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Blurring Boundaries: The "Real" and the "Virtual" in Hybrid Spaces

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This chapter introduces a sequence of four papers that focus on the theme of knowledge and information flow in hybrid and virtual sites of interaction. As the Internet and the World Wide Web proliferate, people live increasingly hybrid lives where the physical and the digital, the real and the virtual, interact. In this world, online and offline identities may overlap and interdigitate, erasing prior boundaries in social, cultural, linguistic, political, and economic domains. My central argument proposes that we are witnessing an underlying process of technology-spurred blurring, resulting in major shifts in the cultural landscape of the 21st century. Providing context for the papers, I argue that the blurring of boundaries and the fusion of the real and the virtual in hybrid settings may require rethinking conventional ethnographic methods in the future, and beyond that, the actual problem space for anthropology. To frame the papers methodologically, I suggest that we are in a process of experimentation during which conventional ethnographic methods are being adjusted, or will need to be adjusted, to the requirements of a truly hybrid ethnography, i.e., one that combines research in virtual and real-world spaces. I specifically examine some of the issues that arise in and for online and offline research, gauging the impact on core concepts in anthropological ethnography such as "fieldsite" and "participant observation."

Key words: knowledge flows, blurring, hybrid spaces, lifescapes, hybrid ethnography

Introduction: A Hybrid World

In the last few years, the digital communication infrastructure provided by the Internet has become extensive enough to touch all parts of the globe. The World Wide Web has indeed become worldwide. The papers in this section[1] speak in detail to some of the ways in which this has affected the flow of knowledge and information in industrial, recreational, and domestic situations. In this introductory chapter, I am concerned with two key issues that provide the context within which the papers might be seen: one revolves around hybridity, the other, very relatedly, around the blurring of the "real" and the "virtual."[2]

A central consideration revolves around the observation that a growing number of people now live in a hybrid world where the boundaries between what is physical (or actual) and what is digital (or electronic) continue to fade. This hybrid world is one where a person's identity, experiences, and life possibilities begin to integrate physical and virtual facets of existence so that consciousness is to some extent shared between an offline physical and an online virtual self. In this process, cultural and social dynamics interact with demographic and technological trends to conceive, birth, reproduce, and manifest this very world.

The global flows of information, capital, commodities, ideologies and human beings affect increasing numbers of people in all walks of life, from the often illegal transnational laborers who "work the border" wherever borders exist (Reeves 2008), to the meat cutters in the chicken factories of the American heartland whose manual labor supports their families across increasingly permeable borders with regular "envios" (Griffith 1985; Pribilsky 2008; Trager 2005). Many of their transactions crucially involve the Internet, as do those of the professional knowledge workers in global corporations described by Hinds and Crampton (2008), Ruhleder and Jordan (2001), Ruhleder, Jordan, and Elmes (1996), Wasson (2004), or the fishermen in Nova Scotia who, within hours, sell the day's catch to traders in the Tokyo wholesale fish market (Bestor 2001, 2004). The ubiquity of cell phones is an indicator of the extent to which electronic connections have become indispensable to people for managing their lives (Brown, Green, and Harper 2002; Ito, Okabe, and Matsuda 2005), not only in industrialized countries but maybe even more so in less developed regions where adoption of cell phones leapfrogs over earlier kinds of communication media

My thinking on these issues, as always, has been influenced by conversations with a variety of friends and colleagues, especially Robert Irwin, Diane Schiano, and the members of the workscapes group at PARC. I thank them all. I also thank the contributors to this section who responded with more or – on occasion less – enthusiasm to my editorial suggestions. We extend very special thanks, however, for the very helpful professional critiques we received from anonymous reviewers and for the editorial guidance of David Griffith.

such as conventional landlines (Ling and Pederson 2005; Rangaswamy and Toyama 2006; Wong 2007).

As the papers in this section show, what we once called "virtual" has become all too real, and what was solidly a part of the real world has been overlaid with characteristics we thought of as belonging to the virtual. The very fact that these terms have become problematic allows the speculation that the underlying dualism itself is in some ways becoming less significant.[3]

A signal event for understanding the separation between the physical and the digital was the emergence of virtual worlds in the last few years. Foreshadowed by social interaction in blogs, chat groups, and social networking places like MySpace, Facebook, YouTube, and Twitter, it was the appearance of persistent virtual worlds like Second Life, Sims Online, There, and ActiveWorld that convinced many of us (myself included) that the virtual has become real.[4] Virtual worlds have a physical existence in the technologies, the servers, and networks that provide the electronic infrastructure, and another one in the minds and interactions of the people who populate them. They continue to operate while particular "residents" are away (logged off), and will be totally familiar when they get back—a reality that is very similar to my conviction that there is a place that continues to exist, called Silicon Valley, where I can go next week, even though I am physically in Costa Rica as I write this.

The co-existence of the physical and the virtual manifests itself differently in different parts of the world and for different populations. Nevertheless, as the access tools to the Internet (such as cell phones, laptops, PDAs, Blackberries, web conferencing, wireless and broadband connections) become even more widely available, larger and larger segments of the global population find that the lifescapes they construct for themselves are irrevocably composed of both physical and virtual realities.[5] Thus, the hybridity I talk about is emergent and a matter of degree.

It has been suggested that physical-virtual hybridity is not a new kind of phenomenon since change has been ubiquitous historically and even pre-historically. After all, technology and society are in a continuous process of co-evolution (Gluesing 2008). Imaginaries of various sorts, constructions of the human mind that serve one purpose or another, have been around for a long time, as have simulations and collaborative games of various kinds. In that regard, what comes to mind for many people is Hermann Hesse's (1972) novel about the *Glasperlenspiel* (Glass Bead Game), a mind game played by an order of monks some centuries in the future. Hesse mused about reality and persistence in and of the game, but as one of the monks notes, such games fly into the ether without a tether to reality.

