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SPECIAL ISSUE EASST010
Practicing Science and Technology,
Performing the Social

cover

The Beggar Robot by Sašo Sedlaček (Slovenia)

Beggar Robot is a robot for the materially deprived and is constructed entirely from old computer hardware and a few spare parts that were obtained at no cost. As a low-tech, friendly device, it advocates three main ideas in contemporary activism. It is a surrogate agency created for a world in which the marginalized such as impoverished individuals and families, refugees and asylum seekers, elderly people, disabled people, and those hidden from the public view, will never step onto the street to beg, except in the most dire of circumstances. The robot has access to areas normally off-limits to beggars, such as shopping malls and community events, where the richer members of society more often frequent.

The hypothesis is that this part of society is only able to show some sympathy towards the marginalized if they communicate from a safe distance and via a technological interface. The project tests and exploits the advantages of robotic interface by bringing the Beggar Robot to public spaces in different countries and adapting it to the local context and local language, to beg in the name of the poor. The project is both a social experiment and a low-key, humorous charity action, which raises public awareness of invisible deprivation and possible remedies.

As a machine built out of computer parts recycled from the ever-growing electronic junkyards, the robot also bears an environmental consciousness for a world dominated by the ideology of endless development. Moreover, the robot advocates the concepts of open source and do-it-yourself tactics and their consequences for social action, by allowing people to freely make their own copy of the robot. Anyone interested in obtaining the instructions of how to build their own robot replica can leave a contact with the robot, or go to the artist's website (www.sasosedlacek.com).

Tecnoscienza è una rivista scientifica che indaga i rapporti tra scienza, tecnologia e società. La rivista è semestrale, open access e peer reviewed; la rivista è gestita da un Comitato di Redazione, con la supervisione di un Comitato Scientifico Internazionale.

***Tecnoscienza** is a scientific journal focusing on the relationships between science, technology and society. The Journal is published twice a year with an open access and peer reviewed policy; it is managed by an Editorial Board with the supervision of an International Advisory Board.*



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Editors' Note

This third issue of “Tecnoscienza” is a special one, from various points of view and in many respects.

Its special value mainly lies in the fact that it is entirely dedicated to the EASST010 Conference, the biennial forum of the European Association for the Study of Science and Technology (EASST – www.easst.net), held, for the first time, in Italy (at the University of Trento) in September 2010 and co-organized by STS Italia.

As from its title (“Practicing Science and Technology, Performing the Social”), the particular focus of the conference was on science and technology as performative domains of an ecology of sociomaterial practices. In fact, if a key characteristic of the contemporary world is the role played by scientific knowledge and technological artefacts in the production and reproduction of that peculiar configuration that is often called “society”, then the concepts of practice and performance provide a unique perspective for studying and observing scientific and technological innovations, as well as the articulations of different forms of sociality and ideas of the social. This is the challenge that researchers are nowadays called to face in key areas such as medicine and genomics, body and gender, work and organizations, communication and consumption, geographies and space.

As a partial but representative follow-up to the aims and results of the conference, in this issue we propose a selection of excerpts deriving in different ways from the experience of the Trento colloquium.

The first section (“Lectures”) is devoted to keynote speeches, following the same order in which they were delivered at the conference. Retrospectively, it is interesting to notice how each of them challenges current STS perspectives.

Adopting a storytelling approach, in the first lecture, Silvia Gherardi tells the story (or rather stories) of the ongoing conversations that, over time, have given a situated meaning to the black box of STS. Focusing on intellectual traditions and research trajectories, Gherardi narrates the intricate (as well as intimate) texture of books, authors, images and metaphors that have contributed to build a STS-oriented perspective. At the same time, she highlights some of the key challenges currently facing STS, such as how a generation of academics is going to pass the baton to a younger one.

Lucy Suchman deals with the problem of how STS researchers make the objects of their research, considering that researchers are an integral part of the practices through which their research objects are made. The situated use of a schedule in a “centre of coordination” is turned by Suchman into a generative example for questioning the order and mess regime that informs what researchers regard as productive and coherent units of analysis. “The delineation

of a practice is always and irremediably part *of* a practice", she writes, so that the responsibility of our research lies in the systematic and necessary exclusions performed in our practice.

The collage by Pelle Ehn is a work consisting of three different layers of images and texts, which aims at envisioning ways to combine creative design with participatory approaches. Referring to a few "circulating references" (texts, EU research project, teaching experiences), this speech addresses the challenge of encompassing aesthetic and democratic practices and values in designing "things". In particular, as Ehn argues, by "drawing things together" and "making things public".

Mike Michael's lecture treats of the technoscientific body, focusing on the role of peculiar objects whose effect upon bodies enables the emergence (and conventionalization) of new emotions and feelings. Stem cells and rolling luggage may seem not to have much in common with each other, but in this contribution they provide different occasions for reflecting on the construction of the technoscientific body, both in scientific and mundane domains. Finally, Michael pushes his reflection further, calling for the use of anecdotes as a methodological strategy to account for emerging phenomena (in our case, emotions and configurations of the technoscientific body).

The last lecture, by Amade M'charek, engages with the question of race in practices, reframing two dominant and dichotomous notions as mutually constitutive: race as a fact and race as a fiction. Presenting the intriguing case of the discovery (in the Netherlands) of a grave of a ten-year-old child dating back to the 13th century, M'charek shows how race is enacted through factual and fictional practices. The challenge is thus not to distinguish "facts" from "fictions", but rather to trace the connections between the two.

As conference participants, we have been struck these contributions, not only for their analytical quality, but also for the way they were performed and their evocative power. As editors, we think they are a perfect representation of the highly articulated and differentiated landscape of contemporary science & technology studies and of how STS can contribute to the understanding of a wide range of social phenomena and issues. Moreover, each speech adopts a twofold, reflexive logic: authors do not just make a point at the theoretical and/or methodological level, but they question the relevance and the implications of the point made for science and technology studies, showing their willingness not to take for granted knowledge categories and classifications (not even the ones produced in the field of STS!). Finally, from our point of view, it is quite evident how, in each speech, language, narration and analytical reflection are not 'wor(l)ds apart', but constitutive of one another. This is something STS learned quite a long time ago, and we think it is not just a matter of rhetoric to remind it.

The section "Debates" hosts two other texts deriving in some way from the EASST010 Conference. The first one consists in a debate around one of the books presented at the conference – *Care in practice* –, discussed for "Tecnoscienza" by three Italian scholars, to whom the book's authors reply. The se-

cond text presents an interview with Christine Hine, a well-known author in the field of STS, but also the person who (during her past EASST presidency) created the first connection between EASST and STS Italia.

Last but not least, the cover captures an instant of a performance hosted by the Trento conference, based on the work of the Slovenian artist Sašo Sedlaček and its Beggar Robot.

In order to enhance not only the international scope of this issue, but also its willingness to widen the geographical focus on the STS world, the Journal features a new section called “Cartographies”, with the aim of mapping the reception and diffusion of STS in countries different from the ones traditionally taken into account (Netherlands, United Kingdom, North America and Scandinavia). We start this new section by presenting a review of Spanish studies influenced by Actor-Network Theory. Following the same logic, the book review section is also given a “renewed look”, featuring reviews of mainly non-Anglo-American books.

As a result, and for the first time, “Tecnoscienza” is in English only. This is a particular achievement we aimed to pursue as part of the journal project; it is not a coincidence that, since the very beginning, “Tecnoscienza” has been supplemented by an English subtitle (“Italian Journal of Science and Technology Studies”), featuring bilingual abstracts of articles and debates and soon proposing increasing parts of the journal entirely in English.

Our aim for the future is to preserve the national character of the journal project – offering an otherwise absent space for debate and discussion to STS Italian scholars – but always finding strategies and occasions for dialoguing and connecting with the international English-speaking arena. We take this as a necessary but also challenging horizon to look at, in order to make sense of the never-ending, fluid and hybrid character of contemporary society and... of STS as well.

The Editorial Board

Acknowledgements

When it comes to special occasions, some special thanks are owed.

We would like to express our gratitude, first of all, to Pelle Ehn, Silvia Gherardi, Amade M’Charek, Mike Michael and Lucy Suchman for their vivid talks and their kind help in transcribing their speeches into written texts, making them available to our Journal and its readers. We would also like to thank Liam Bannon for the efforts he put in revising his keynote speech, although for a series of problems and time constraints we were not able to publish it in this issue. But the future is unwritten (to quote the Clash), so we hope to be able to publish Liam’s contribution in one of the next issues.

6 EDITORS' NOTE

These particular acknowledgements are not intended to slight the commitment and hard work of all the other authors (Jorge Castillo Sepúlveda, Christine Hine, Annemarie Mol, Ingunn Moser, Jeannette Pols... just to name our 'international guests') who contributed to make this issue a special one. Our gratitude also goes to them.

The EASST010 Conference, as well as this "Tecnoscienza" issue, would not have had its 'logo' (and 'mascot') without the kindness and cooperation of Sašo Sedlaček and its Beggar Robot. This is just an ironic, easy way to thank an artist whose work has also triggered serious reflections.

Finally, our warmest thanks go to the EASST Board and to its current President, Fred Steward. The whole EASST010 experience would not have been possible without their supportive attitude and practical help. We therefore owe EASST a special debt of gratitude and, in this sense, we are glad to recognise its valuable role in the making not only of the EASST010 Conference, but also of this special issue.



