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Multi-sited Ethnography as a Middle Range Methodology for Contemporary STS

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The paper draws its inspiration from the provocation which Merton offered sociology both to engage with empirical data and to perform analyses adequate to guide intervention beyond the particular case. Whilst contemporary STS is very different both in its models of theory and its forms of methodology, this paper suggests Merton's concerns with engagement and adequacy provide a useful way to interrogate current approaches. Specifically, the paper explores some recent anthropological conceptions of ethnographic fieldwork that have provided potent models for the study of scientific and technological cultures. These multi-sited approaches have also provided the opportunity to develop new notions of intervention and explore alternative ways of making contributions to development of theory and practice. In the process of pursuing the goals of engagement and adequacy notions of ethnography have however become stretched. This sense of detachment from methodological canons accentuates the need for methodological debate and skill-sharing in STS.

Keywords: *ethnography; laboratory; multi-sited; intervention; middle range*

Introduction

This paper began as a response to a call for papers, described in the introduction to this journal issue, which questioned the relevance of Merton's concept of middle range theory for contemporary science and technology studies (STS). In this paper I suggest that the notion of middle range theory provides a useful framework to examine some recent developments in ethnographic methodology as deployed by STS. Whilst a long way indeed from Merton in its theoretical and methodological stance,

multi-sited ethnography provides a contemporary means of exploring similar issues of adequacy and engagement to those raised by Merton in his proposal for middle range theory. STS has made use of multi-sited ethnography to develop new forms of intervention, focusing often on dialogue and the emergence of negotiated solutions rather than a straightforward linear move from research to recommendations. Such developments are, I would suggest, a contemporary manifestation of the concern to produce accounts that are both faithful to the world that researchers experience and adequate to intervene in the issues of the day: a concern expressed by Merton as a need for middle range theory. Middle range theory provides, for this paper, a route into a discussion of the ways that methodological adequacy is negotiated for a particular set of circumstances. Having established this situated notion of methodological adequacy, the rest of the paper then focuses on the role of multi-sited ethnography in contemporary STS, and discusses both the various qualities that it affords and some tensions that this kind of methodological innovation raises.

In the next section of the paper, I introduce in more detail the notions of adequacy and engagement that arise in Merton's formulation of middle range theory, and explore the emergence of similar issues in multi-sited ethnography as formulated by Marcus (1995, 1998). The following section then moves on to explore some applications of multi-sited approaches within STS. Whilst laboratory-based ethnographies were highly potent objects for development of theoretical interventions in the sociology of scientific knowledge, contemporary studies have often used more wide-ranging models of the field site. Rather than the outcome of these projects being a middle range theory, in Merton's terms, it seems rather that the ethnographer in this kind of project embodies the tensions of a middle range which attempts to remain relevant to diverse audiences whilst faithful to a complex and ultimately methodologically elusive experienced world.

In a subsequent section, I describe a multi-sited study in the ethnographic spirit as a means to illustrate a further tension that methodological innovations of this kind can entail. Multi-sited approaches risk estrangement from canonical ethnographic texts, and from the laboratory ethnographies upon which, rhetorically at least, contemporary STS approaches are based. This does not, however, mean that methodological conversations become obsolete or that methodological anarchy is advisable. The conclusion proposes that in the current climate it seems important to continue to embrace experimental and extended forms of ethnography within STS, as a means to develop reflection both on the world as we experience it and on the audiences with whom we engage. However, as these approaches stray

further from the canons, it will also be important to promote methodological conversations and to develop our traditions of skill-sharing.

Middle Range and the Multi-sited Imaginary

Merton (1968) famously called for sociologists to produce theories of the middle range as a way of avoiding what he saw as the key pitfalls of much of the sociology around him: over-ambitious and premature attempts to develop unified theories with little obvious connection to observable social experience; and a tendency to produce descriptive data focused on specific situations without providing enough conceptualization to guide future study or generalize to other situations. Merton was concerned that both poles failed to produce adequate sociology, framing adequacy as based on the ability to contribute to design of a programme of future study and to sustain the public standing of the discipline. The spirit of Merton's call to middle range theory lies, for me, in the identification of a tension between engaging with the world as we find it and intervening in debate. As an ethnographer, in a tradition all too often accused of possessing a limited capacity to intervene coherently on issues that concern practitioners and policy makers, this sense of tension is troubling, and the notion of the middle range provides a useful framework to examine it.

