning of science as culture pertains to the increasingly transnational organization of the life sciences. Molecular biology at the turn of the millennium is done in large consortia that span continents, subdisciplines, and institutions. This kind of multisitedness (Marcus 1995) is not just about quantity and scale in transforming biomedical platforms (cf. Keating 2000). It is also about the different dimensions that are related to these matters of scale (Layne 1998; Cambrosio et al. 2009). And these dimensions have a lot to do with standardization, translation, and comparison—all processes, which are initially infused with a Western cosmology. They are science in their specific cultural context. A second, perhaps "thicker" meaning of science as culture, is delivered by Martin in a 1998 *Science, Technology, & Human Values*

(*ST&HV*) special issue, where she argues that technoscience is not located "where we thought it was but rather is made throughout—bubbles up from many places within historically constituted human culture" (Martin 1998). Martin takes an anthropological reading of the notion of "culture" to argue that science ought to be seen as inseparably entangled with other means of knowledge production across society. Her image of the *string figure* as opposed to the *citadel* does away with any lingering ideas of science as an exceptional mode of knowledge production, as a system of expertise worthy of special treatment and with it all related ideas of public understanding of science or simple notions of one-way translations. Science becomes an integral and inseparable part of modern ordering practices and needs to be analyzed as such:

> Note that I am not attempting to explain science by society asymmetrically. Rather, I am claiming that both "science" and "society" as categories are produced inside the heterogeneous matrix of culture [. . .]. Culture, meaning fundamental understandings and practices involving such terms as the person, action, time, space, work, value, agency, and so on, is produced by a far wider range of processes than those deployed by experts producing science. (Martin 1998, 30)

The praxiographic strand of work, which emerges in the early 2000s at the intersection of ethnography, empirical philosophy, and science and technology studies, takes this anthropological call to its radical conclusion in that it gives up altogether the modern dichotomies that come with science and society to focus on practice (Mol 2002; Mol, Moser, and Pols 2010; Law and Mol 2002). While it places itself at odds with the anthropological reading of practice to some degree, it shares with our second and third movement a careful interest and concern for the role of knowledge, technology, and everyday practice in the multiple enactments of the human body, particularly in medical arenas. It thus forms an important line of work leading into our fourth and last movement.

The Fourth Movement in this Special Issue: Everyday Lives, Different Scales, and Competing Rationalities

This special issue "Investigating Emerging Biomedical Practices: Zones of Awkward Engagement on Different Scales" hopes to capture a fourth movement starting from the notion of science as culture:

> [L]ife is being related, being in relation, and so being connected. Life implies experiencing connection and participation. But it also implies being held in connection, and being made part of, and so sharing in, a collective and the practices that carry it. Life is never self-contained. It is always also carried. This notion of life does not sit easily next to the notion of life in biomedicine and in the somaticizing mode of ordering care. (Moser in this issue)

In this quote from her article "Dementia and the limits to life: Anthropological sensibilities, STS interferences, and possibilities for action in care," Ingunn Moser (in this issue) speaks about being in relation, being connected and sharing as that which makes life *as such* (Fassin 2009)—in contrast to the prevailing biomedical understanding of "life" and life itself. Rose (2007) diagnoses five mutations (molecularization, optimization, subjectivation, somatic expertise, and economies of vitality) that are characteristic of the transformation of *life itself* into a heavily politicized and capitalized field that is not in any relevant sense restricted to the diagnosis and therapy of disease any longer. Fassin juxtaposes life *as such* to life *itself* and argues that the experience of suffering and the related moral principles and controversies are highly important aspects of life politics that governmentality oriented studies of biomedicine fail to grasp (Fassin 2009). Following a similar thread, Moser draws upon fieldwork in a dementia care unit, to explore how different modes of ordering life with dementia coexist and what this implies for patients and caregivers. She critically examines how limits to life and agency are handled and acted upon in relational ways and makes an argument against STS's science centrism.

The emphasis on "being connected" and on "collective practice and life" by Moser brings to our mind a quote by Adele, a healthy woman who comes from an American family where four members have been affected by Alzheimer's Disease, interviewed by Margaret Lock (this issue):

> According to that test, I don't have the risk, okay? So, technically I should feel better. But I don't believe it, given that there are four people in my family with the disease.

This is a lucid example not only of how lived kinship may outweigh the abstract knowledge of a genetic test but also of how notions of kinship and being "at risk" reveal themselves to be heterogeneous and biosocial in everyday practice. This of course—as we know from many studies (e.g., Franklin and Ragoné 1998)—does not mean that kinship relations are not affected by technoscientific and biomedical practices. It implies that

kinship relations and collective practices and lives do not *linearly* or *directly* change under the influence of technoscience and biomedicine but are affected in manifold, heterogeneous, multiple, and uncertain or unpredictable ways. The article "Dementia entanglements in a postgenomic era" by Margaret Lock documents on one hand a series of developments around the Apo E4 allele, which has been associated in some studies with increased risk of Alzheimer's Disease. On the other hand, she interprets interview extracts by healthy people who come from families where one or more members have been affected by Alzheimer disease and have been genetically screened in the context of a broader study. Lock explores some of the problems that emerge when attempting to deal with a disease by promoting the use of individual genetic testing and investigates the discontinuity between what can be seen as scientific and popular understandings of risk.