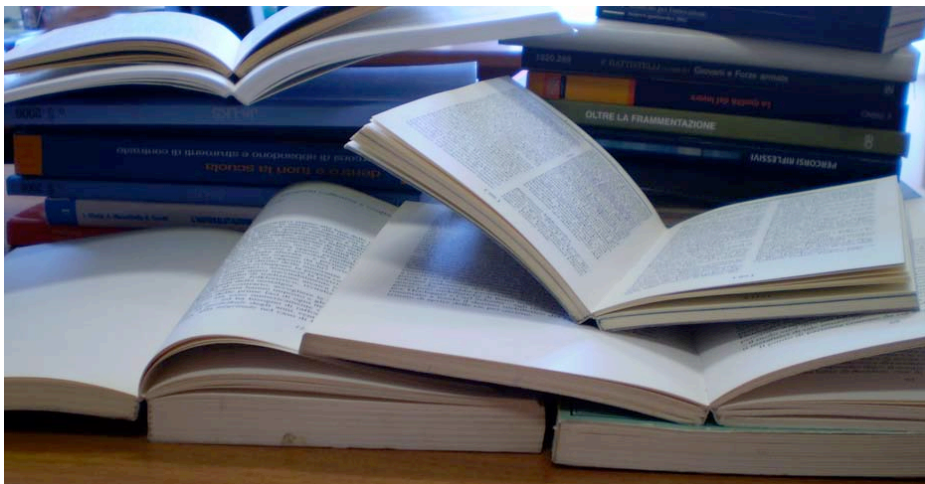
EASST010 - During the welcome aperitif

A Text of Texts...almost a Texture

Silvia Gherardi

Abstract: This lecture intends to be a journey through ongoing conversations that over time gave a situated meaning to the black box of STS. It tells the story (or rather stories) of how these perspectives have influenced the study targets of various groups of researchers, mainly sociologists and students of organization, technology and science. Using a narrative technique, it places the reference texts of the authors who have helped to build the STS perspective centre stage. The lecture focuses on traditions, authors and intellectual and research trajectories, and then concentrates on the ways in which we are preparing to pass the baton to a younger generation of academics, both in Italy and elsewhere. It also highlights how this new generation is acquiring relevance in the ongoing debate surrounding the social sciences. The texts examined represent the dense texture of the diverse STS perspectives.

Keywords: narration; text; texture; technology; situated knowledge.



The invitation to speak at the first Italian EASST conference is a great honour and gave me the opportunity to rethink and to reflect on the way STS studies were welcomed to Trento and what this meant to the group of people (mainly labour and organization sociologists and scholars of technology and industrial relations) who began working here at the beginning of the '80s. Many of them are still here and are ready to pass the baton to the next generation of scholars, those who recently set up STS Italia.

I wish to tell a local story, a personal and collective narrative from the margins, in order to contextualise this conference within an intellectual tradition and a disciplinary field. My story is intended to be a journey through ongoing conversations that over time gave a situated meaning to the black box of STS. I chose some texts, images and metaphors to be the spokespersons of flesh and blood authors, many of whom are here in the audience and hopefully can join in my narrative. Every respectable story starts with 'once upon a time' and once upon a time...there were tools!

In fact, in the first issue of *Technology and Culture* (the review of the Society for the History of Technology), in 1959, we find an article by Peter Drucker, a well-known author in organization studies, another interdisciplinary field. May we say that tools and technology have long represented a common trait linking the future STS and Organization Studies?

Let's read the first lines of 'Work and Tools':

Man [!], alone of all animals, is capable of purposeful, non-organic evolution; he makes tools. This observation by Alfred Russell Wallace, co-discoverer with Darwin of the theory of evolution, may seem obvious if not trite. But it is a profound insight. [...]. One such implication is that from a biologist's (or a historian's) point of view, the technologist's identification of tool with material artefact is quite arbitrary. Language too is a tool, and so are all abstract concepts. This does not mean that the technologist's definition should be discarded. All human disciplines rest after all on similarly arbitrary distinctions. But it does mean that technologists ought to be conscious of the artificiality of their definition and careful lest it become a barrier rather than a help to knowledge and understanding. This is particularly relevant for the history of technology, I believe. According to the technologist's definition of "tool", the abacus and the geometer's compass are normally considered technology, but the multiplication table or a table of logarithms are not. Yet this arbitrary division makes all but impossible the understanding of so important a subject as the development of the technology of mathematics. Similarly the technologist's elimination of the fine arts from his field of vision blinds the historian of technology to an understanding of the relationship between scientific knowledge and technology. For scientific thought and knowledge were married to the fine arts, at least in the West, long before they even got on speaking terms with the mechanical crafts: in the mathematical number theories of the designers of the Gothic cathedral, in the geometric optics of Renaissance painting, or in the acoustics of the great Baroque organs. And Lynn T. White, Jr. has shown in several recent articles that to understand the history and development of the mechanical devices of the Middle Ages we must understand something so non-mechanical and non-material as the new concept of the dignity and sanctity of labour which St. Benedict first introduced.

We may note several things: first that gender studies, cyberfeminism and ‘political correctness’ is yet to come (but later has proved very influential in STS); the idea of semiotic-material artefacts was already there; so was the awareness of the power of categories and categorization; the link between scientific knowledge and aesthetics had already been problematized (but later was almost forgotten); finally, the symbolism of work was taken into consideration.

We were in 1959 and at that time I was at primary school and was not reading *Technology and Culture*. Today, by the way, I am surprised by this text and I like to see it as a precursor of STS vocabulary.

20 years later, a new actor – the computer – enters the scene and with it computing, the cultures of computing and so on, but... what is a computer? Sherry Turkle, in “Computer as Rorschach”, *Society* 17 (1979: 15-24) gave an answer:



Computers are projective objects, akin to Rorschach tests, those inkblots designed by a Swiss psychiatrist in order to reconstruct the inner world of respondents on the basis of their interpretations. Also for Bruno Latour (1996) and Donna Haraway (1999), computers may be seen as a projection screen, but what kind of images are seen on that screen? According to Bernward Joerges (who is a friend and a colleague who visited Trento several times in the '80s) what people see are Butterflies and Bats.



Butterflies and bats are common interpretations in the Rorschach tests that Joerges uses for interpreting sociological images of technology. Like any proper metaphor - Joerges writes - this one is meant to evoke several interpretations. In the first place, it stands for the "projectivity" of machine technology, quite in tune with Turkle's initial notion that technologies are manifestations of cultural projects. Beyond this, I use it to indicate the "dual face," the ambiguity of technology as a pervasive motif of social-science interpretations of technology. Last, however, bat and butterfly stand for the "fluttering" approach some sociologists take - now coquettish and seductive, now frightening and aversive in dealing with the new machines.

Metaphors of the field (either butterflies or bats), supercharged with meaning, were put to conceptual uses, as a theoretical resource for a sociological study of technology. In 1990 (and before in *Romancing the Machine*), Joerges was pointing at the 'distance to artefacts' in sociology. So far (in the late '80s, beginning of the '90s) sociology has not had much to say on technology *per se* and distance to artefacts was still characteristic of most sociological studies of technology.

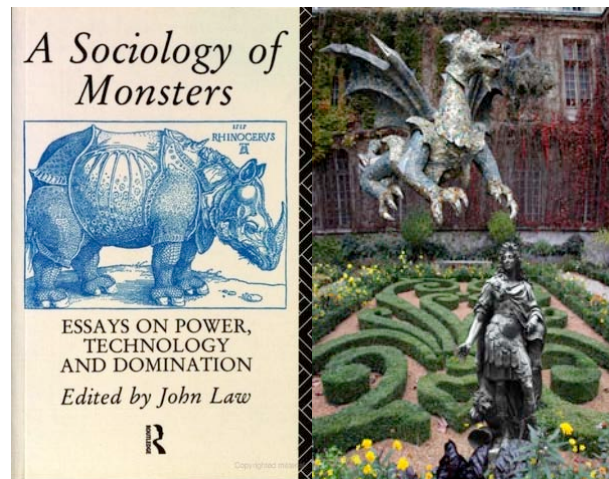
But at that time STS was about to change it:



1985, *The Social Shaping of Technology*; 1986, *Mapping the Dynamics of Science and Technology*; 1987, *The Social Construction of Technological Systems*. These books have been my teddy bears (or my dodoo as my French friends would call them) and maybe they have been a generational phenomenon. My group was introduced to these books by Attilio Masiero, a former colleague of ours who was so passionate about them that he transmitted his passion to us; although we have never been able to convince him to write a line in STS style (and nor did we!).

While this trilogy of books were opening a strand of thought based on the metaphor of construction, the reference is of course to Sergio Sismondo and his definition of STS as 'STS looks to how the things it studies are constructed'.

More or less at the same time, a terrifying reprimand was going around: science and technology become ‘monsters’, when they sever their connections with the social conditions of their production (Haraway 1991; Law 1991; Star 1991).



Another metaphor became an icon of STS and it resonates more with the empirical and methodological reflection that our group was conducting in those years. I think of *labor-atories* studies.



They helped me/us to get rid of the industrial model of work/worker/ technology and to see work differently. Scientists negotiated the nature of data and other results in conversation with each other, working toward results and argument that could be published. Scientists *work*, like many other human beings...but also non-humans work with them and make them work. Sometimes, they go out from the

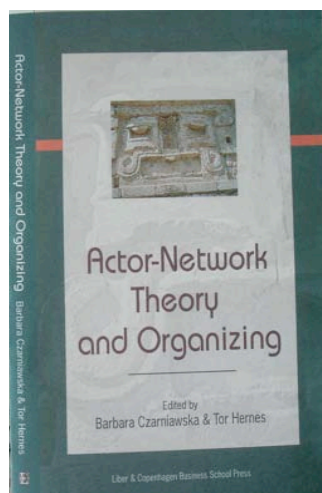
laboratory; sometimes they go to the Amazonian rain forest; or, better, the Amazonian rain forest goes into their lab.

The early work by Bruno Latour, who visited Rucola a couple of times, had a large impact on the way we were developing our approach to knowing in practice in those years.



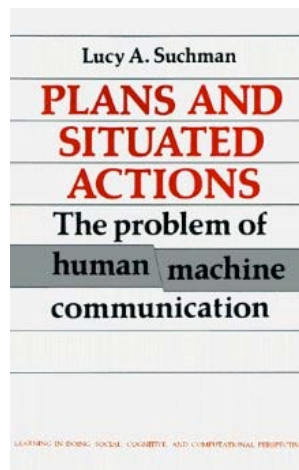
Science as practice and technology as a social practice are labels grounded in symbolic interactionism. In fact the symbolic interactionist approach treats science and technology as work, taking place in particular localities, using objects as symbols that enable work and through work the creation of scientific knowledge and technological results. This approach was nearer to our educational background in sociology and to our engagement in those years with the theme of organizational culture and with the Standing Conference on Organizational Symbolism. Our world became richer, full of boundary objects, bandwagons, ecologies of knowledge, categories and so on.

Nevertheless, it was Actor-network theory (with or without the hyphen) that offered the most powerful and enduring metaphor: a network of heterogeneous elements. Maybe it was ambiguity to offer this image a competitive advantage, but for sure ANT is the larger of the two contact points between STS and Organization Studies.