Merton aimed to promote sociological theory adequate for the situation that the discipline currently faced. He did not rule out the production of grand theory altogether (despite concerns that the natural science model might not be an appropriate one), but felt that it was a premature aspiration for a young discipline. His idea of an adequate discipline was definitely not that it should "be adequate to meet all demands, intelligent or stupid, made of it" (Merton 1968, 49). Again, without taking on the same theoretical trappings, and being rather more skeptical that the accumulation of middle range theories would ever provide the basis for an over-arching grand theory, that spirit of approaches adequate to their times is one that I wish to take on board in this paper. Adequacy is a negotiated phenomenon and a moving target, and as I will discuss in a later section of this paper, while laboratory ethnographies have had an important rhetorical adequacy for sociology of scientific knowledge, we seem subsequently to be finding other kinds of engagement adequate for developing theory in different directions. First, however, I will take the themes of adequacy and engagement and explore some ways in which they arise in contemporary ethnography.

Contemporary ethnography is rich with debate and alive with controversy, both concerning the history of the methodology and the proper routes for its future. Much of this debate revolves, it could be said, around the methodological frameworks and epistemological stances that would permit ethnography to provide engaged and adequate contributions. A recent special issue of the *Journal of Contemporary Ethnography* demonstrated that there are many different ways of characterizing ethnography's past and its future: Loseke and Cahill (1999) used the device of a dialogue discussing the possible arrangements of papers in the special issue to draw out diverse themes and cross connections between the various millennial visions of ethnography's place that the issue contained. They identified diverse notions of ethnographic practice, the role of practitioners, the status of ethnography and its potential to intervene, and rejected as excessively crude the division of perspectives into modern and postmodern, optimistic and pessimistic or historically oriented versus innovative or forward looking. It is not fair, then, to for me to represent ethnography as having moved in wholesale fashion towards multi-sited approaches. Neither has the relationship between ethnography and theory been settled, either for anthropology or for sociology: a glimpse of this troubled territory in sociology is offered by Hammersley (1990) and Stanley (1990), and questions about the status of theory in ethnography live on still in Loseke and Cahill's (1999) collection of papers. In this paper I certainly do not claim, therefore, to offer a neutral account of ethnography's methodological development and theoretical contribution. Instead, I focus in depth on one recent aspect of ethnographic development, chosen for the possibilities which it has been recognized as offering to take STS to new places in its engagement with scientific and technical practice. In the rest of this section I describe this development, and the particular form in which questions of adequacy and engagement have been expressed in this context.

The development that I focus on is multi-sited ethnography (Marcus, 1995, 1998). Increasingly adopted by researchers as a label for their methodological orientation, the notion of multi-sited ethnography centers attention on the construction of the ethnographic object. Running alongside recognition that bounded territories are a somewhat artificial way of construing the objects of a research interest in culture, that field sites have always been more or less conscious constructs (Amit, 2000), and that contemporary society is increasingly characterized by mobility, connection and communication (Urry, 2000), the notion of multi-sited ethnography suggests that we deliberately pursue alternative ways of formulating the objects of ethnographic study. Of course, it is a cherished anthropological

stance that it is in the local that the global emerges, indeed that there is no supra-local phenomenon except in so far as it is constituted in the local. Nonetheless, there has been an increasing tendency to propose approaches that directly pursue apparently global phenomena (Burawoy, 2000), and multi-sited ethnography is formulated in this spirit.

Marcus explicitly connects multi-sited ethnography with the question of adequacy through the notion of circumstantial activism. This, for him, provides a way to shape the ethnographic project such that it makes an intervention in the very way that problems are conceptualized. The strength of this approach comes from a willingness to pursue connections rather than accepting field boundaries that might on first sight seem obvious:

> In short, within a multi-sited research imaginary, tracing and describing the connections and relationships among sites previously thought incommensurate is ethnography's way of making arguments and providing its own contexts of significance. (Marcus 1998, 14)

The shift in terminology from ethnography to imaginary marks an embrace of the constructed nature of research projects, and of the agency of the researcher in determining the focus. For Marcus, the multi-sited imaginary offers up the possibility of crafting a research object specifically designed to engage in a particular argument, or to be significant to an identified context of concern. At the same time, the multi-sited approach feels necessary in many circumstances as a faithful reflection of lives lived not in discrete locations, but through various forms of connection and circulation. The multi-sited imaginary is a way of capturing the need which has increasingly been expressed for forms of ethnography which do justice to the complex patterning of contemporary life. It seems, then, in Marcus' formulation that we have a very close kin to Merton's middle range aspiration. Marcus proposes multi-sited approaches as a way to develop insights both adequate for purpose and engaged with the way that the world is, acknowledging a similar style of tension to Merton but meeting it with a very different solution.