While virtual worlds are clearly built only "to do the things we humans do" (in the words of one reviewer), I am nevertheless going to suggest that they are substantially less imagined than other imaginaries. They are "realer" in the sense that they are actual (though electronic) places that persist and continue to operate dynamically when individual participants leave. The World Wide Web started as a collection of nodes forming networks. With the addition of "place" (three-dimensional space which could be occupied) to those cyber-networks, there is now a "there" there, a point made by writers like Jones and Ortlieb (2006), and particularly by Boellstorff (2008) in a powerful way.

My own work, during the past few years, has been based in corporate contexts in the Silicon Valley of California, and I am quite certain that the trends I talk about are more visible there than elsewhere. Quite likely, they are also more seductive and persuasive from this privileged viewing point. But I am also quite aware of the fact that the digital continues to extend itself, reach out to, undermine, overshadow, and redefine the lives of people around the globe.[6] I believe, as Christina Wasson suggests, that what we see in corporate contexts is very much related to a broader set of cultural shifts that are taking place globally, not only within corporations but in all spheres of life (Wasson 2004). Thus, the context for the papers should be seen as an increasingly hybrid world where the digital/virtual is omnipresent but differentially distributed and differentially visible across geographies, demographies, and economies as the boundaries between real and synthetic, offline and online, physical and virtual continue to shift and fade.

The Blurrings

The physical/digital hybridity I have been talking about is part of a much wider phenomenon, a trend I will refer to as "the blurrings." As suggested above, processes of fusion and diffusion, of spread, of cultural confluence and dissemination of new worldviews have been happening throughout history and prehistory. Technology has been implicated in many of these transformations from early on—probably from the time when, a million years ago, one of our ancestors fashioned a vine into a sling to carry her baby, thereby freeing her hands for digging roots or carrying supplies. Archeologist Charles Cobb explodes the myth of a static pre-discovery world by pointing out that the high flow of goods, peoples, and ideas that archeology can demonstrate has always transformed localities into "hybridized entities with multi-faceted identities and nebulous boundaries" (Cobb 2005:565).

Since the proliferation of the Internet and the rise of the World Wide Web, most of the social transformations we are seeing owe their life to digital technology. The blurrings of interest here, then, are the technology-induced and technology-mediated fusions that have emerged with the new communication technologies, especially the Internet and the World Wide Web. We might think of the blurrings as the processes by which cultural practices, lifestyles, and underlying ideologies are reshaped in relation to one another. Blurrings already extend across many content domains, from worklife into people's personal lives, from education and entertainment to commerce, and progressively into larger and larger geographies.

At the current time, we observe the blurring of the boundaries between homelife and worklife that were created

by the Industrial Revolution. Removing production from a shoemaker's hut and the shop that was part of his family's living quarters to a factory, the Industrial Revolution erected barriers that are only now beginning to be faded. By cutting up the day into (then) 12-hour shifts, it established regular working hours and with whistle and factory bell managed to separate home and work as temporally and locationally separate spheres.

At least in the industrialized world, that separation has now been breached. Digital tools such as the laptop and the cell phone and a transition from material production to knowledge work allow collaboration and communication across distance without the necessity of physical co-presence in a particular location. Work that formerly was tethered to a defined workplace is now routinely done at home, in the car, or in the kinds of public third spaces described by Churchill and Nelson (this volume). As a matter of fact, for many people, work activities and related obligations have proliferated into almost all aspects of daily life.

Work has invaded the home in many ways. For example, Darrah, English-Lueck, and Freedman (2007), in their 10-year study of transformations of family life in Silicon Valley, have documented that at least in this area, many families have begun to conduct their home life with the management techniques they learned at work. Twenty-four/seven has colonized their homes (see also English-Lueck 2003; Ruhleder, Jordan, and Elmes 1996), but what may be more surprising is that a parallel change is proceeding at work. Digital technologies have allowed home- and leisure-related activities to make inroads in the workplace, so that for many people work life has become very much like home life (Hochschild 1997, 2007).

Another manifestation of global blurrings can be found in the demographic changes generated by major population movements, including the dispersion of workers around the globe, the Internet-facilitated mobility of knowledge work, and the upsurge in globally distributed teams of corporate knowledge workers. These trends have spawned new social formations that operate along lines quite different from the organizational teams business anthropologists like myself used to study, leading to a certain flattening of hierarchies and blurring of lines of power and authority.[7]

Globalization, moving on the back of the World Wide Web with its ever-increasing availability of online connections and improved distance communication, is also a major factor in the blurring of national boundaries. It is characterized by "a decline in the capacity of states to nationalize, and, consequently, by the upsurge of a series of alternative identifications, such as those based on indigenousness, regional location, and immigrant status" (Friedman 2003:744). We are seeing the transnationalizing of a growing range of local or national relations and domains (Latham and Sassen 2005b). Technological, economic, political, and demographic forces seem to be eroding the traditional boundaries among cultures, societies, and nation states, further undermining illusions of territorial integrity (Reeves 2008). Thus, Ferguson (2005) argues that territorialized capital investment for oil and mineral extraction changes the reality of political boundaries. Increasingly, transnational flows of people, technology, capital, media representations, and political ideologies link and divide regions of the globe in networks that belie cartographic abstractions.