The other important contact point was the one between STS and Information Systems and, within it, with the two communities of Computer Supported Cooperative Work and Participatory Design, who were dealing (in parallel) with the design of technologies. IS, like other approaches oriented to the study of workplaces, is interested in the relations between knowledge, the individual, the collective, social structures and technology. What STS has offered to this area of studies, is an enlarged understanding of the user and the information system, an awareness of the importance of practice and the materiality of knowing, notwithstanding a qualitative-ethnographic methodology.

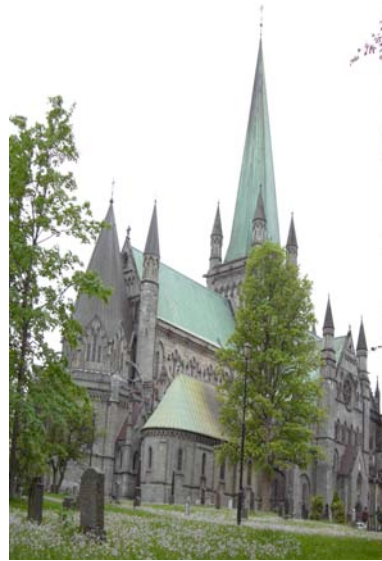
At the crossroad of STS, ANT, IS and OS, there was a very powerful concept, *situated action*, that acted as an ‘affiliative object’ (Suchman, 2005). In fact, objects are not innocent, but fraught with significance for the relations that they materialise.



In the aftermath of ‘ANT and After’ (Law and Hassard, 1999) I dare to say that we had ‘stormy weather’ full of images such as Collins and Evans third wave:



Not to mention the high church and the low church of Fuller (some years before).



These houses cut across science and politics, reconceptualising epistemic processes so that all parties can participate at all stages. An Upper house has the power to take into account; the lower house has the power to put in order; and both together have the power to follow up. I should say that the symbolism of the house, of the upper and the lower, of the division of labour, recall a gendered subtext (the story of Thales and the young servant girl) that contrasts with the presence within STS of feminist voices and epistemologies.

For STS in the years 2000s, I have the image of stormy weather. Mine is an image coming from outside but consider the voices from inside.

A growing concern for engagement seems to contrast the traditional debates on politics: STS becoming repetitive is the worry (or joy?) of Guggenheim and Nowotny in 2003, where being repetitive means that for STS there are always further artefacts to deconstruct; STS losing its provocative power is the concern for Woolgar. And in a very telling special issue in 2009, entitled 'Does STS mean Business', Woolgar, Coopmans and Neyland explored the nature and consequences of STS coming in contact with Organization and Management studies. In their introduction, the authors are more concerned with management studies (and maybe that the encounter between STS and management is recent, but the influence of STS on organization studies is long lasting, as I have tried to argue so far). But this

is not the point. I want to stress a change in vocabulary and imagination. In that special issue, Woolgar and colleagues talk of STS as a set of sensibilities, meaning that ‘it is unhelpful to construe STS as a unitary set of approaches, methods and topics’. And in the same issue Lynch calls for a time out.

During the 2000s we took a time out, and we developed some themes that were in common and were somehow labelled as STS themes differently, but we avoided to use a bland version of STS.

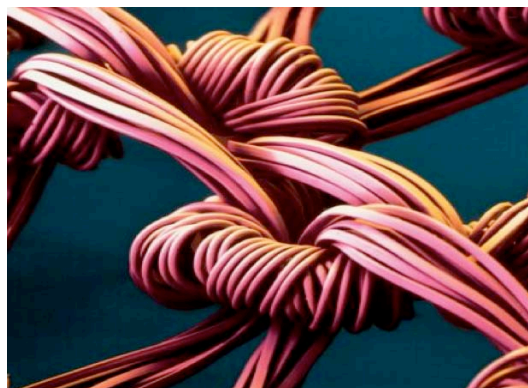
STS have been the humus, the breeding ground, of our theoretical growing up, but now our group – Rucola (<http://www3.unitn.it/rucola/>) – is known for the other acronym of PBS (Practice-based Studies...acronyms are a classic form of social control, limiting the imagination by offering mechanisms of social ordering, in Woolgar’s words!). Together with another new ‘brand’ (the aesthetic approach), Rucola has taking up the theme of what knowledge is, how knowing is collectively accomplished, how sociomaterial relationships produce social effects, what taste means for organizational practices...and more generally a search for a non rational-cognitive view of knowledge and organizations.

Our preferred image/metaphor is that of ‘texture’.

The philosophical referent for the concept of texture is the contextualism of the American philosopher Stephen Pepper: “It is doing and enduring, and enjoying: making a boat, running a race, laughing at a joke, solving a problem, communicating with a friend”. These acts are composed of interconnected activities with continuously changing patterns (notice the similarities with a concept of practice).

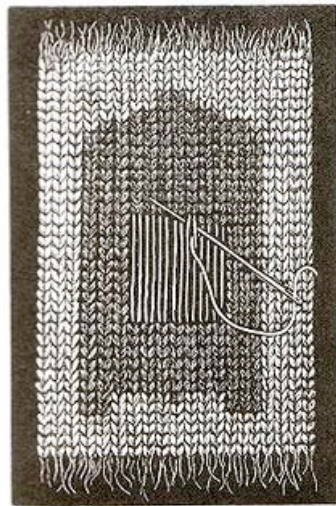
The metaphor of “texture” was taken up by a group of scholars whose reflections were published in a special issue of the *Journal of Management Studies*, edited by Robert Cooper and Stephen Fox in 1990: “The key to understanding texture is the idea of ‘connectedness in action’; this phrase brings out the definitive features of texture, its endless series of relationships which continually move into each other”.

The woven text has a texture that stretches and shrinks, and “to follow the pattern and interlacing of the composition requires the weaver’s art of looping and knotting”. *Weaving*, i.e. following the multivalent process that constitutes texture, is the analytical metaphor most appropriate for its understanding and for linking text with texture, the semiotic and the material.



Practising may be considered a mode of ordering the different elements that go into a practice. And weaving becomes the metaphor for knowing in practice, since knowledge is seen as a collective activity and not as an object.

Weaving is a traditional female craft/art and the gender subtext is strongly intended! The fabric of practical knowing and its repair in case of breakdown can necessitate different forms of weaving:



Darning is the art of invisible mending. It is a repair technique. And repair is not at the margins of order, waiting to be deployed if something goes wrong. Instead it is a practice at the centre of social order: repair work makes workplaces 'normal'.



Patching is the art of remedial mending. Patching is a practice intended to forestall any further damage and embroidering is the art of decorating quilting as a *bricolage* and the art of recycling which does not seek to conceal but instead to historicize continuity through change.



What I tried to do through this presentation is an old patchwork cover, even if my cover is made of texts and not of colourful, fancy fabrics.



Every quilter makes decisions as to what to choose or cut, what to put together to obtain good results. I left behind many nice STS images: onions, lizards, aeroplanes, oncomouses, coyotes, tricksters, simians, cyborgs, monsters.....

Quilters usually meet to exchange scraps of fabric and patterns, this being also an opportunity to communicate, to stay in touch, to build some sort of dialogue. I hope that the Trento conference will be a good place for quilters to sew their text into a collective quilt.

In the intricacies of my welcome speech I tried to include a couple of things which could prompt further discussion:

1. that in STS there are recursive images and metaphors and the repetition of these metaphors and their associated imaginaries have social and material effects;
2. that STS texts become affiliating objects that connect ideas and imaginaries in a texture of research practice;
3. that STS research practice has given momentum to a project of revising sociology's concept of the actor. The change in this concept is a change in epistemology, moving towards a relational, in-between, intra-action or interstice epistemology whose specificity is the questioning of the knowing, materially embodied and socially embedded subject.

Thank you.



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Practice and its Overflows: Reflections on Order and Mess

Lucy Suchman

Abstract The starting point of this paper is the problem of how STS researchers make the objects of their research, considering that researchers are an integral part of the practices through which their research objects are made. A “center of coordination” in an airport is used as an example to show how a schedule, used as an ordering device within the ongoing work, operates at the same time as a form of normative prescription for what the work should come to. The schedule demonstrates how prescriptive representations presuppose the work of their enactment, in ways that differ from representations used to describe “natural” events, insofar as the former are constitutive of the processes and practices to which the artifacts are accountable. Finally the paper draws on the work of John Law (2004) to show how consistent relations, i.e. orderings, are maintained through routines that, in producing other relations, constitute mess. In this respect, the order created by the researcher in analyzing the situated use of the schedule is not different in kind from the order created by the members’ practices to manage the traffic of planes.

Keywords Apparatus; center of coordination; normative prescriptions; order/mess; practice.

My starting point in this paper is the problem of how, as STS researchers, we make the objects of our research.

Given the 2010 EASST conference theme, I address this problem through the figure of “practice” – both in the sense of research methods as practice, and in the sense of “practice” as itself an object of research. My opening question is this one: what are the implications of the fact that we are an integral part of the practices through which our research objects are made?

This is of course a longstanding question for science studies, but it seems that our thinking about it has recently taken a more radical turn. Feminist science studies scholar Karen Barad (2007), in particular, has elaborated the sense of *the apparatus* in ways that extend it beyond the by now well accepted premise that instruments have material effects in the construction of scientific facts, to more

deeply conjoin agencies of observation, including subjects, and their objects. She emphasizes that we are neither outside of the world looking at it, nor are we inside of it. Rather we are *of* it. She writes:

The point is not simply to put the observer or knower back *in* the world (as if the world were a container and we needed merely to acknowledge our situatedness in it) but to understand and take account of the fact that we too are part of the world's differential becoming. And furthermore, the point is not merely that knowledge practices have material consequences, but that *practices of knowing are specific material entanglements that participate in (re)configuring the world* (Barad 2007: 91, original emphasis).

Knowing subjects and objects know, in other words – the distinction that underwrites the classic Western philosophical differentiation of epistemology from ontology – are mutually constituted, including in their enactment as separate things. And delineating lines around and between things is, as we know, a practice of boundary-making. It follows that responsible knowing requires an attentiveness to the reiterative, material-discursive practices through which object boundaries are drawn, and to the constitutive relations – and exclusions – that boundary making enacts.