An important dimension of multi-sited ethnography viewed through the lens of the middle range has been the way in which it problematises the relations of ethnographer with subjects. While a study located within a single field site positions the ethnographer in a relatively unambiguous relation to research subjects, Marcus (1995) suggests that pursuing multi-sited approaches makes such identifications less clear, and makes particularly problematic the characterization of research as "studying up" or "studying

down". Ethnographers become placed within a field of varying connections, tensions and identifications, and moral positions become harder to maintain with any certainty. The immersion of the ethnographer in a complex and multi-dimensional field means that the ethnographer becomes a form of activist, shifting in role and relationship to subjects in different sites. Marcus uses Martin's (1994) study of immune discourse as an illustration of this shifting yet sustained commitment. Martin is always committed to where she is and developing the relationships appropriate to her location, yet develops a highly personal trajectory of engagement as she reflects on where she has been and where she intends to go.

Viewed from the perspective of aspirations to adequacy and engagement that for Merton mapped the gap middle range theory would fill, it becomes clear that the multi-sited ethnographer can be viewed as an embodiment of the middle range: it is not that the study contributes to bridging a pre-existing middle range, as much as that ethnographers bring it into being through the territory they map out whilst attending to the diverse accountabilities which they experience. Multi-sited ethnographers craft field sites with an eye to producing appropriate accounts for heterogeneous audiences comprising diverse sets of peers, policy makers, funders, bosses and research contacts. Rather than a pre-existing territory in the middle, there is instead an embodiment of tensions, in the ethnographer attempting to sustain a sense of meaning in the project out of diverse responses and accountabilities. From this perspective a study is therefore not, in some abstract sense, adequate or not. Instead, the ethnographer seeks out resonances, finding audiences for whom the study will be recognized as having an adequacy to connect with their concerns. Rather than being inherently recognizable as timely, a study finds an audience through a much more active process.

Multi-sited ethnography, or indeed any ethnography, is certainly not middle range theory in Merton's terms. Middle range theories are portrayed as finished products, whilst the contemporary ethnographer tends to recognize a more active and situated negotiation of adequacy. Still, in its recognition of potential tensions between accounts adequate upon which to base intervention in debate and accounts that portray engagement with data faithful to lived experience, the multi-sited imaginary that Marcus formulated has a lot to do with the spirit of Merton's pleas. Multi-sited ethnography epitomizes ethnography as a methodological tradition open to self-examination. Much of the recent writing about ethnography carries a sense of looking for ways to engage ethnographic experience with theoretical abstraction and with global perspective, but never being sure of arriving at an adequate solution.

Rather than a weakness, this sense of search and experimentation could be a valuable substitute for the kind of complacency implicit in Merton's aspiration to an adequate middle range level of theorizing.

I think, then, that multi-sited ethnography and the related discussions in contemporary ethnography are a very fruitful way to keep alive that concern with adequacy and engagement that Merton expressed. Instead of aspiring to a middle range theory, it is more in keeping with contemporary epistemological sensibilities to adopt a methodology which embraces the tensions of the middle range and keeps alive the question of whether the study is adequate for its various audiences. In the next section I will examine the ways in which multi-sited approaches have been deployed in contemporary STS, in particular fleshing out the tensions and ambivalences that this contemporary manifestation of the middle range brings with it. This next section demonstrates that studies of scientific and technical cultures provide some rich exemplars of innovative research designs, and have in the process developed insightful conversations about methodological adequacy in terms of the kind of world we depict and the interventions which we wish to make in it.

Multi-sited Imaginaries in Science Studies

Whilst clearly not the only methodology used within STS, ethnography does have a special place in its heart. The laboratory ethnography has a key role in the foundation myth of contemporary sociological approaches to scientific knowledge, many of which would place themselves in explicit opposition to Merton as well as to philosophical accounts of science. Recent summaries of the discipline will serve here to illustrate the role that ethnographies in laboratories play in the stories that the discipline tells about itself. Rouse (1993) credits laboratory studies for their contribution to a dramatic transformation in the agenda for understanding science. In similar style, Sismondo has a chapter entitled "Laboratories", which begins as follows:

> In the 1970s a number of science and technology studies (S&TS) researchers more or less simultaneously identified a novel approach to the study of science and technology. They went into laboratories to study the practical and day-to-day scientific work. (Sismondo 2004, 86)

He describes how this approach treated the knowledge construction process anthropologically, enabling ethnographers to examine the practices which constituted scientific facts, and thus to engage with philosophical statements

about the nature of science. Similarly again, Golinski (1998) describes the analytic thrust of the laboratory ethnographers, but he also raises a concern with the limitations that this focus might entail:

> These studies were characteristically focused on a single laboratory; they generally displayed no interest in social forces beyond the laboratory walls. The claim was that interactions among small groups of researchers were no less "social" than large-scale forces, such as classes or political movements. However plausible this is, it certainly suggested a more restricted specification of the social context relevant to understanding scientific practice than had previously been claimed. (Golinski 1998, 11)

These descriptions of the early laboratory ethnographies point in interesting ways to the notion of adequacy. According to these accounts the adequacy of laboratory studies is in their ability to make the crucial point about science upon which contemporary constructivist sociology of scientific knowledge rests and to distinguish it from philosophical accounts. In so doing, however, Golinski suggests, they narrow the scope of interest to what goes on within the laboratory. Whether accidentally or by design, this move renders a very conventional notion of ethnography to be the appropriate methodology for studying science. Latour and Woolgar (1986) make the point most explicit of all, in their characterization of scientists as the "tribe" whose beliefs the visiting anthropologist is to reveal. No doubt this caricature was a deliberate rhetorical flourish. Nonetheless, the iconic status of laboratory ethnographies as the ideal methodological form for sociology of scientific knowledge would offer some problems if taken as a prescription for ongoing work and as a boundary for the legitimate interests of a sociology of science. Limitations for the understanding of science have been pointed out: Keating, Cambrosio, and Mackenzie (1992) particularly raised concerns that ethnography within the laboratory neglected some relevant structures to which scientists oriented their work, notably the discipline.

Latour himself took the methodological argument one step further by arguing that if we now believed that what was going on in the laboratory was ordinary social practice, we would have to move outside the laboratory in order to find out how it came to seem that something special was going on (Latour, 1983). He exhorted that:

> "... sociologists of scientific practice should avoid being shy and sticking only to the level of the laboratory (for this level does not exist) and being proud of diving inside laboratory walls, because laboratories are the places where the inside/outside relations are reversed. In other words, since laboratory practices lead us constantly inside/outside and upside/down,

> we should be faithful to our field and follow our objects through all their transformations. (Latour 1983, 160)

It is notable, however, that this time Latour pitched his argument by engaging not with ethnographic experience, but with historical materials. By exploiting his mobility as a historical analyst Latour is able to show us Pasteur in the laboratory and in the farmyard, and focus his analysis on the movements of people, concepts and artifacts between these sites. Actor network theory has often not been overtly ethnographic, nor indeed has it dwelt particularly on any links with methodological traditions from social science or anthropology. The point arises in a paper by Bruni, describing an ethnographic approach based around shadowing a non-human, a digital clinical record system, studying the varying ways in which it is organizationally accomplished on a daily basis. Bruni recounts in a footnote that:

> An anonymous reviewer asked what the difference is between such an approach and "standard" actor network theory (ANT). I am grateful to the reviewer for this remark and I would like to reply that "standard" ANT does not use ethnography (not explicitly, at least). (Bruni 2005, 375)

In his own work, Bruni develops a form of ethnography which he argues is fit for the reality he encounters when he tries to develop an approach to understanding the heterogeneity and multiplicity of organizations, and particularly the involvement of non-humans in the accomplishment of organizational reality. Bruni portrays his approach as an ethnographic solution to the ANT challenge.

Bruni is not alone in the development of innovative ethnographic forms in STS, and it is possible to trace a considerable body of STS work which aims to innovate in the direction of multi-sited approaches. The division between single sited and multi-sited studies is of course as hard to sustain as any dichotomy once we examine it closely. There are some prominent studies within the tradition of laboratory studies which have taken comparisons between sites (notably Knorr Cetina, 1999), or even clashes between different sites working in the same field (significantly, and over a period of many years, Collins [1985, 2004], as their object. These studies are multi-sited, in a straightforward sense. They do not, however, necessarily capture the spirit of the multi-sited imaginary if they begin from given notions of the sites themselves. By studying differences between laboratories we once more assume that laboratories are distinct sites, and that sites contain culturally significant wholes. The upshot of the contemporary anthropological thinking suffusing the more imaginative developments in ethnography is that these bounded cultural entities rarely exist, and it is a distraction to assume in

advance that they can usefully define our studies. Rather than going to identified places to study science, the spatiality of science becomes a topic of exploration in itself (Law and Mol, 2001). Amongst multi-sited studies it is therefore more usual to place studies which remain more ambivalent about relevant locations, and which make it part of their goal to find out where interesting things might be going on.