Border porosity has led to new types of transnationals (individuals who culturally and psychologically live "in-between") and consequently to a newly prominent transnationalism, amply described in the anthropological literature (e.g., Alvarez 2006; Bestor 2001; Bueno Castellanos 2001; Hamann and Zuñiga 2008). As "the bones of the sovereign state system creak while trying to regulate transborder flows with institutions evolved to regulate life within territorial borders" (Bach and Stark 2005:37), the permeability of national borders becomes noticeably visible in political and trade alliances such as the European Union, MercoSur, North American Free Trade Agreement, and a variety of other attempts to establish global trade markets, as well as in the rise of international aid organizations that operate with increasing efficiency on a global basis, in many cases taking over governmental functions and constituting the prime engine for economic development (Moran-Taylor 2008), disaster relief, and other humanitarian efforts. These include a variety of non-state actors and forms of cross-border cooperation and conflict resolution that are carried out by non-state organizations such as NGOs and other boundary organizations that emerge to reterritorialize transborder flows.[8] It is within these large scale flows that the papers that follow should be seen to provide local pictures that zero in on knowledge flow in a small set of particular sites. In the subsequent section, I will argue that the rise of the digital has generated not only a new type of ethnography but also has challenged some of the pillars of traditional ethnographic research and, indeed, the ethnographic sense as we knew it.

The Papers

The current group of papers is about the different knowledge interfaces that emerge in this transition. While they represent rather limited snapshots of selected features of this vast territory, they address a significant focus within these transitional spaces: the flows of knowledge, information, customs, and procedures in and in between online and offline worlds. As such, they speak to a wide range of practical, conceptual, and methodological issues in research on knowledge flow in hybrid spaces. All of them use some version of ethnographic methods for investigating such flows in venues such as technical settings, domestic environments, recreational sites, and the gaming spaces of the Web, thereby widening traditional ethnographic domains of study where high-tech design and virtual reality sites are still rather uncommon fieldsites. In every case, be it for reasons of competent participation, of technology design, or facility development, the question of what knowledge and skills are available for whom, for what, and how they are accessed, shared, and produced in the first place, is of central concern.

The effects of blurring between virtual and physical worlds, lives, and existences can be seen progressively in the papers of this section. While the use of the digital in Collins' engineering venue was limited to wide-spread, long-accepted simulations and data depositories that facilitate the transmission of design knowledge, it is in the papers by Churchill and Nelson, Lange, and Moore, Gathman, and Ducheneaut that the digital becomes pronounced and impossible to ignore. Thus, each constitutes a piece in the multi-faceted puzzle of ethnographic analysis of emergent hybrid systems.

Shawn Collins' paper "Wading and Jumping into a New Job—Exploring Dynamics of Knowledge Flow for Systems Engineers" takes us into a live engineering environment where understanding the flow and distribution of knowledge is crucial not only for the socialization of new hires but in the end for productivity and the bottom line. In spite of the fact that it deals with a setting that is rarely addressed in anthropological studies (engineering in a manufacturing environment), this paper is probably the closest to a standard anthropological ethnographic account in this collection. Collins, with degrees in both engineering and anthropology, brings an anthropological approach to understanding how novice systems engineers are socialized into an industrial design environment by pointing to the tension between, and negotiations about, tacit and explicit knowledge as crucial in understanding this world. His research complements other studies of industrial production settings that identify similar instances where workflow documentation simply glosses over important processes, relying for its efficacy on operators' embodied, tacit, localized knowledge.

This is a phenomenon that has also been highlighted as crucial in a number of other investigations of industrial production settings (Bechky 2003; Ikeya et al. 2007; Jordan with Lambert n.d.; Obata et al. 2007). His work confirms the massive prevalence of this phenomenon in every nook and cranny of the work process and suggests that a best strategy for optimal information flow would probably be to use workflow documentation for making face-to-face consultation with experts more efficient. His results are vitally important to developing effective policies that help employees "wade or jump into the turbulent waters of their rapidly changing knowledge domains."

Elizabeth Churchill and Les Nelson, writing on "The Effect of a Digital Bulletin Board on Social Encounters," identify key aspects of information flow, community conversations, and community transactions in situation where they can be supported by digital bulletin boards. The goal of their research is to engage people online with those in physical spaces (and vice versa) by using large digital displays as communication devices that interweave and imbricate online and offline interactions. In their paper, they describe installing a large screen digital bulletin board in a café and art gallery in a San Francisco neighborhood. Melding physical and virtual presence, the board provided a touch screen on which users could experiment with doodles and hand-scribbled notes in a way that was both fun and novel. In a detailed analysis of the comprehensive body of qualitative and quantitative data they collected, the authors paint a fascinating picture of the verbal and nonverbal interactions around the board and how this new social artifact became part of the life of the café as artists, workers, and families left messages for each other (including anonymous others) or for the owners of the café. They conclude with insights into the design, deployment, and survivability of digitally based social interaction devices, a perceptive discussion of relevant design features, and recommendations for those who intend to construct large-scale socially interactive displays.

It is likely that hybrid social artifacts of this sort will become ubiquitous in our work- and lifescapes in the future. One of the important lessons that emerges from this study is that not only their usefulness but also their survivability depends on multiple factors such as the affordances of the physical space in which they are installed, a deep understanding of the needs and motivations of the user population but also, and significantly, on the micro-political climate around the introduction and use of such social artifacts.

Patricia Lange's "Conversational Morality and Information Circulation: How Tacit Notions about Good and Evil Influence Knowledge Exchange" is concerned with technical communication in an online chat group. The author makes a compelling case that prior technological affiliations help shape the course and moral tone of online arguments and can work to foreclose open debate about the merits and shortcomings of new technologies. In a detailed autopsy of online technical conversations, she shows how a playfully moralistic turn in an argument can derail a technical, purportedly factual discussion into innuendos of moral deficiencies.