In an argument that I read as deeply resonant with Barad's construct of the apparatus, John Law (2004: 14) characterizes this practice of knowledge making as a "method assemblage"; that is, enactments of "relations that make some things (representations, objects, apprehensions) present "in-here", whilst making others absent "out-there". The "out-there" comes in two forms: as manifest absence (for instance as that which is represented); or, and more problematically, as a hinterland of indefinite, necessary, but hidden Otherness," where by Otherness in this context he means that which is taken for granted, unknowable within particular knowledge systems, or actively repressed. So Law takes us, explicitly, to questions of method, of practices of drawing things together, and of making difference.

These arguments resonate for me as well with the ethnomethodological dictum that method – understood as members of the society's everyday practices of ordering, of making the social world intelligible – rather than being taken by social science to be its distinctive provenance and resource, is rather an integral part of our subject matter (Garfinkel and Rawls 2002). It is in this sense that social science methods are radically *reflexive*; that is, our own work of making sense of the world relies upon the same basic competencies through which its intelligibility is collectively enacted in the first place.

Another of ethnomethodology's insights is that, like method, theory is not the exclusive province of the social scientist: the world is full of mundane theories. One form that these take is that of normative prescriptions of various kinds – plans, policies, procedures, rules, conventions, instructions for how things should be done, maps, and the like. And of course social science methods can be formulated prescriptively as well. Conventionally, these prescriptions are taken as separate from, standing outside of practice: "In theory", we say, things happen this

way, but “in practice” it is different – where usually practice is seen as a flawed approximation of the ideal.

But a radically different strategy is to take an STS, or material-semiotic approach, and to treat these prescriptive formulations as themselves particular kinds of artifacts. Like all artifacts, these things are made in specific locations to be put into use in others – in fact, the more you think about it, the more resemblances there are to devices, with all of the problematic relations between locations of design and use that have become familiar to us through the study of technologies.

To make this all more concrete, I go back to some of my earlier research, involving a form of close analysis that, while I have not continued it in my own work, deeply informs my sense of what we might mean by “practice,” as well as my understanding of how prescriptive devices operate as artifacts (see Suchman 1993). The central device in this case is this one, the airline schedule (Fig. 1)

FLIGHT	SBT	LAX	SFO	SEA	HOU
680					21
696					8
445		1			1
677					5
644					3
420					6
647					2
677					1

Fig. 1 – Airline schedule

There are many stories that I could tell about the schedule, including its history in the emergence of the railroad in North America (historian Jo Ann Yates (1989), among others, tells this story), and the ways in which it enabled what we now think of as large scale organization both generally, and more specifically in relation to logistics. But I will frame the case here (remembering that it is already framed as an instance of the category “prescriptive devices”), in terms of a particular category of work sites, which I have suggested we think about as “centers

of coordination” (citing Latour’s famous category, the “center of calculation” – Latour 1987; Suchman 1997).

Centers of coordination – control rooms, emergency dispatch centers and the like – are concerned with problems of space and time, specifically the deployment of people and equipment across distances according to a canonical timetable, or in response to the emergent requirements of a time-critical situation. We can think of centers of coordination as designed to maintain two somewhat contradictory states of affairs.

On the one hand, to function as centers requires that they occupy a stable site to which participants distributed in space can orient, and which at any given moment they know how to find. At the same time, to coordinate a system of widely distributed activities, personnel within the site must somehow have access to the situation of others distant in space and time. A job of technologies in such settings is to resolve this contradiction through the reconfiguration of relevant spatial and temporal relations.

This particular center – the ground operations room of an international airline at a metropolitan airport in the Western United States – was the focus of a project carried out by myself and my colleagues in the Work Practice & Technology research group at Xerox PARC in the late 1980s. Our interest was to show how workers in this site, through their work’s material practice, act as skillful mediators between regimes of time and among spatially distributed participants, in the ongoing reproduction of an accountable social order. Most directly influenced by ethnomethodology at the time, our project followed a prime poststructuralist directive: *the order is in the detail*.

I’m going to take you through one brief sequence recorded during an afternoon of work in the branch of the airline’s operations dedicated to small commuter flights¹. But as I get into the specifics, keep in mind that we are interested in the work of the operations room as the production of an accountable relation between a normal order of events prescribed by the airline schedule, and a lived, contingent order of events observed and enacted by operations room personnel. We’re theorising those relations, in other words, through our close examination of this instance.

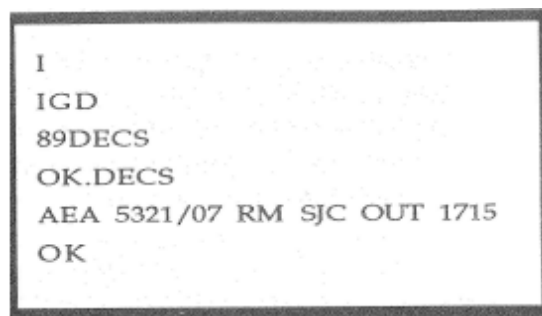
Let’s start by looking more closely at the schedule. The schedule is a technology that plots the movement of airplanes onto a two-dimensional grid of space and time. The schedule is produced at one site in the airline network (which is, in turn, constituted as central in part through its production of the schedule), and distributed to others throughout the world where it is taken up both as an instruction for the work, and as a form on which to record the work’s course. (I will come back to that shortly.) In this way the schedule travels throughout a network which, through those travels, it helps to create.

So the schedule as instruction and record is both an immutable mobile in the Latourian sense (1986), and a dynamic participant in the work of the local site. It

¹ I am grateful to my colleagues Charles and Marjorie Goodwin for recording this particular afternoon’s work.

has an indexical relation to the order of events that it prescribes, and to the work that is required to establish an accountable relation between it and those events: work that it presupposes, but does not itself fully specify (again, a basic ethnomethodological premise, and true of all forms of prescriptive representation). Personnel at each site in the airline's network are oriented to achieving a normal order of on-time arrivals and departures, in the face of endlessly many contingencies some subset of which, due to requirements of interdependency and accountability, must be recorded and conveyed to other sites throughout the network. The discipline of the schedule is implemented through the medium of the nationwide computer system, accessible at each local site.

One task for the workers at the local site is to enter departure times for each aircraft into the system, both as a resource for colleagues at other airports and as an audit trail of the day's work. For example, on this particular afternoon we see Rick, one of two co-workers in the operations room, entering the time out of 1715 for a flight 5321 (Fig. 2):



```
I
IGD
89DECS
OK.DECS
AEA 5321/07 RM SJC OUT 1715
OK
```

Fig. 2 – Record of departure time

We have here a simple bit of screen-based activity – an entry by Rick, received with an “OK” from the system. “OUT” here refers to the time at which an aircraft leaves the gate and moves out onto the runway, the performance of ground crew being measured by the difference between the scheduled time and the time of actual push back (all other things being equal; that is, in the absence of delays attributable to circumstances beyond the local site's control). Rick next enters the “ETO” or “estimated take off” time; that is, the time at which the plane can be expected to leave the ground, which he enters as 1535 (Fig. 3a).

On this occasion, his entry elicits a routine bit of machine-initiated repair, from a “time out of range” of 1535 (where the estimated take off precedes the time out of the gate) to a corrected time of 1735. One aspect of the discipline of the schedule, then, is a logic of time with which operations workers must negotiate.

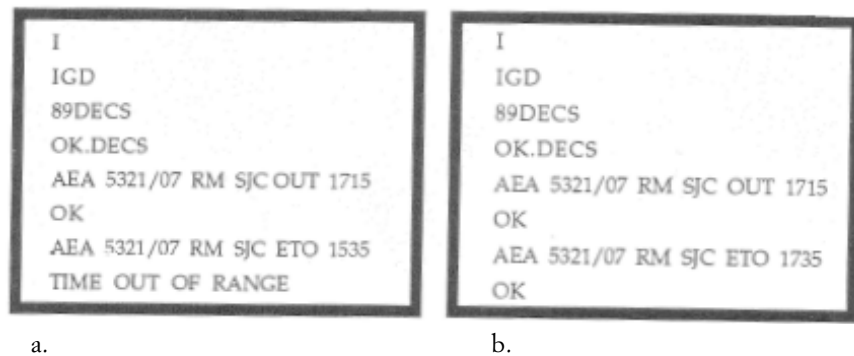


Fig. 3 – Estimated time off entered as 15:35 with error message (a.) and estimated time corrected to 17:35 (b).

In this case, the work of inspecting for logical inconsistencies in time entries has been delegated to the machine, in a way that becomes for Rick a bit of machine-support for the detection and repair of a routine error made at the keyboard. Part of Rick's competence is his familiarity with this machine-based logic. But if we follow this line, it turns out that the work we've just watched isn't a simple reporting on events at the gate at all, but a more subtle round of negotiation with a machine-based system of temporal accountability. So let's look at that more closely (Fig. 4).



Fig. 4 – Interaction with the computer system

If we were able to watch the video recording, we'd see that at the close of Rick's interaction with the computer system he turns to another machine, a video monitor placed just to his right, then glances out the window in front of him be-

fore turning to a document beside his keyboard. At this juncture we get an inquiry from the ethnographer who's running the camera, regarding the sense of the work he's just seen:

5:14:20 pm

Chuck: S'cuse me, Rick, what were you just doing there? You were getting some stuff from the computer and then you were jus-

Rick: Oh. Yea, this is our Tahoe trip, it is supposed to leave at 5:15 and it'll be boarding about a couple of minutes late. It is they're starting right now which, we like to have, actually the engines running a couple of minutes before departure time.

Chuck: Uh huh.

Rick: So I just (inaud) y'know and I check and just look at the screen and see, you know, how they hold out and if they close the door, they're just starting the engines now, so

Chuck: Uh huh, uh huh.

Rick: Uh, I just want to make sure he stays on time.

So Rick's job is to maintain a consistent relation between an order of events prescribed via the schedule from the national center, and events at the local site.

Through his entries into the computer system, Rick must represent the site's adherence to the prescribed order – in this case, that the Tahoe trip is supposed to leave at 17:15 – while ensuring that his entries also have a reasonable correspondence to unfolding events observable by him through the video monitor and outside his window. In this instance he can see that the Tahoe flight is boarding a couple of minutes late: a situation he judges to be close enough to be recorded as on-time, but problematic enough to require continuous monitoring for signs of further delay. It is in that sense that Rick's work is, as he says, “to make sure [the pilot] stays on time”; that is, to maintain an acceptable relation between the on-time departure he's just entered into the computer system, and the inevitable contingencies of an actual on time departure.