I will now describe some of these multi-sited STS studies to demonstrate the ways in which their methodological strategies express contemporary concerns with the middle range concepts of adequacy and engagement. An entry into this territory is provided by Hess (2001), who gives an account of the history of ethnography in STS. He positions laboratory ethnographies as the first generation, succeeded by a second comprising studies focused on wider social issues instead of the construction of scientific knowledge per se. Hess makes explicit a link between the goals of these studies and the places which they chose to examine:

> Second-generation ethnographies have tended to be more oriented toward social problems (environmental, class, race, sex, sexuality and colonial) in addition to theoretical problems in the sociology and philosophy of knowledge. Consequently, the second-generation tends to have a wider field site than the laboratory or core set of a controversy. (Hess 2001, 236)

Hess acknowledges that the "generational" characterization is a somewhat crude heuristic device: the different generations are as much a product of different networks of researchers as they are a sign of a wholesale development in a singular field over time. Nonetheless, he portrays a shift towards a different style of problem, considering that a move towards greater interest in issues of culture and power prompts an accompanying methodological tendency towards sites outside the laboratory. Whilst not all of these studies are multi-sited, many become so as they seek to explore the ways that knowledge moves and is transformed in diverse sites of practice.

Hess (2001) considers the qualities that a good ethnography in STS should exhibit. Good ethnographies, for Hess, display a deep knowledge of the field of endeavor they cover, they contain surprises and subvert the obvious. They also contribute to existing bodies of work. Here Hess visits that tension which Merton identified between theoretical ambition and empirical data:

> There is a tension between the tendency to immerse oneself in the complexities of ethnographic detail and the tendency to produce an explicit contribution to a research tradition of theoretical models and empirical findings, but I would maintain that good ethnography can and should do both. (Hess 2001, 239)

Hess, then, inhabits a similar territory of methodological aspirations to Merton. He continues, however, to flesh out an additional quality of a good ethnography which has become important to STS: the ability to intervene. Hess considers that the notion of intervention has proved pivotal for the post-constructivist second wave of STS ethnography that he identifies, but as a problematic rather than a prescription. Just as identified by Marcus for the multi-sited imaginary, STS scholars have found that wanting to produce studies with purpose does not necessarily mean that a recipe for intervention will emerge: the sense of purpose, instead, is adapted as the project itself comes into being. Because of the multiple relations into which they enter with their research fields, and because of the heterogeneous and often ambiguous nature of their experiences, researchers in this multi-sited tradition are both compelled and cautioned where intervention is concerned. Their engagement draws them into an active relationship with the field at the same time as they become aware of their own inability to draw a plausibly encompassing "bigger picture". Hess's picture of the second wave STS ethnographer is a figure inhabiting a highly charged middle range, embodying the pull between the extremes of their aspirations and their experiences.

A notable pioneer in exploring this territory has been Deborah Heath. In a keynote address to the *Virtual Society? Get Real!* conference in 2000, she outlined the challenge for studying contemporary genomics thus:

> Tracking genetics and genomics anthropologically during the past decade has required an agile ethnographic practice, in order to provide a map of the cultural contexts of knowledge production in this rapidly changing field of inquiry. Doing anthropology of genetics both *in vivo* and *in silico* requires a readiness to hyperlink between diverse fieldsites—lab, clinic, lay advocacy groups, both on-line and off-line—and between a wide array of human and nonhuman interlocutors (Heath, 2000).

The concept is further fleshed out by Heath et al. (1999) in an account of a study of genetic knowledge production across diverse sites. The term "location work" is used to denote the ways in which knowledge travels across sites and yet is made specific, and appropriate, to the various places that it connects. As a component of engagement with diverse locations Heath takes on the spirit of circumstantial activism that Marcus calls for, particularly in the notion of modest intervention (Heath, 1997), which she sees as appropriate for a researcher moving between groups and forming complex ethical engagements with them. Modest intervention lays aside

claims to grand pronouncements, and focuses instead on developing situated conversations.

While Heath uses the multi-sited approach in sociology of science, it has also proved potent in the sociology of technology. One iconic example of this approach is the Zimbabwe bush pump, as described by de Laet and Mol (2000).

> The Pump is a mechanical object, it is a hydraulic system, but it is also a device installed by the community, a health promoter and a nation-building apparatus. It has each of these identities—and each comes with its own different boundaries. (de Laet and Mol 2000, 252)

The description which de Laet and Mol offer of the bush pump shows how it is flexibly and variably defined, and how assessing even whether it is working successfully or not is a highly contextual judgement which can rarely be given without qualification. The identity of the technology, and thus where to start and stop in studying it cannot be decided in advance. Indeed, it is by following a trail that led them to places they could not have defined beforehand that de Laet and Mol arrived at their argument about the particular quality of the bush pump, its fluidity, which accounted for its success. Had they set out with a defined idea of what the technology was, they would not have found out what they did. Their advice is to suspend judgment on the appropriateness of various sites, but instead to engage with the situations that they find.