Moral positionings may appear even when the partners in the conversation do not explicitly use morality metaphors. Nevertheless, they influence what information is circulated and who has access to it. Thus, her study pinpoints some of the basic linguistic mechanisms that, in online as well as offline talk, can change the flow of information and the shape of an argument. This is as true for domestic quarrels or political negotiations as in chat rooms, where informal conversations about technology are critical to technology development and everyday work practices. As she points to the unavoidability of importing real-world language rules into the virtual world, Lange identifies one of the mechanisms that allow for the imbrications, the overlapping, of online and offline worlds.

The window that Lange provides into the various ways that morality enters discussions about technology leads her to a refined, contextually based understanding of flaming. Instead of portraying flaming as a phenomenon that arises because of the nature of the communicative medium (as has frequently been argued), she uses a series of examples to demonstrate how flaming has as much to do with social context and social factors as with the communication medium. In that way, she highlights the unavoidable importing of our habits and ways of expressing ourselves into the virtual world. Though digital communication has clearly developed its own linguistic modes (for example in texting), many of the basic

communication patterns we work through in the physical world appear also in the virtual world. Further studies will need to shed light on how and when this is true for other activity patterns, an enterprise towards which the paper by Moore and colleagues makes important contributions.

Finally, Bob Moore, Cabell Gathman, and Nicolas Ducheneaut lead us into the virtual world of avatars and cyber-games. Massively Multiplayer Online Games (and virtual worlds in general) are complex social worlds built from text and animated graphics that persist and continue to function when a player logs off. Originally operating in the realm of fantasy games like "Dungeons and Dragons" where players carried out heroic quests, they have begun to blur the distinction between the physical and the virtual, the difference between player and avatar, and the distinction between work and play. They put players into a parallel world where they can buy and sell, acquire real estate, run experiments, do and receive therapy, go to parties, design gadgets, devise new social systems, and much more. In crossing the boundaries between physical and virtual worlds and between real and imaginary economies, these possibilities are adding new dimensions to people's lives, changing our perceptions and expectations about how we work, how we learn, and what social activities we engage in.

The authors report on three virtual worlds in detail with respect to their ability to generate the kind of lively, interactive, social spaces experienced by people hanging out in neighborhood bars, best known as Oldenburg's (1991) "third places." Examining the flow of sociality in these worlds, they succeed in identifying the criteria for designing successful public spaces in virtual reality, making an important contribution to virtual space design and virtual urban planning.

Methodologically, this paper joins others, including the recent seminal book by Boellstorff (2008), in arguing that virtual worlds and other digital social formations deserve to be studied in their own right. This serves as an introduction to the discussion in the next section where I consider some of the methodological questions that arise as electronic components creep into ethnographic fieldwork.

Doing Research in Hybrid Spaces: The Implications of Virtuality

The look and feel of ethnography has changed as research increasingly focuses on the digital, both by investigating virtual communities per se, and in tracking how the Web enters into people's daily existence. Thus, current investigations of the hybrid spaces we live in appear to fall into two categories. *Virtual ethnographies* are based on fieldwork carried out exclusively in the virtual world, while *hybrid ethnographies* explore how people design, encounter, and use the Internet in their physical, real-world lives.

The clearest use of ethnographic methods for studying virtual places is the recent monograph by Tom Boellstorff with the suggestive title "Coming of Age in Second Life" (evoking, of course, Margaret Mead's classic "Coming of Age in Samoa"). As a resident of Second Life, Boellstorff uses standard anthropological participant observation in his online research, even collecting informed consent from the avatars who he (or rather his avatar) observed and interviewed. He refrains from even speculating what role these electronic activities might play in the real-world physical life of the player/residents, but shows that it is possible to study virtual spaces as self-contained social systems, as distinct social formations in their own right, with their own rules and conventions, value systems, modes of communication, economies, and formal and informal politics, without worrying about the lives of the people who are behind the avatars in Second Life. This virtual approach is represented in the papers by Lange and by Moore and colleagues in this section, as well as by a fair number of other researchers such as Guimarães (2005) and Jones (2007).[9]

Hybrid ethnographies, on the other hand, focus precisely on what virtual researchers ignore, namely how digital activities are embedded in people's daily lives, be that information seeking, blogging, emailing, or game playing.[10] For them, what might be of interest is how hanging out on Facebook or MySpace might affect teens' sleep patterns (Orzech 2008), how email connections can change family relationships, and, more generally, how digital technologies and the Internet affect people as professionals, family members, and study participants. This implies two types of fieldsites for hybrid systems: physical fieldsites where researchers might observe how the Internet enters into people's daily lives and online fieldsites where they observe and participate in (possibly multiple) virtual communities.

Hybrid ethnographies generally are traditional-looking ethnographic reports in which Internet-based activities are treated with the same emphasis as other types of communication modalities, such as phone conversations and "snailmail" exchanges—foregrounded or backgrounded as the goals of the research require. An exemplary publication along those lines is a book by Miller and Slater (2000) that tracks Internet use as a way to access other cultural features of the island of Trinidad, and thereby provides an intimate picture of how the Internet has penetrated the daily life of Trinidadians. Trinidadians have no trouble recognizing the Internet as real. For them, it replaces to some extent phone calls to family members on the island and abroad and is appreciated for maintaining, vitalizing, and even recovering family relationships beyond what would normally be possible. This kind of development could probably also be found in other populations, where migration threatens severing family ties.

What constitutes a particular strength of hybrid studies is the combination of online observation and participation with offline interviewing of the participants. Sometimes this takes place via telephone and sometimes face-to-face when the researcher meets chat room members or virtual residents in real life. There is abundant evidence in the literature for the benefits of this approach. For example, Ruhleder (2000) showed that offline interviewing added new dimensions to

her analysis of e-learning, such as different perceptions by faculty and students regarding students' postings, different uses of formal documentation by process architects and engineers engaged in daily design activity, and a pronounced orienting to hierarchy and lurkers by students and staff. Interpolation of data gathered online and clarified or expanded offline has been shown to be highly productive and is probably the most commonly used methodology for the study of mixed, hybrid systems at this time (Churchill and Nelson this volume; Heath et al. 1999; Hine 2000; Lange this volume; Nardi, Ly, and Harris 2007; Schiano 1999; Schiano and White 1998).