But his mediation goes further. By talking with Rick about his work we learn that the basis for his “estimated take off” time, which was 17:35 or twenty minutes from the “time out,” is not simply his observation of the work outside his window but his orientation to another discipline of time inscribed in the machine. As Rick goes on to explain it, once he's entered the time out of the gate for a particular plane a clock starts ticking within the system which, if a time off is not forthcoming within a specified interval, triggers an alert message. To forestall the alert message Rick can enter an estimated take off time, before which the system will not complain. He routinely enters that time as twenty minutes after the time out of the gate, giving him generally ample time to receive and enter the actual time off from the pilot.

I want to emphasize that all of this work would be characterized by Rick and his colleagues as “routine” and quite unremarkable – there's nothing “exceptional” going on here. Again this brings us back to a basic ethnomethodological precept, one that undoes the colloquial opposition between routine and exceptional. The ethnomethodological observation is that any normative prescript requires,

for its routine enactment, the management of the inevitable contingencies of actual events.

It is not that routines run off “automatically” (even, as we’ve seen, when they’re delegated to machines), but rather that routines are made to work through what Leigh Star (see Star and Strauss 1999) has identified as the generally invisible work of their enactment. Routines presuppose unremarkable acts of improvisation. The difference between routine and exceptional situations is not one of kind, in other words, but of degree, and is itself an effect of practices of boundary-making, of identification of what falls within, or outside, the bounds of the “normal” case.

In the original paper where I presented this analysis, I opened with Mike Lynch’s classic paper “The externalized retina” (1988), in which he examines the technology of diagrammatic images in the work of biology. Among the examples that he cites is the scientist’s work of tracking the movement of lizards within a given habitat. He describes how an array of wooden stakes is driven into a plot of ground to form a grid, against which the movements of the lizards can be plotted. To distinguish a lizard within the habitat from its fellows and to aid in the process of tracking its movements, each lizard is assigned a unique identification number. Grid and numbers then provide the basis for a diagrammatic representation of, and claims about, lizard behavior.

In the documentary practice of the life sciences, the diagram mathematizes and makes claims about the “nature” of objects. Through the impositions of the grid, lizards come to occupy territories with a graphically depictable shape, in much the same way that planes can be diagrammed as moving through time and across space within the orderly array of the airline schedule. In the case of the lizards, however – and this was the central point of my argument – their movement is taken by their observers to be independent of the tracking process; that is, to be a “natural” event of which the technology of the grid and its numbers simply provides a map. In airport operations, in contrast, the movement of planes is itself coordinated within a process of which the schedule and its numbers are a part. Like the lizard diagram, the schedule represents a course of events as “coordinates” on a two-dimensional grid.

However, the work of the grid and its mathematizations is not to explicate the airplane’s properties, so much as to enjoin the plane and its personnel into a specific course of practical action. It is in this sense that the airline schedule is a disciplinary technology, in the Foucauldian sense (1979). More precisely, the schedule is a of *technology of accountability*, a device that is simultaneously a resource for participants in organizing their own activities, and a regime created elsewhere, to which their activities are accountable.

In closing, I want to return to the problem with which I started (and to a running discussion that I have had over the years with my colleague John Law), and ask of this example: Is this order, or mess? It is order in the way that I have laid it out for you, through my own work of representing and narrating the sequence of events in a way aimed at revealing what is arguably the ordering work of the practitioners themselves.

At the same time, my own ordering, like theirs, has placed outside the frame an open ended horizon of details, contingencies, and so forth that it presupposes, but doesn't fully articulate. It is these that constitute mess in the Lawian sense (2004). Order and mess have of course colloquially been used as normative, evaluative terms, a classic dualism with the first term privileged over the second. It is these politics that it is John's project to challenge. Order and mess are mutually constitutive: order obscures mess; mess obscures the practices of ordering for which it is, in John's terms, the necessary hinterland.

And just what is the practice here? If we take this as a sequence of work, where are its boundaries both spatially and temporally? I have drawn them for you here, of course, in the images that I have shown you, framed in particular ways, in the transcript, and in the story as I have told it. But we could of course redraw those boundaries, following connections out in various other directions – taking as our analytic focus the plane on the ramp, other relevant sites at the airport like baggage handling, passenger service, the passengers themselves, the wider airline network, the larger day's work or the airline's longer history, the political economies of transport regulation, climate change and so forth.

The point is that these objects, while arguably relevant to practitioners, are also analytic ones, of our making. I have made them here in a particular way, one which I could defend in relation to my practical and analytic purposes, but which I would also always want to recognize could be otherwise. These objects are, in short, part of a practice, my practice as a researcher and speaker here at this conference, talking to you now. Like all object making, the delineation of a practice is always and irremediably part *of* a practice that informs what constitute productive and coherent units of analysis. It is that which makes *us* responsible and accountable for our research and its inclusions. And it is that which calls on us to be attentive to our own practice's systematic and necessary exclusions, and respectful of its constitutive overflows.

Thank you.

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Design Things: Drawing Things Together and Making Things Public

Pelle Ehn

Abstract This assemblage is based on the talk I gave at the EASST010 conference in Trento, Italy, September 03, 2010. It is composed of several kinds of materials. The ground structure is formed by the slides I showed at that occasion. These slides are commented in three different ways. Firstly by excerpts from the talk, secondly by comments added now when this assemblage is put together, and finally quotes from “Design Things”, the book manuscript around which the talk circulated.

Keywords design; sociomateriality; things; controversy; assemblage.

Thank you for inviting me here. It is a big honour to be allowed to present in a community different from your own, and trying to make sense out of the things that I think I have learned from this community. Still, many of you will probably think I have just misused or misunderstood what it is all about.

I will not give a literature overview or an overview of the field. What I will do instead is something that could be called to design “things”, by “drawing things together” and “making things public” – words and phrases that are familiar to you in this community.

the challenge: to draw *things* together

**A Cautious Promethea? A Few Steps
Toward a Philosophy of Design (with
Special Attention to Peter Sloterdijk)**
Keynote lecture for the *Networks of Design*
meeting of the Design History Society
Falmouth, Cornwall, 3-4 September 2008

bruno latour

"What is needed are tools that capture what has always been the hidden practice of modernist innovations: objects have always been projects; matters of fact have always been matters of concern."

"*dasein* ist design" (slotterdijk)

the *dasein* of design is *thinging*

What I want to do is to try to respond to a design challenge that Bruno Latour put forward two years ago to the Design History Society in Cornwall.

In that talk he observed that designers over the years have been so good at "drawing" – from four hundred years ago with the central perspective, to technical drawings, and onwards to today with the 3D CAD renderings. He asked: what if this kind of competences could be used to draw things together, to lay out the controversies in the objects of concern that are involved in the single object. Could this designerly way of approaching the object of design be a way to shift from drawing things, objects, to drawing things together? That is the challenge that I will look into. What is needed are tools that capture, in Latour's words, what has always been the hidden practice of modernist innovation: objects have always been projects, matters of facts have always been matters of concern.

circulating references



design students
in vienna and malmö
making things take
place



ATELIER
architecture and
technology for
inspirational
learning



Design Things
by
A.Telier



(The doing of)
Design Things
PhD summer school



design students
in in pukeberg
drawing Things
together

My structure for this talk is a narrative of “circulating references”, to borrow another of Latour’s concepts familiar to most of you. It starts with the “drawing” practice of master design students in Vienna, Austria and Malmö, Sweden. They became involved in an EU research project called ATELIER, Architecture and Technology for Inspirational Learning, and that project designed a number of technological artefacts, objects, and potential things to enhance their “drawing” skills. These objects and these design practises became the grounding for a group of people, under the collective name of A.Telier, to try to reflect further on how “to draw things together” in a design practice.

A result of this transformation was another object, a manuscript for further circulation. This object was last week, or rather starting already half a year ago, transformed into a PhD course on “the doing of design things” and opened up as a “thing” for design students involved in “drawing controversial things together” ending up as new objects and “things” in transformed design student practices.

design and architecture students in malmö and vienna ”drawing” things



The two practical settings that inspired our search for inspirational design “drawing” environments were chosen to be complementary. One was a “traditional” master’s program in architecture. It was complemented and contrasted by the setting of a new-media-oriented master’s studio program in interaction design.

The Academy of Fine Arts is Vienna’s main university of arts; its history goes back to 1692. The studio-like learning environment brings together a diversity of resources-disciplines, people, materials, and technologies. These resources include “hard facts” about context and requirements, images and metaphorical descriptions of qualities, such as atmosphere, movement, and spatial configurations, knowledge about construction, material, detail, and so on. The resources are multimedial—they range from physical objects like CAD plans, sketches, and scale models to samples, product catalogs, art books, and everyday objects, as well as immaterial resources, such as conversations and emotional reactions.

The School of Arts and Communication at Malmö University, is by contrast, very young. It opened in the autumn of 1998. The interaction design program at the master's level is a two-year full-time studio based program and applies a broad perspective on the interaction design field. Students have a mixed background including computer science, design, art, and music. Besides the computer, they typically work with a mixture of video clips, mock-ups, and other physical representations, such as scale models, prototypes, and so on. The design studio is their permanent base, but they also have access to a craft workshop for designing physical devices, a "black box" where they can create full-scale mock-ups of scenarios, and a well-equipped music studio to record sound and music.