This argument is made explicitly methodological by Law (2004) in a book provocatively titled *After Method*. Law starts from the proposition that methods in social science are constitutive of, rather than reflective of social reality (Law and Urry, 2004). Law (2004) argues that the world is an inherently messy and complex place, and that any attempt to superimpose the methodological stances of social science upon that situation will inevitably do injustices to some features of the situation. Our methodological instincts are to clean up complexity and tell straightforward linear stories, and thus we tend to exclude descriptions that are faithful to experiences of mess, ambivalence, elusiveness and multiplicity. Law argues that we need to examine our methods for the directions in which they push us, and consider whether their biases and exclusions are desirable ones. He suggests that we face up to the selective nature of methods, and try to develop alternative forms that select for different qualities than linearity and order, focusing in on the researcher's agency as a constructor of reality and not hiding behind portrayals of method as mere technique. Applied to technologies, this means

accepting that there are many versions of what a given technology is and how it is bounded, and trying to address some of this complexity with our methodological approaches. Applied to science, this certainly suggests designing studies that take us beyond the bounds of individual laboratories.

Another shining example of methodological innovation, with a distinctive theoretical twist, is provided by Mol (2002). Taking as her focus the different manifestations, or enactments, of her chosen research object atherosclerosis in varying locations around a hospital, Mol argues that she is able to move theoretically beyond assertions about the constructed nature of objects. The strategic attention to practices in different locations moves her from looking at construction to concerning herself with matters of coordination and dislocation, and from epistemology to the inherent multiplicity of ontology. This means that her account becomes an account of locatedness in a deeper and more inquisitive sense than would be permitted by exploring any one of the forms of atherosclerosis that she encounters in isolation. Moving around gives Mol a substantial new tool for theoretical intervention. Her ethnography seems to be a remarkable example of the strategy that Marcus (1995) advocated, following the object as a means to scope out an ethnographic project. Mol's insights do not happen just because she moves around. She does far more than that. But her mobility enables her to see the practices that she encounters in a distinctive light, allowing her to formulate a new theoretical intervention. Mol epitomizes the multi-sited imaginary as a knowledge form both engaged with technoscientific experience and oriented to contemporary theoretical needs.

Multiplicity has become a common theme in multi-sited ethnographies focusing on technological objects. One of the most straightforward ways to find diversity, after all, is to go somewhere else and describe the different conditions that prevail. There are, however, some important analytical twists that help the multi-sited STS ethnographer to avoid settling unproblematically on the facticity of diversity. Jensen argues that the focus, rather than diversity, needs instead to be on the ways in which coherent objects emerge. In his study of the multiple manifestations of the electronic patient record he set out to study Jensen proposes a focus on "the ontological stabilization and destabilization of objects" (Jensen 2004, 15) drawing on Latour's (1999) partially existing objects. This shift neatly sidesteps the position of characterizing the world as inherently complex, or objects as inherently multiple, and reasserts the STS sensitivity to symmetry, by offering the possibility that both complexity and coherence could be situated achievements rather than straightforward matters of fact. This observation provides an STS-style twist on Merton's exhortation to provide accounts

that are faithful to the way the world is. Jensen suggests that STS can remain ambivalent about the nature of the world, even drawing back from describing it as inherently complex.

In this section I have explored some diverse methodological innovations in recent STS, that engage with the idea of multi-sited ethnography and find in it a means to explore new ways of intervening and of representing the realities that the ethnographer experiences. Much of STS has diverged a long way from Merton in theory and methodology, but still some of the spirit of his exhortations to produce middle range theory has resonances with the contemporary STS experiments in multi-sited ethnography. Different strands of thought are, however, evident, most notably in the diversity of audiences and forms of engagement with them that contemporary researchers envisage, and in concerns about our capacity to produce robust portrayals of the way the world is. Multiplicity and ambivalence are important aspects of the contemporary STS reworking of the middle range.

Ethnographic Experiments, and Almost Doing Ethnography

Having celebrated the innovative capacities of multi-sited approaches and in particular their embrace of multiplicity and ambivalence, it remains to ask whether their relationship with methodological traditions and guidelines is similarly complex. Whilst striving to be adequate portrayals of the world, and appropriately engaged with audience concerns, multi-sited studies may not, for some observers, count as adequate representatives of the ethnographic approach. In particular, there is a potential for loss of the depth of engagement that is often thought of as intrinsic to ethnographies. In response to this concern there is thus a tendency for studies to describe themselves not confidently as "ethnographies", but rather less directly as bringing "ethnographic sensibility" (Star 1999, 383) or carrying out a "quasi-ethnographic study". (Jensen 2004, 3). In this final section I will describe the emergence of methodological solutions in some of my own recent work in order to illustrate the ambiguous relationship which multi-sited approaches can have with more orthodox ethnography. By exploring the particular methodological solution that I arrived at in some detail I hope to illustrate that the middle range tension embodied by the multi-sited ethnographer encompasses not just engagement with audiences and adequate representations of experienced realities, but also the maintenance of appropriate relationships with methodological traditions such as ethnography itself.