The articles "Chasing science: Children's brains, scientific inquiries, family labors" by Rayna Rapp (in this issue) and "Cardiovascular disease and obesity prevention in Germany: An investigation into heterogeneous engineering" by Jörg Niewöhner, Martin Döring, Michalis Kontopodis, Jeannette Madarász, and Christoph Heintze (in this issue) follow a similar thread. Rapp studies on one hand the laboratory practices of two scientific groups: neuroscientists who scan children's brains in search of resting state differences according to diagnosis and psychiatric epidemiologists who look to epigenetics to distinguish differential diagnostic populations. On the other hand, she explores the harmonies and discordances between what researchers and parents understand to be at the root of children's learning and social capacities in the United States.

Niewöhner et al. investigate the heterogeneous engineering of cardiovascular disease and prevention in contemporary Germany with its long history marked by ruptures and discontinuities. The authors move across various settings, labs, clinics, primary care, and kindergartens to trace in a similar way to Moser, Lock, and Rapp the *différance* (Law 2004; Law and Mol 2002) that reveals itself when shifting from studying everyday practices in the lab into studying everyday practices in other settings or spaces—and especially when paying attention to the connections or ruptures among scientific and other material and semiotic orderings.

The volume proceeds by Allan Young's epistemological analysis of recent developments in the neurosciences. His article "Self, brain, microbe and the vanishing commissar" critically reviews recent scholarship, which concentrates on connecting consciousness to neural networks. Young refers to a series of epistemological shortcomings of two approaches: the recently "discovered" human mirror neuron system as well as the influential

philosopher Daniel Dennett's account of brain and consciousness and argues that both approaches fall short. While the author moves from the micro level of the organic to the macro level of Stalinist politics in a highly metaphoric account about visibility and invisibility, the toing and froing between different analytical scales—rather than between social spaces—introduces an important new element that is central for the whole special issue.

Following this movement between different analytical scales, the special issue closes with Niamh Stephenson's article "Emerging infectious disease/emerging forms of biological sovereignty." Stephenson focuses on a very specific case—that of the Indonesian withdrawal from the WHO's virus sharing mechanism—to study broader crises and transformations of the field of global health and their entanglements with market economies. Stephenson analyses new forms of (health) regulation across different scales of existence, from the molecular to the global and argues that "postliberal global health security aggregates" are by no means solidified, unchangeable, closed systems.

All articles in this issue illustrate that the life sciences and biomedicine in many areas begin to work across different levels of analysis and on different scales. They challenge established fields that have not so far been dominated by technoscientific rationality—and that will not readily yield to some hegemonic attempt at reordering. The result are *zones of awkward engagement* (Tsing 2004), where different rationalities rub against each other, compete, and become entangled in different ways. Science here cannot be investigated as a readymade object of inquiry. It is instead woven into the fabric of everyday life struggling for authority against competing interests. These zones of awkward engagement are difficult to access. They are not always the powerful, self-confident sites of scientific knowledge production that will not be disturbed by STS researchers. Zones of awkward engagement are often more fragile in many ways, slow-moving, often seemingly trivial, extending into everyday lives. This requires attentive, careful research; research that has the time to hangout and forge relationships. Ethnography may once again prove a fruitful mode of involvement with these zones—just as it did in the first movement into the laboratories forty years ago but for very different reasons.

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Notes

1. What the authors of a recently published issue of *Cultural Anthropology* (Kirksey and Helmreich 2010) call "multispecies ethnography" can be seen as a late/later outcome of this movement. When writing about the importance of relationships and ethnography at the end of this introduction, we have also in mind such a methodological "opening"—which is in line with the effort observed in the fourth movement to work across different levels of analysis and on different scales (see below).
2. In 1995, the famous article of Sarah Franklin "Science as culture, cultures of science" was published in the *Annual Review of Anthropology* (1995, 24:163-84). The 4S annual conference of 1994 has also been important in this regard. It was the first 4S conference that did not coincide with the American Anthropological Association conference. For the first time in the history of 4S, anthropologists

such as Emily Martin, Rayna Rapp, and others were invited as keynote speakers. Their keynotes were presented in a special issue of *Science, Technology, & Human Values* (Layne 1998). This special issue was followed by a series of other articles in *Science, Technology, & Human Values* (Layne 2000) as well as in other journals (Collier, Lakoff, and Rabinow 2004; van der Geest, Whyte, and Hardon 1996; Franklin 2003; Layne 2000; Oppenheim 2007; Taylor 2005) as well as edited books (Downey and Dumit 1997; Clarke and Fujimura 1992; Franklin and Lock 2003; Hess and Layne 1992; Lock, Young, and Cambrosio 2000) that established what might be called the "anthropology of science and technology." More ore less in the same period, monographies such as those of Biehl, Franklin, Lock, Petryna and Rabinow (Biehl 2005; Lock 2002; Franklin and Ragoné 1998; Petryna 2002; Rabinow 1996, 1999) examined technoscientifically mediated experiences of embodiment from an anthropological point of view.

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Bios

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