The *Atelier* project studied design education practice, developed prototypes to enhance such education, introduced prototypes to different real-world settings (design and architecture classes) and, partly in collaboration with the students, reflected on the interventions to learn about how to improve both architecture and technology and the learning situation. This "pro-searching" is built on a user-collaborative approach involving users and researchers as reflective co designers and evolves from early explorations of practice and visions through field trials with gradually more integrated scenarios and

prototypes for inspirational learning. (A.Telier manuscript)

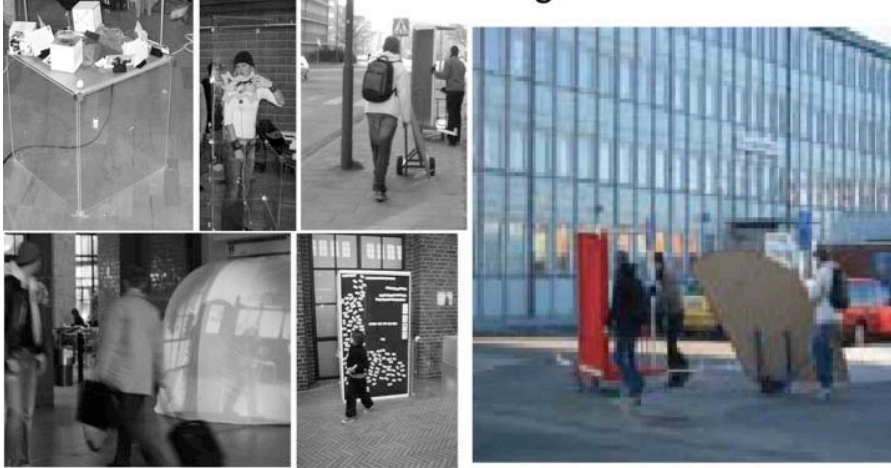
The ATELIER project, as an EU project, produced lots of objects. These design artefacts were given names like the Texture Painter, the Mixed Object Table, the Interactive Stage, the Tangible Archive, the Physical Building Block, the Tangible Image Query, the eDiary, the Tracking Game Table...and I could go on...

ATELIER: qualities of inspirational design environments ...



The interest of the project had to do with inspirational qualities of design environments. So we were interested in how qualities of such an environment could be supported, and we explored aspects like materiality and diversity of representations, creative density, connection, multiple travels, narrativity, reprogramming, dimensionality, scaling, configurability, etc. These were the kind of qualities that the project struggled to support. I will not talk much more about the project, but just conclude that most of this worked reasonably well. The students got quite subsumed into this new design environment, to the degree that they did not get out to do their design work into the field anymore. This great design environment was really too cocooning, with great “drawing” tools, but not really supporting “drawing things together”.

ATELIER: ... and out of the box and into controversial things



So towards the end of the project we literally had them move the design studio out of the box and into a controversial thing, into public space, etc. So that is how that project ended, on the one hand with a number of tools and an environment supporting designarily “drawing” of complex objects, but with the conclusion that these activities had to be moved out into public space and controversial things to really support engagement in “drawing things together”.

“Design Things” by A.Telier

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A group of us continued the work into something that became a manuscript, another designed object, that we in the end came to call “Design Things”. We met for two years and worked on a manuscript that tried to deal with these issues, but not as an edited volume but as a collective writing. Even if we found a publisher in 2007, it turned out to be really controversial to act as a collective writer (now, four years later the book is eventually being circulated by the publisher, MIT Press September 2011).

Even if “A.Telier” has been intensively doing research on interaction design and related areas for the last twenty years, his name is not known in the research community. Probably from a strong case of shyness, or some other form of psychological fragility, during these years he (or she) has hidden behind a large variety of pseudonyms. We know for certain that he has widely published and has frequently appeared in Aarhus and Malmö as Pelle Ehn; in Copenhagen he has also gone by the name of Thomas Binder. In Italy he is well known as Giorgio De Michelis, while in Wien he has adopted a feminine pseudonym: Ina Wagner. Moreover, in recent years he has augmented the confusion by creating new younger aliases: in Denmark and Sweden he has appeared as Per Linde, while between Finland and Italy he appears under the name of Giulio Jacucci. This list is not complete, but illustrates adequately a behavior whose deep reasons merit attention. It seems as if he or she needs a multiplicity of personalities to deal with a complex subject like design, investigating and practicing several aspects of it as well as proposing different viewpoints on it, without being able to take a consistently uniform point of view. A turning point in his/her life has been the project Atelier (the name cannot be casual!) where, with all his/her different names he/she has played almost all the roles, multiplying him-/herself like a Fregoli of research. At the end of the Atelier project, A.Telier has spent some years reflecting on its outcomes, coming out finally with this book—Design Things—which he signs for the first time with his/her true name.

So what is suggested is a “deconstruction” of the individual designer and the object of design, an edifying approach for reflection and dialogue for, by, and with fellow designers and design researchers. This deconstruction begins, following Heidegger, with the *things* themselves, or more specifically in our case with sociomaterial *design things*. Such *things*, or rather events of “*thinging*” (as Heidegger would put it), gather human beings; they are events in the life of a community and play a central

role in community members' common experience. In this spirit, Bruno Latour has called for "*thing* philosophy" and "object-oriented politics" (Latour and Weibel 2005), and by doing so has also challenged designers to make public the object of design. *Things* are not carved out of human relations, but rather of sociomaterial, "collectives of humans and nonhumans," through which the objects of concern are handled. At the same time, a designed artifact is potentially a thing made public, since once it is delivered to its users, it becomes matters of concern to them with its new possibilities of interaction. A turn toward *things* can, as will be elaborated upon, be seen as a movement away from "projecting" and toward design processes and strategies of "infrastructuring" and "*thing-ing*". (A.Telier manuscript)

from "things" (objects) to "Things" (assemblies)



things as governing assemblies and places
 "thingings" as events in the life of a heterogenous communities
 things as "collectives of humans and non-humans"

This shift of meaning in the word 'thing' is also of interest when we reflect upon how we as designers work, live and act in a public of design that permits the heterogeneity of perspectives and actors to engage in alignments of their conflicting objects of design.



To a community like yours the complexity of "things" and objects are well known. This is not so much problematized in the design community, but just as Latour and others, we are struck by the etymology of the English word "thing".

The etymology of the English word “thing” reveals a journey from meaning an *assembly*, which was decided on beforehand to take place at a certain time and at a certain place to deal with certain “matters of concern” to the community, to meaning an *object*, “an entity of matter.” So, the term *thing* goes back originally to the governing assemblies in ancient Nordic and Germanic societies. These pre Christian things were assemblies, rituals, and places where disputes were solved and political decisions made. It is a prerequisite for understanding this journey that if we live in total agreement, we do not need to gather to solve disputes, since there are none. Instead, the need for a neutral place, where conflicts can be negotiated, is motivated by a diversity of perspectives, concerns, and interests. (A.Telier manuscript)



how can we draw things together?
 how can we gather and collaborate
 in and around design things?

This journey back and forth is interesting for us to consider. A suggestion in the manuscript is that “things” are going on in assemblies and places, “thingings” are events in the life of heterogeneous communities, and “things, as we have learnt from this community, may be seen as collectives of humans and non-humans. But for the design community we also have the question of an object out there, and the assembly of the design thing itself, but we also have the question that the object of design is not yet there.

So, this is our complexity: to deal with a “thing” that is not yet there, that does not yet exist. It seems like the vocabulary of “things” and objects could help us a

bit. For designers, there are two kinds of outcome of a design thing: there is the engineering outcome: devices providing access to functions, but at the same time there is the architectural outcome; “things” modifying the possible spaces of interaction (functional, aesthetic, cultural, etc.). In the manuscript we investigate things, devices and the object of design.

We propose a view of design as accessing, aligning, and navigating among the “constituents” of the object of design. People interact with the object of design through its constituents, be those constituents *things*, artifacts, or representations. In experiencing *things*, objects, and devices people are primarily involved not with different types of materials, but in different kinds of interaction. (A.Telier manuscript)

(social) things and material (representatives)/ constituents

things =

- socio-material assemblies

≠ physical devices

design artifacts =

participating representatives/constituents

≠factual representations

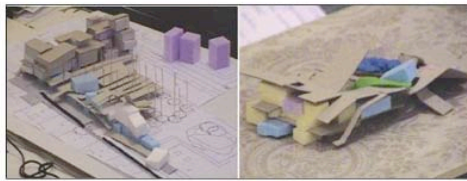


So when moving into the design studio, we have to deal with social “things” and material representatives or constituencies, “things” which are socio-material assemblies, but also thing as physical devices, and as design artefacts that we work with, the models and sketches etc., which in turn could be looked upon as participating representatives or constituencies. This is very different from the idea of factual representations. Design instead becomes a way of creating, importing, manipulating, cancelling the different constituencies of this “thing” and its object of concern. So the question becomes how to do that. The manuscript explores this in terms of metamorphing of the object of design, by investigating the performativity

of “things” and by hinting at how designers may journey an emerging landscape of design and not least how in design projects and other design engagements designers may “draw things together”.

design as metamorphosing objects

a focus on the materials and artifacts through which an object of design evolves



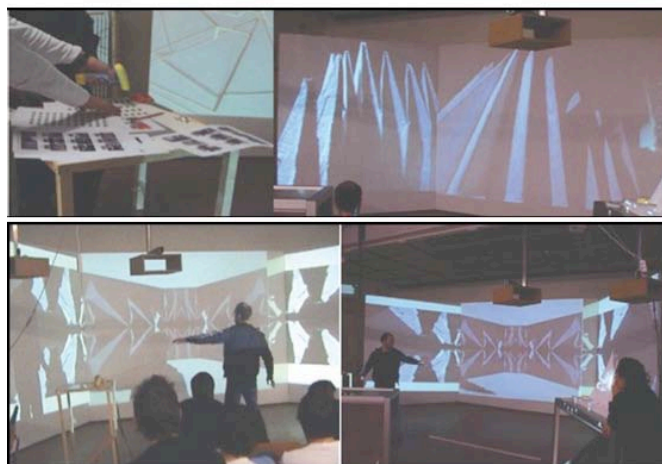
design objects as *not* being unified or singular....

design work proceeds through transformation, articulation and objectifying of material 'representatives' (constituents of the object of design)



How do designers mobilize, manage, and transform artifacts and their interpretations? Our approach explores how the web of “constituents” is weaved around a drifting object of design as the designer engages in its transformations. Design work is looked on as an act of “metamorphing,” where design concepts are envisioned and realized through objectifying and manipulating a variety of representations. (A.Telier manuscript)

design as performing the thing experience, expression, event



How do designers express and experience design objects? The approach here is to describe and explain the evolution of the design through the designer's performance of it. This includes considering narrative temporalities, fictional spaces, and creative constraints as basic features of performing design, and looking at characteristics of staging design events. We suggest an interventionist, participative and experiential understanding of design as purposeful staging and accomplishing of events. (A.Telier manuscript)

design as places imagined and enacted



herbert simon
problem-solving
abstract design space
decomposition of
and searching in
the design space
external to designer

donald schön
(+ problem-setting)
emerging as-if worlds
conversation with the situation; designer involved
(a journey into places)
as lived and imagined landscapes of design

We propose particular notions of place and landscape to explain how the design environment is performed in the work of designers and how a situational ground is enacted and transformed as design artifacts emerge. We suggest the concept of an "emerging landscape" as an alternative to the notion of an abstract design space, an experienced landscape in which the designer journeys and dwells. (A.Telier manuscript)

“Objects have always been projects”, but projects are preferably performed as Things



Let's now move to the design project thing and questions of participation and representation. Latour points out that objects have always been projects. But we could, from a designerly view, add that projects perform things. So, this means, as I mentioned earlier, to design “things”. For us in the design community this means a shift away both from a tradition of waterfall or other sequential models of analysis, design, construction and implementation, but also going beyond thinking of user participation as the ultimate solution. Questions have been raised like: how to construct a finished objects of design, what kind of task is that and how do you go about it, how do you align constituents around a shared problematic objects of concern, how do you make these practices reportable (all the work we do with ethnography, participation, fieldwork), how do we make these objects possible to manipulate, through working with sketches, models, prototypes, games, etc., and – last but not least – how is a design made into a public thing, how does it open up to controversies among participants in the project as well as outside, in workshops, exhibitions, public debates. In this view, designing and “drawing things together” becomes a matter of aligning, engaging, attaching representatives or constituents in the life cycle of design objects and devices, and in making and designing a thing, as this collective of humans and non-humans.