In using the phrase "virtual ethnography" (Hine, 2000) the aim was to signal an ambivalent relationship with the ethnographic canon. I described the style of ethnography that I aspired to conduct in, through and around the internet as virtual in the old-fashioned sense of the term, meaning to hint that it was almost the real thing, or good enough for practical purposes. This methodology that was virtually ethnography was adequate, I claimed, as a means of exploring the cultural connections and ramifications that internet activities entailed. Specifically, I wanted to advocate studies that would range around between online and offline activities, exploring connections between them without assuming that online and offline would be maintained as distinct cultural spheres. In pointing to the "virtual" nature of the methodology I aimed to maintain dialogue with established ethnographic principles and practices whilst opening up space for methodological innovation in directions that would be more troubling for that tradition.

More recently I have developed an increasing sensitivity about claiming the label of ethnography, which is related to the increasingly diverse forms of connection that I explore. In a recent study I have been tracing developments in use of information and communication technologies (ICTs) in biological systematics (Hine, forthcoming 2008). In exploring how these developments make sense to those involved, I have been taken to diverse situations, including online discussion forums, museums, botanic gardens and herbaria, policy documents and web sites, journals, conferences, interviews, emails and informal conversations. This research has been multi-sited, in the sense that I have gone to many different places to explore different aspects of my phenomenon. It has also been possible to explore how various sites define and inform one another in dynamic fashion. A mailing list could be studied both as an instance of the embedding of ICTs in the discipline and as a site where the discipline itself was progressively enacted and redefined. A government report wove together ideas about the status of the discipline with belief in the qualities of new information technologies as socially transformative and symbolically potent. Landscapes of interconnected institutions and initiatives emerged on the internet, providing a territory of their own to navigate with ethnographic sensibilities. Institutions, with their rich material cultures and their finely tuned awareness of political nature and historical legacy, provide the fertile ground from which diverse internet initiatives emerge and interconnect. Tracking the development of ICTs has taken me through diverse aspects of the discipline, and also entailed recognition that the discipline is itself both a continually enacted process and an important structuring feature.

Doing this research has also involved engagement with diverse groups and individuals. The research has found some resonances that I hoped to

activate with audiences, has involved me in facing some which I found challenging and troubling, and has enabled me to design in and seek out some sets of resonances to enable me to engage in a wider debate. I hoped to activate resonances within the systematics community, particularly in discussing the understanding of user needs which informs the development of internet resources and exploring the possibility of adding STS sensitivities to the mix. This has been to some degree successful and certainly accounts of the complex accountabilities that shape the current landscape of initiatives have found some resonance within the institutions concerned. Other resonances that I hoped to explore were with different fields of science where investments were being made in ICTs. Whilst the technologies themselves differed, and this was sometimes seen as limiting the relevance of my observations, I had some success in forging common ground with policy makers and practitioners in these fields. The research was not, it seemed, inherently relevant to this potential audience, but in some formulations it was feasible to render it as relevant.

More numerous than engagements with systematists and science policy makers, and sometimes challenging, have been the connections made with mailing list users. Researching a mailing list in overt fashion results in a diverse set of engagements, and in this case involved a commitment to share research findings for comment with the 1,400 users of the list. Each may have only a passing interest in my project, and I have become used to "selling" my project in bite-sized pieces and fleeting encounters. As in many ethnographies whether multi-sited or not, the resonances and the kinds of engagement vary widely in scale, from an individual chat or a passing email comment to formal reports and presentations. However, the sheer range of possible engagements that a multi-sited approach offers does add something quite special, as does the need for sensitivity about the boundary between interesting research insights and gossip carried inappropriately around the field.

The resulting methodological solution was adaptive, in that I sought not to follow methodological canon for its own sake, but to develop an approach that felt adequately engaged with the reality that I experienced and that some audiences might want to hear about. In the end, however, I have sometimes described my methodology as "a methodologically eccentric historico-ethnographical autobiographically-inflected thematic analysis of the material and communicative culture of systematics" rather than simply as an ethnography. This is a tongue-in-cheek formulation, in line with the initial usage of "virtual ethnography" to distance myself from the "real" thing: I would not wish to be open to accusations that I did not

know what counted as adequate ethnography in the formal tradition. Less flippantly, I would suggest that claims about fitness for a purpose, albeit an emergent and ephemeral purpose, can be framed without relying on canonical versions of what methodologies should be. Still, the relationship with ethnography remained important, as an inspiration and source of guidance. Canons exist for reasons, and it is good to know at least what your transgressions are, even if you choose to persist in them.