If we now turn to consider how the rise of the World Wide Web has affected anthropological research, it becomes immediately apparent that fundamental concepts such as fieldwork and the idea of a fieldsite have been affected.

Fieldwork and the Fieldsite: From Bounded Place to Multi-Connected Space

Hybridity calls into question much of what we held to be of well-established, almost commonsense relevance in ethnography, such as immersion and face-to-face interaction in the fieldsite, the collection and analysis of physical artifacts and documents in fieldwork, the idea of community, of a fieldsite, and what it could mean to do participant observation. The question now is: have our conventional methods become problematic, and if so, what adaptations might be called for? Moving ethnography into a hybrid setting does require rethinking to some extent what our traditional methods can accomplish there. Two concepts that might deserve some special amount of rethinking are two pillars of traditional anthropological ethnography: "the field" and "participant observation."

Though the anthropological "field" was not always a specific, bounded, physical site, the time-honored classical image of an ethnographic fieldsite has been that of a particular, specific place. Typically and emblematically (though not exclusively) this field has been a physical place, a fieldsite where the ethnographer is engaged in prolonged, sustained, intimate interaction with local people and the local scene. For me personally, that has been at various times a Maya village, a corporate headquarters, an airlines operations room, and a factory floor, to mention just a few where I've done ethnographic work. All of these were physically bounded places. I could say, with authority, that I had been there; I could show pictures and artifacts to prove it, and much of my claim to have something authoritative to say about those spaces was based on those facts. When different sites were investigated with a comparative focus (as I did in a study of childbirth in four different countries), this was also conceptualized as a series of bounded sites.

Thinking in terms of multi-sitedness had become common in anthropology beginning in the 1980s (Marcus 1995), but it was with the advent of connection technologies that allowed researchers to be "in two places at the same time" that the location focus began to blur in earnest (Wasson 2005). For example, when we looked at the work of design teams that communicated via speaker phone and shared file access (Ruhleder and Jordan 1997, 2001), it was clear that what was important was how much activities in the sites were modulated by the technology and how this affected flow and availability of information to the spatially distant teams.

With the rise of the Internet, researchers' work has begun to revolve more and more around the nature of the connectivity between sites, the developing norms of interaction, and the socialization processes that flow through the nodes in the network. What has become critical is the "stuff" that moves between the various nodes of technology-assisted hybrid networks and what effect that has on what people do and how they do it (Latham and Sassen 2005a). For example, Ruhleder (2000), in her study of web-enabled distance learning, reported that what was most important was getting a sense of the rhythm of interactions—*when* people posted on the shared bulletin board, *to whom* they responded, *what* information they shared (see also Cefkin 2007).

As Hine (2005) says, the growth of technology-mediated interaction renders it unnecessary for ethnography to be thought of as located in particular places, or even as multi-sited. The time may have passed when we could (or would want to) think of ethnography as located in particular places, or even as multi-sited. We may be breaking away from a committed long-term participatory approach to a knowledge-flow focused, technology-facilitated ethnography.

New Modes of Representation

As a consequence of the move from physically bounded fieldsites to tracking flow through digital networks, new modes of representation have arisen that sometimes complement and sometimes replace well-entrenched earlier forms. With less reliance on linear stories, we now see experimentation with, and an emergent reliance on, ecological maps of various sorts that show knowledge flow across networks and ecosystems, including experience models, network diagrams, creation nets, and other representations, often using ecological systems metaphors (Thomas and Salvador 2006). While the greatest proportion of anthropological publications still report on bordered physical locations, we see the site focus blurring in researchers' experiments with multi-site, multi-team, participatory, distributed, multi-expert, connectivity-based (rather than site-based) kinds of approaches. The despatialization of the locus of activity through Internet connectivity has added an additional factor that has undermined the traditional focus on the fieldsite as a bounded physical place.

Validity and Authenticity

This trend in how ethnographers think about their fieldsites has some notable implications. Traditionally, much of anthropology's claim to authenticity, to telling it like it is, was

based on the fact that anthropologists spend extended periods of time in the field. At least since the time of Malinowski, immersive, lengthy stays in the field were rites of passage required for the fledgling anthropologist and for later claims to professional authority.[11]

It appears that the transition from site-focused face-to-face interaction to technology-mediated remote interaction requires abandoning the idea of physical immersion in physical fieldsites as the basis of authentic knowledge. Hand-in-hand with that has to go a restructuring of traditional validity indicators (such as evidence of travel to remote places, foreign language competence, artifact collections and the like), to a demonstration of competence and experience in and with these new fieldsites and their technologies.

As Hine (2000) says, in bounded, physical field settings, the validity of the ethnographer's results is judged to depend on the breadth of observation and sustained participation in the everyday life of the community. She argues (as would I) that online ethnography depends for its viability on admitting spatially distributed (non face-to-face) interaction as the basis for claims to validity. As we have seen, this flies in the face of a long tradition that has made proof of having been there and evidence of immersion in the local culture the cornerstone of claims to authentic knowledge. Instead, we now rely on evidence of online experience and such things as new types of "arrival stories," glossaries of technical terms, and otherwise demonstrated expertise in technical language (see Boellstorff 2008; Hine 2000).

Participant Observation

If the idea of fieldsites benefits from being rethought, so does the idea of participant observation. What could it mean to do participant observation online in social networking sites or virtual worlds when you never see or even talk to the people in whose digital lives you are "participating?"[12] For some virtual sites, one might actually ask: are we really studying people or some set of fantasy personae produced by them? What imaginary are we stepping into? What kind of reality are our methods uncovering when they are applied to virtual sites?