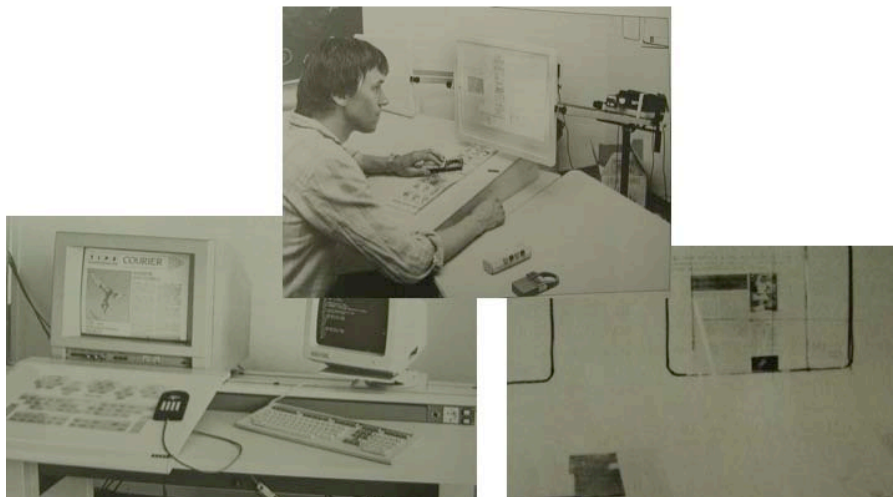
There are at least two strategies to draw things together in design projects: to focus on “use-before-use” or “design-after-design” as Johan Redström has put it.

drawing things together I: participatory design thinging “use before use”

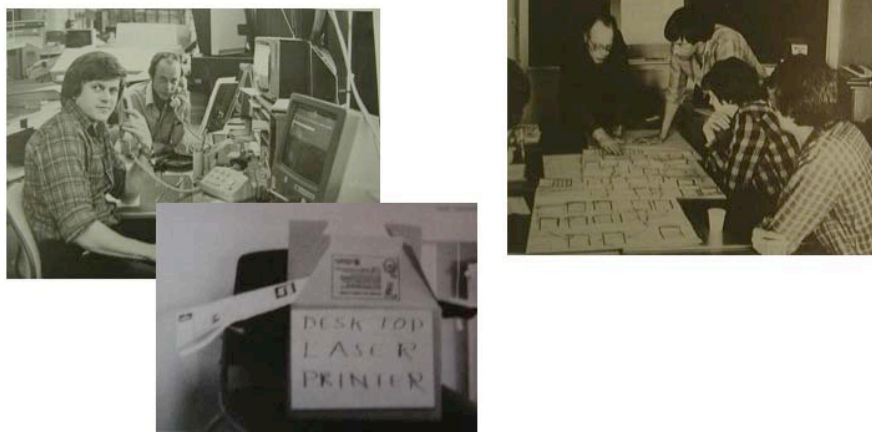
- strategy:
- focusing on Things (assemblies) before things (objects) and use before actual use
- by user participation in design

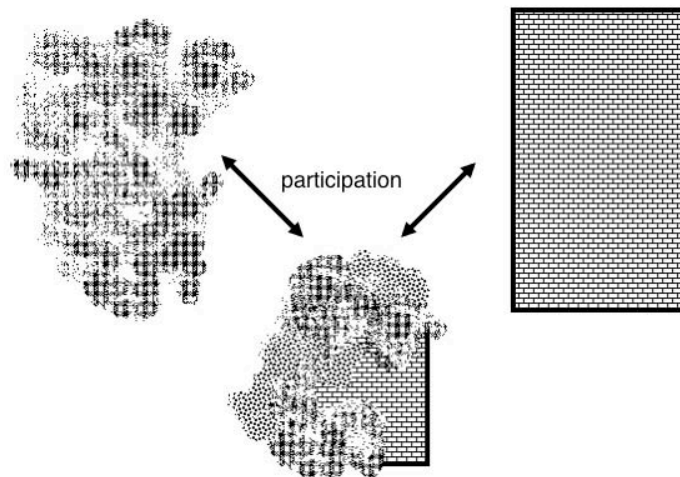
Let's start with use. This is the traditional way to go about drawing things together in my own field and is often referenced as Participatory Design. Basically, the idea is to say: well, Let's invite users – we know who they are, who the human constituencies are – and have them participate and, by that way, envision a future use, and we use all these tools, all scenarios and prototypes to do that. It could be said: to focus on assemblies before objects, and use before actual use. Design by doing as prototyping, design by playing as performing of visions, and more generally design by participation as the making of shared design things, are key elements in engaging participants/constituents in this approach to drawing things together. I will not go into any details here. So this is a very unfair history of Participatory Design in thirty seconds (Ehn 1988; Greenbaum and Kyng 1991).

“design-by-doing”: prototyping



“design-by-playing”: performing visions



design and participation

design by participation - making a design thing
**drawing things together II:
infrastructuring Things
“design after design”**

strategy:

- opening up for potential design after actual design by deferring some design to use
- from design things aiming at useful products and services, to design things to create good environments for future design things at use time
- configurable open-ended social, technical and spatial infrastructures/ or open-ended prototypical practices.

This is maybe also the right moment to pay tribute to Susan (Leigh Star), to her concept of processes of on-going infrastructuring (and special attention to those being marginalized in these processes). This is a question of how to draw things together for “design after design”. What we need to do is to design a thing that opens up for potential design after the actual design in the project has taken place, to defer some of the design until later on, assuming that people would be interested in doing that (an assumption that could be questioned). We go from designing things aimed at use of products and services, to design things, to create good environment for future design things, in the future, at use time, wherever and whenever that might be.

infrastructuring

- not “substrate” on which “tools” runs or operates, but
- “substance” that emerges *in situ*
- relational concept: it becomes infrastructure in relation to organized practices
- “an infrastructure occurs when the tension between local and global is resolved” (Star & Ruhleder, 96)

shaped over extended timeframes:

- selection, design, development, deployment, enactment
- mediation, interpretation, articulation
- adaptation, appropriation, tailoring, re-design, maintenance

We should not focus on the infrastructure but on the process of infrastructuring, which is ongoing between the here and now and somewhere in a future we know very little about. There are a lot of practices involved in this: selection, design, development, employment, enactment and, later on, with other actors, articulation, adoption, appropriation... The list could be much longer. All these kinds of practices seem to be involved in this infrastructuring and it becomes an important work how we make it possible for diverse actors to get involved into the performing of these kinds of practices. In the manuscript we suggest some strategies – protocolling, formatting, configuring, working with components, working with patterns, working with ontologies, working with ecologies of things etc. That has to be for another talk, or for the book, if it eventually comes out.

out of the box and into controversial things ?



Despite all the potential merit of drawing things together through strategies of designing as engaging users in potential use before actual use or designing platforms that open up for design after design in actual use there are challenges beyond this, so to say out of the box and into participation in controversial public events.

Where will the design studio of the future be situated, who will participate, and what kind of “design games” will they play? Is there a new role for the professional designer to play that takes place “outside the box,” by participating in controversial public events? In the final chapter we reflect on such issues of design “outside the box,” extending design into political processes, public debates, and possibly even subversive but creative misuse. In doing so we reflect on values that guide such design and we look into a few controversial issues, such as: Are designers the enemy of design? (A.Telier manuscript)

Call for participation:

NORDES PHD SUMMER SCHOOL 2010 (The doing of) Design Things

*Pukeberg, Nybro, Sweden, 23.8 – 27.8, 2010
Last day of registration April 19, 2010*

Design deals with things, but what does that suggest? In *design practice* the things we deal with may be *objects*, products, artifacts and services, but also *assemblages*, processes, projects and even parliaments. This diversity also goes for contemporary *design thinking*, focusing things such as design collaborations as well as prototypes and “matters of concern”. This diversity may be noticed in the etymology of the English word “thing” which reveals a journey from a meaning of an assembly, like the governing assemblies in ancient Nordic and Germanic societies, to a meaning of “an entity of matter”. In short: How are design things being done in contemporary design practice, thinking and theory.

The Nordic Design Research Conference (NORDES) summer school 2010 is addressing such design theory issues conceptually and exploratory in a five-day course for Ph.D students. Each day will have a specific design thing theme (see below), and each theme will be explored both in a reflective seminar and a performative workshop.