Conclusion

In adopting the multi-sited imaginary, contemporary STS is both shaping a picture of the way the world is, and making propositions about its own role in accounting, and intervening in that world. The multi-sited imaginary situates research itself as an intervention, highlighting that the form of stories we deem acceptable, and the choices we make in developing encounters into research projects, are themselves ways of intervening (Zuiderent, 2002). Adequate stories, in this sense, are often ones that find audiences for whom they are news, which have the capacity to surprise, challenge, or offer new conceptualizations. Multi-sitedness may be portrayed as adequate for particular forms of intervention: more often, however, it appears that these approaches are required because of the way the sites and technologies we study are (Henriksen, 2002). Scholars in many fields, STS included, feel that our world is a complex place, and that our methods for describing and understanding it need to adapt accordingly. Complexity is becoming the new orthodoxy, even while STS sensitivity to the achieved nature of accounts of reality serves to remind that, after all, simplicity and complexity are both situated achievements. The methodological approaches which respond to and reinforce the experience of complexity include: the tendency to range around in the pursuit of appropriately engaged studies of our research objects; a focus on diversity as the key insight of ethnography, resisting the urge to find common threads or singular stories; and a tendency to stretch the notion of ethnography beyond comfortable limits.

The multi-sited imaginary has proved for science studies to be a handy way, at the present moment, for pursuing a course that is both engaged with the experience of scientific practice and adequate for a variety of current theoretical concerns and policy-related issues. Being multi-sited is a way to engage with scientific and technical practice in complex allegiances that go beyond description and critique. As Merton suggested, it seems that certain kinds of endeavor are appropriate at particular times, and the multi-sited

approach seems particularly relevant just now for science studies—because of the laboratory ethnographies that have laid the ground, because of the complex forms of connection that contemporary science and technology seem to entail, and because the time feels right for some science studies messages to be heard by some diverse audiences.

It appears that an adventurous spirit in designing ethnographies could get us a long way, both in terms of engaging with the experience of scientific and technical work, and in forming an adequate basis for theoretical and practical intervention. Moving around gives us ways to suspend judgment about the appropriate places to study experience and make interventions and the appropriate ways to reproduce methodologies. It allows us to embody the middle range, rather than designing studies to address it. Merton wanted middle range theory to guide hypothesis development for purposively designed studies. I want something rather more itinerant, emergent and anarchic, although I want it for some of the same reasons. In particular, it has been particularly effective to decouple laboratories and ethnography, even when the focus of our interest is scientific practice. Whilst it was once of a vital strategic importance to "go inside the laboratory", it is now often more timely for STS to pursue the ways in which science is practiced across sites and the ways in which it practices sites.

Placing too much emphasis on the laboratory as a field site for ethnography will increasingly be an obstacle to developing approaches that engage with the experience of doing science: because science is about practices carried out between varyingly identified groups and institutions and individuals; because it increasingly takes place not just in physically bounded laboratories but also in computer-mediated locations; because different media combine into complex communication ecologies; because material and virtual cultures are imbricated and intextricable; and because we need to be agile, itinerant and attentive if we are to trace these connections. Also, too much focus on laboratory ethnographies ties us into a representation of science that may have little purchase for the policy makers and practitioners we might want to influence and the theoretical directions that we might want to develop. New methodological directions have the capacity to take us to new theoretical places and to new policy locations.

Along the way, however, it may be dangerous to abandon methodological canon altogether. Law (2004) exhorts us to move beyond method in exploring ways of expressing complexity. STS has, in practice, little in the way of formal methodological guidance to leave behind, having been understandably wary of straightforward methodological recipes for elucidating reality. Increasing methodological experimentation, and apparent distance

from tenets of ethnographic enquiry may lead to problems, however, even where they are designed with the goal of adequate and engaged studies for the contemporary sensibility in mind. Too much emphasis on innovation can be a concern both in terms of relations with audiences who respect the strength of methodological tradition, and in bringing on new generations of scholars appropriately skilled to experience, to intervene, and to engage with diverse audiences. It may be fruitful to strengthen and renew our traditions of skill-sharing, moving them beyond the traditional apprenticeship model of doctoral students and into more open and generally interactive forums, and developing forms of methodological conversation which help to explicate methodological solutions and make them topics in their own right.

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