Participant observation used to mean you are there. Physically. Face-to-face. All of the time. Or at least most of the time. In the past, anthropologists took this seriously.[13] Our claim to authentic knowledge was based on the fact that we were physically present, physically immersed in the setting for lengthy periods of time, and ipso facto doing participant observation.

It is clear that whatever we could mean by participant observation online, it is something different from what is created in the close encounters of real-world participant observation and will produce different results. Ruhleder (2000:14) fears that we may lose the intimacy and trust generated by face-to-face encounters; that virtual environments challenge our notions of seeing and experiencing an event together with the other participants; and that they "rob us of the illusion of being there." In a similar vein, Hine (2000) contends that the utterances of participants may be preserved, but the experience of participating is not.

However, as more data about online interactions have accumulated, this deficiency argument has lost some of its persuasiveness. Deep immersion can certainly be achieved by the ethnographer who becomes an insider, as shown by the papers in this section and by Internet studies that privilege online participation like those of Boellstorff (2008), Guimarães (2005), and many others. These researchers learned about the culture of chat groups, online games and virtual worlds by becoming players, creating avatars and other representations for themselves, and learning how to interact with other players and their representations as fully participating insiders. Based on the appearance of serious virtual and hybrid ethnographies that include significant material on online social interaction, researchers now argue that it is precisely the different ways of producing "being there" and "being together" that are of interest (Churchill and Nelson this volume; Miller and Slater 2000).

An interesting problem in online participant observation, often simply ignored, is the issue of the invisible presence of lurkers. Lurkers constitute a category of participant in cyberspace for which there is no parallel in real-world anthropological ethnography. Lurkers constitute an audience that at any moment may become active. Lying in wait out of sight, they work behind the scenes and wield invisible power to which producers of online content and advertisers orient. All participants know that lurkers are present and their presence can be confirmed by records of access to the Internet site, but, like ghosts, they leave no observable traces for the researcher (Hine 2005:25). Studying lurkers per se appears impossible in ethnography restricted to online research, not in the least because there is no way to identify them, in spite of the fact that they are a clearly significant presence, for students (Ruhleder 2000) as well as workers. To my knowledge, nobody has done an investigation of lurkers in corporate digital contexts, but I am sure that employees in distributed corporate teams orient to their potential presence and the possibility of surveillance.

The ethnographer herself can do research as a lurker, that is to say, a participant who does not post to the community and in particular does not disclose her or his research interests. In that case, she would simply log on and "lurk" silently, more like the observer behind a one-way mirror—a technique that used to be common in laboratory psychology but is frowned upon by field anthropologists. One might question whether a researcher who lurks in chat rooms or virtual worlds is actually doing participant observation. On closer examination, this issue becomes rather complex. There is a big difference between sitting unseen behind a one-way mirror and a lurking kind of remote participation, given that most people who are signed on never post and so never participate in a visible way either. But does that mean that the researcher should log in periodically, as do the participants? Should she be doing "interstitial fieldwork?" Or should she be connected 24 hours a day, seven days a week? But connected to what and

to whom? A lurking anthropologist is actually doing what her or his research subjects are doing: hanging out at a site without posting. Nevertheless, there are widespread ethical concerns with undisclosed research presence. At this time, there appears to be some consensus emerging in the research community that, under most circumstances, the researcher should disclose her or his reasons for being there.[14]

Technology-Mediated Ethnography

The ethnography of hybrid spaces will push anthropological methodology into new domains, not only in regard to representations as suggested earlier, but also through new kinds of tools. I believe we are at the beginning of a realignment of approaches and methods that is fueled by the increasing availability of technology-assisted data collection and analysis tools and their new ability to connect over the Internet. Technology-mediated, digitally-enabled investigations allow not only melding qualitative and quantitative information but also amplify our traditional methods by addressing issues of validity, reliability, and sampling and, thereby, improve conventional ethnographic techniques. While many of these tools have been available for a long time, it is their new connectivity via the Web that opens up new possibilities. For example, in a diary study where participants record their entries electronically, these data can now be available immediately to the researcher who can develop new hypotheses as data collection proceeds, investigate missing entries, develop potent data representations, and develop a pool of potential recommendations on an ongoing basis.[15]

Web-based connectivity is giving researchers and participants better tools for observation and data collection both through "instrumenting the researcher" and through "instrumenting the subject," especially valuable when face-to-face participant observation is not possible because of remoteness, accessibility, the private nature of the event, or sporadic occurrence. Tools and applications, such as multifunctional cell phones, webcams, time lapse photography, shadowing by remote camera, Instant Messaging (IM), Google Earth, video journals, photo diaries, geographic positioning systems (GPS), and the like, especially when complemented by technology-aided interviewing techniques (e.g., digital audio recorders with voice recognition) enhance both the capabilities of the investigator and the participatory power of study participants, often precisely because they do not require face-to-face presence.[16]

When study participants themselves collect the relevant data and transfer them to the investigator, traditional face-to-face participant observation is transformed into remote participation (Whitehall 2009). In general, we can expect a much closer relationship between study participants and a more organic development of ethnographically-based research and design projects as former "subjects" become "participants" and increasingly active collaborators. This heralds a fundamental change in the relationship between researcher and informant and a whole new era in collaborative ethnographic research. In the past, study participants were passive data sources; now they become not only data producers but active collaborators in many aspects of our work.

An intriguing issue is the incorporation of machine data into ethnographic research. Machine data are automatically generated every time an electronic transaction occurs, but their use is comparatively new, still mostly experimental, and quite controversial in ethnographic investigations. Machine traces such as activity logs and transcripts, click data, variations in time of sign-ons, and the data from locational and other sensors can be correlated with data from observing and interviewing study participants. Moore and colleagues (this volume) point out that their data logs capture all of the verbal exchanges in the virtual spaces they study, providing accurate real-time transcripts that free their time for participation and other data collection activities. Anderson and colleagues in experimental work collected location data for instrumented household members as they moved around their living space, then matched those with activity data from their subjects' laptops, and in their final analysis used participant observation and interviewing data to help them make sense of what the automatically collected data actually meant (Anderson, Rattenbury, and Aipperspach n.d.).

Machine data generate "objective" records of events as they happen. Formerly, audio and video recording were the primary way to generate such records and they are still widely used and appreciated for that reason. But now computers also provide a real-time, step-by-step record. Like video and audio, they preserve "action as it happens," not through retrospective interviews or interpreted recordings. It took time to figure out what video was good for and what its limitations were, and we can expect the same to be true for machine-based data. But as was true for video records, *what* is recorded and preserved is the crucial issue here (Curtis 1992; Jordan and Henderson 1995; Ruhleder 2000; Schiano 1999; Schiano and White 1998). At this point, it is not clear how to interpret machine data, how to judge their significance, and how they might complement and fit with other data as we triangulate between different kinds of information.[17]

An ever-present temptation is to privilege these easily obtainable "objective" data in the analysis. In that case, it is especially important to ask: what does this technology contribute to our efforts and in what ways does it blind us in our attempt to exploit its positive affordances? In the hybrid industrial environments in which corporate anthropologists like myself are working, production processes always rely on a combination of human-based and machine-based information, making access to the latter crucial for researchers. In such situations, it is clearly important to consider data from both arenas, the physical and the digital. In our study of chip factories, for example, the most crucial success factor was that we were able to combine machine-based workflow data with our on-site observations (Jordan with Lambert n.d.).

In spite of the many advantages of technology-enabled ethnography, it will be important not to get swept away by the technological enablements. They may be associated

with significant costs, often requiring technical know-how and additional investments. To remain squarely centered on the purpose of ethnographic fieldwork, our decisions should always be governed by considering what questions do we want to answer; what data do we need to do that; and what are the best ways to represent our findings so they become actionable.

This brings us back to the heart of the question that has hovered over this paper all along: what has the advent of virtuality wrought?

The Heart of Virtuality

The increasing mundaneness of the Internet testifies to the hybridization of the lived world, though much of the change generated by the advent of the virtual is still under the waterline, still largely imperceptible. It is still possible to put the fusion of the real and the virtual off as "so much hype." But virtuality with its imaginaries is here to stay, and to expand. It is beginning to penetrate into the interstices of daily life and of professional conduct.

For anthropology and ethnography, this means that we need to adapt our methods of data collection, analysis, and representation to changing conditions as our investigations move into hybrid territories. Machine-based data and, more generally, technology-enabled methods, together with new forms of co-analysis and co-design, enable new types of research designs. We are experiencing a subtle change in how we think of the anthropological problem space and are beginning to see different issues as our investigations move into settings that are distinctly hybrid and virtual. At this time, we find ourselves in a period of exploration, sometimes cautious, sometimes confident, kicked off by the opening of virtual territories and the experimental use of tools that allow a new kind of connectivity. As a result, the nature and direction of the flow of knowledge will change in the world. Now the crucial task becomes developing empirical studies, methodologies, tools, and theoretical interpretations of worlds that have only recently opened up.

As the papers in this section show, the advent of virtuality has pushed anthropological methods and approaches into new domains. Research in virtual and hybrid spaces transforms ethnography in ways that are still new and experimental, enabling different forms of situatedness, participation, collaboration, data analysis, and representation of findings, though most journal publications are still conventional at this point. As a scholarly community, we still hear little about such spaces; what we hear about is seen mostly through the eyes of an earlier methodology, a methodology that was appropriate for the workplaces and workpractices of a simpler, more decidedly physical world. Nevertheless, in conferences and early papers, we see evidence that increasing numbers of established scholars and increasingly students are experimenting with new vistas and exploring what the incursion of the virtual could mean, not only in people's personal lives but also in professional endeavors.

We hope that this introduction and the papers that follow begin to open up a window to how ethnography is evolving to meet the challenges of the digital age. Our goal with this section has been to arrive at a better understanding of the nature of hybrid systems and of how people manage to integrate digital activities into their lives, thus providing some measure of insight into one of the major cultural shifts of our times. Our papers paint a picture of a world in transition as we focus on one of its most significant aspects: the flow of knowledge in hybrid systems. Thus, our discussions both frame and begin to open up an important area for research for contemporary anthropology concerning the nature of virtual space and its intersection with the physical realm.

All new technologies have to get "a social life." They must be adopted if they are to be successful. Those that are have managed to insinuate themselves into people's mundane, everyday existence and have changed their interpersonal bonds, power relationships, value systems, and the rest—changes that we've seen with the introduction of every major technology from the baby sling fashioned from jungle vines to the telephone, the automobile, and now the Internet. It is up to us, the ethnographers of this world, to track and illuminate these changes.

Notes

[1]The papers originated from a panel entitled "Knowledge Flow in 'Real' and 'Virtual' Spaces: Ethnographic Approaches to Workpractice Analysis and Technology Development" at the 2005 meetings of the Society for Applied Anthropology in Vancouver, Canada.

[2]I continue to keep the terms "real" and "virtual" in this discussion, in part to remind myself of how I, too, used to think about the relationship between what happens in the physical world where we live and breathe and the electronic one "out there," in cyberspace. I will continue to use these terms without apology though every writer in the popular press, every analyst in the professional literature, agrees that those terms by now carry excessive baggage and do not describe the reality we see. Nevertheless, no terminological consensus has emerged—a phenomenon that itself points to the emergent and transitional nature of our understandings about these relationships. To keep options alive, I use a variety of terms interchangeably, such as "actual," "offline," or "authentic" for "real" and "electronic," "digital," "online," or "imaginary" for "virtual."

[3]Jones and Ortlieb (2006) argue against such an ontological separation (as would I). There are also several writers who have emphasized the difference, such as Haraway (1991) and Suchman (2007).

[4]For a long time, it was possible to think of text-based virtual worlds such as LambdaMoo (Curtis 1992; Schiano 1999; Schiano and White 1998), adventure-oriented multi-player games such as World of Warcraft (Nardi, Ly, and Harris 2007), and those described by Moore, Gathman, and Ducheneaut (this volume) mostly as attractions for kids and young adults. This has become questionable as many large corporations and private individuals are acquiring virtual real estate to establish a presence in those worlds with the intention of experimenting and exploring what this blurring could mean for personal lives and commercial success.

[5]The idea of "lifescapes" came out of early work at the Institute for Research on Learning (IRL) and the Workpractice and Technology

(WPT) group at the Palo Alto Research Center (PARC) where by the early 1990s our focus on workpractice studies had expanded to include the more holistic notion of "workscapes." In a project with on-the-move high-performance executives, I coined the term "lifescapes" because it became clear that work was no longer confined to work-in-the-workplace but had spread into people's "other" lives. The idea of "scapes" as indicating horizontal cultural conceptual domains has been publicized by Appadurai with "ethnoscapes," Cefkin with "rhythmscapes," and many others (Appadurai 1996; Cefkin 2007).

[6]At this point, it is still possible (as happened in a meeting with professional peers a few days ago) to dismiss these ideas with an "oh, it's just hype. There is nothing new here." Five years from now, this will be a ludicrous statement.

[7]Excellent discussions of outsourcing and related movements of work and workers are to be found in Palm (2006) and Skipper (2006). See also the discussion of distributed work and distributed lives in Jordan (2008); Meerwarth, Gluesing, and Jordan (2008); Miyata, Wellman, and Boase (2005). For the effects of globalization on the flow of knowledge and issues around globally distributed teams, see Baba et al. (2004); Gluesing (1998); Hinds and Kiesler (2002); Wasson (2004, 2005).

[8]There is a substantial interdisciplinary literature on transborder issues and actors. A good introduction are the papers by Alker (2005), Bach and Stark (2005), and Sassen (2005) in the volume edited by Latham and Sassen (2005b). NGOs, in many cases, are able to overcome their philosophical and pragmatic differences and join in highlighting complex issues when international efforts fail. See for example, the joint recommendations of 21 NGOs regarding the Palestinian crisis at http://news.bbc.co.uk/go/em/fr/-/2/hi/middle_east/7634894.stm (accessed November 3, 2008).

[9]Boellstorff goes to great length to argue that virtual anthropology constitutes a new subdiscipline of anthropology, akin to medical anthropology or political anthropology. So far, the notion of a "virtual anthropology" has not yet gained much acceptance in the academic community, though it appears in business as early as 2005, when Trendwatching, a consumer advisory forum, alerted companies to the relevance of virtual ethnography for commercial business interests. (See http://trendwatching.com/trends/virtual_anthropology.htm, accessed November 7, 2008).

[10]The tremendous impact these activities must be having on work and family begins to become visible when one considers research that has shown that the average player spends 20 hours a week in virtual reality (Yee 2005).

[11]I recall, now with a smile, how (many years ago) I wanted to do a computer-based project for my Ph.D. dissertation. I was a single mother with three small children and had done a computer simulation of the diffusion of innovation for my Master's Thesis, so I thought that was a reasonable proposal. My advisor said, looking me straight in the eye with a no-nonsense look: "You want to be an anthropologist? You go to the field!" That is how I ended up studying Maya midwives in the Yucatan. On the other hand, in retrospect, I would say that the advice served me well.

[12]I mean "participant observation" not as an observer who observes the participants (a surprisingly common misperception of the meaning of the term) but as an observer who endeavors to become a participant in order to acquire an insider's understanding.

[13]For example, years ago, when Nancy Fuller and I made a 24-hour record of the activities of a Maya midwife, we arrived at her compound at 3:00 a.m. under the light of a full moon. We sat outside her hut, dozing, but tape recorder and notebook at the ready for any sound from the inside, until the midwife emerged at 5:28 a.m. to rekindle the fire. And from then on we shadowed her throughout the day, following her to the market, observing a postpartum massage on the way back, listening in when she gave advice to a client on the road, cooking and eating meals throughout the day in her compound, watching her supervise her grandchildren's reading lessons in the evening—until she went to sleep again at 10 minutes after 10:00 p.m. All of that was faithfully recorded. Since then, in airports, hospitals and factories, we've followed activities over multiple shift changes, often with sleepless nights.

[14]For a perceptive discussion of ethical issues in online research, see particularly Boellstorff (2008) chapter 3.

[15]Here we see, as we have in so many details before, the blurring of boundaries, in this case the fading of the boundaries in the conventional stages of data collection and analysis and of distinction between researcher and researched.

[16]For recent examples, see the special issue of Practicing Anthropology, Fall 2007, for a variety of GPS applications, and papers in the Proceedings of EPIC 2005, 2006, 2007, and 2008, for an impressive arsenal of ethnographic tools and technology-mediated projects. See also Lovejoy and Steele 2004; Wasson 2000.

[17]In the extreme, overreliance on machine data could lead to a new kind of armchair anthropology where there is no participatory field involvement at all. At any rate, some interesting changes in the meaning of "participant observation" have already occurred. For example, a corporate researcher whom I asked if they do participant observation in their projects, said "Yes, we are doing participant observation, but not in person."

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