The five seminars will be based on themes and chapters in *Design Things* (A.Telier

(The doing of) Design Things PhD summer school

The book is not yet out, as I said. The final manuscript was sent to MIT Press a year ago, so I do not know if it is a book object or not, but at least it has been circulated into another kind of activity, the Nordic Design Summer School, which was held last week in Pukeberg, in the forests of Sweden, with participants from all the Nordic countries and from the US and Germany: 41 design PhD students who,

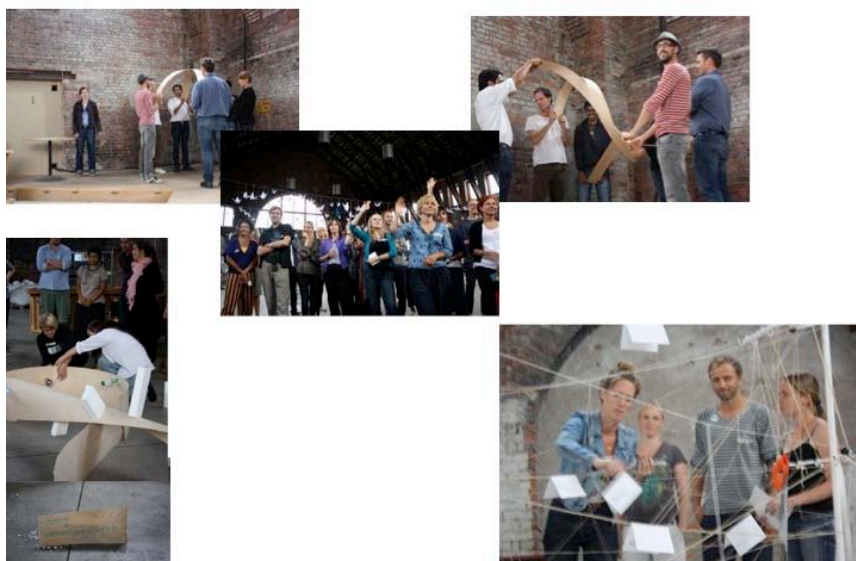
during a week, read the manuscript, had seminars in the morning and workshops in the afternoon. In this way, they were designing parliaments or parliamentary technologies (Latour and Weibel 2005), and mapping controversial issues. As a main assignment, they were probed to design ways of “drawing things together”.



from designing design parliaments and
parliamentary technologists,
to mapping controversial issues
to drawing things together (matters of concern)

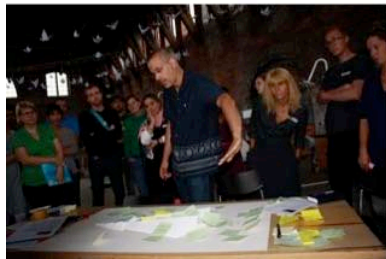
I would like to quickly go through how they appropriated and transformed what started as design student practices in Vienna and Malmö, became the design of collaborative things in a European design research project, and then became a manuscript. Of course this is not a linear story, there are a lot of actors participating all over, going in and out.

design things and parliamentary technologies



Here are some examples from day one on drawing things together, on that day with a focus on parliamentary technologies. The pictures on the top show an interactive wave machine, where the waves were responses to controversies but also participated in them. Down left is a space for eternal encounters and to the right representations of the ongoing and becoming of networks.

mapping controverscies



On the next two days, the design students were mapping controversies. To the left opening up and laying out controversies from already public stories, and to the right, on the following day, being much more concrete in the square in the city of Kalmar. The square, recently being redesigned by a well-known architect, had become big controversy in the city. The design students did, based on their interpretations of the controversy, interventions to create dialogues around the controversy with citizens passing the square.

closing design thing and opening up matters of concern



The main work was, however, the closing design things opening up matters of concern on the last day of the summer school. For this the design students gathered in groups on matters of concern that they would like to work on for the whole week, and the assignment was to organise a design proposal. The things they “draw together” ranged from “material” controversies to open-ended design things.

material “controversies”

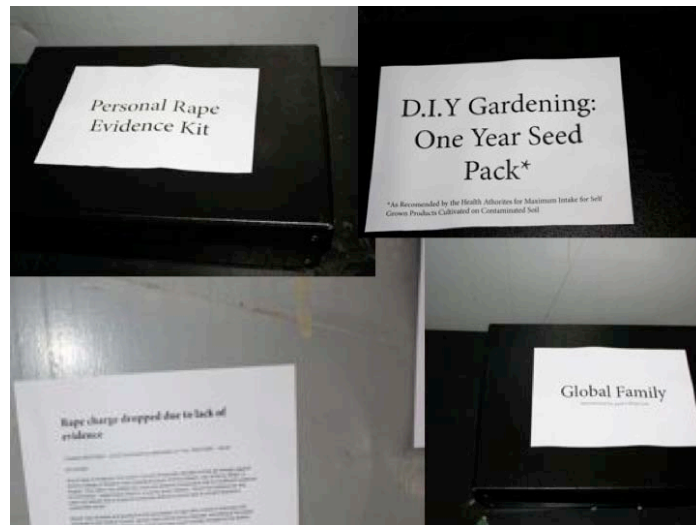


Some of them were very simple. One example is the thing in which 16 cubes with different materials participated. The human participants were asked to judge and discuss which one was best. Maybe this was not a deep and essential controversy, but it is interesting that even (or especially) among designers it was not so easy to agree in judgements.

Another group worked on environmental issues. They challenged the traditional environmentalist “Apocalypse Later” approach (postponing the catastrophe), by mockingly suggesting a strategy of “Apocalypse Faster”. There would be things like the 10.000 Miles Food Certificate, the Energy Abuse Meter, and the Ultra-safe Vehicle for Shopping etc. They tried to engage people in this campaign.



Another proposal, “band aid”, was about packages to be distributed the market. Examples included a “do-it-yourself gardening pack”, and “a personal rape evidence kit”. The suggested kits were close to products that already exist, and they were piggybacking on the interest in such projects. But the interventions were really responses to articles on existing major controversies, like on contaminated ground or the demands for hard evidences in cases of rape. The designers intervention also included engaging the audience in how they would best market these products.



The final group, working on the platforms for open ended design (design after design), draw all the participants together in a reflective thing evaluating the design summer school, revealing controversies, and opening up for further design engagements and things after the summer school.

bringing the thing together (locally) open ended design



I do not know if these “circulating references”, this weave of successive transformations, from design student “drawing” practices, to the design of artefacts supporting such collaborative design “drawing”, to a view of design as the performance of controversial “design things” and finally back to design student practices of “drawing things together” compose a proper response to the challenge put forward by Bruno Latour, but I hope to have shown that the design research community takes the challenge of “drawing things together” seriously, and that we in our pragmatic and designerly way try to put science and technology studies at work.

Thank you.

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Affecting the Technoscientific Body: Stem Cells, Wheeled-luggage and Emotions

Mike Michael

Abstract In this paper, I will be treating the technoscientific body in terms of the emergence of emotion and emotion conventions, mainly by considering the role of affect. In this I want to pay attention to technoscience not only as a key site for the emergence of epistemic and ethical novelty, but also emotional novelty. In particular I want to focus on the role of the peculiar objects of technoscience whose affect upon bodies enables the emergence of peculiar, new emotions, and their conventionalization, that is the way in which such new emotions become warrantable. In all this I address the technoscientific body in two versions: on the one hand, there are the bodies of practicing stem cell scientists, and on the other, there are the bodies of members of the public in the transport system non-places like airports and train stations.

Keywords technoscience; body; affect; emotions; stem cells.

Introduction

In this paper, I will be treating the technoscientific body in terms of the emergence of emotion and emotion conventions, mainly by considering the role of affect. In this I want to pay attention to technoscience not only as a key site for the emergence of epistemic and ethical novelty, but also emotional novelty. In particular, I want to focus on the role of the peculiar objects of technoscience whose affect upon bodies enables the emergence of peculiar, new emotions, and their conventionalization, that is the way in which such new emotions become warrantable. In all this I address the technoscientific body in two versions: on the one hand, there are the bodies of practicing stem cell scientists, and on the other, there are the bodies of members of the public in the transport system non-places like airports and train stations.

By way of clarification, I treat technoscience not only in terms of the more or less sequestered spatialization of heterogeneous knowledge-production and assemblage-making (the hub of which is often the laboratory), but also more expansive spatializations traced by the artifacts of technoscience as they circulate and serve in the construction of hubs, like hospitals or airports. Put simply, I want to think about technoscience in relation to both centers of calculation and the calculation of centers. Or to put it in yet another way, I am interested in how technoscientific bodies are affected both by the *process* of making technoscientific object, and the way that more or less stable technoscientific objects have affects. Of course, in both cases I see the “object” as an actual entity that emerges from and contributes to a complex heterogeneous assemblage (Whitehead, 1978).

I. Emotions and Technoscience

Now, despite the commonsensical division between rationality and emotion, and by extension, mind and body, and the way these shake out institutionally as the parallel contrast between science and religion or anti-science say, this division is, needless to say, highly problematic. So, we can see hints of emotion in, for example, the reported trauma of paradigm change, or in the practices that go into the purging of core sets. As Jack Barbalet (2001) has noted, one can be highly passionate about what one sees as rationality or truth, as well as be highly rational about the experience and performance of emotions. In this respect, emotions are routinely accompanied by their rationalising discursive accounts that serve to warrant them.

Of course for social constructionist accounts of emotion this should come as no surprise. This is because constructionist accounts “view emotions as primarily dependent upon the definitions of situations, emotions vocabularies, and emotional beliefs, which vary across time and location” (Thoits 1989, p. 319). Thus, subjective experiences:

are influenced not only by a society’s emotion vocabulary, but by cultural beliefs about emotions (...) rules regarding what one should or should not feel or express; ideologies about emotions such as romantic love; shared understandings of the typical onsets, sequences and outcomes of emotional experiences and interactions (...) and beliefs about which emotions can and cannot be successfully controlled (Thoits 1989, p. 322).

These are “ethnopsychologies” or “emotion cultures”. As various authors have noted, this background of shared assumptions serve as the medium by which displays of emotion, and emotional talk and behaviour, are warranted in situated interaction.

I have certainly witnessed this in a number of areas I have studied. For instance, in relation to ethical judgement of animal experiments, in work with Lynda Birke, we found that our scientist participants had particular versions of

what counted as appropriate emotionality. Too much emotionality – too much empathy with animals – and ethical calculation would be disrupted. What we see here are particular conventions for emotion acts being enacted. This is a version of the argumentational processes that make up core set controversy. A typical accusation is that one's opponents cannot see the "truth" because they are too committed – irrationally committed, emotionally over-invested – in their own theories, or technologies, or experimental system, or data sets. In this animal experimentation case we have a sort of ethics core set (Michael and Birke 1994a; 1994b).

Now, arguably, constructionist accounts of emotion are somewhat static and even functionalist in practice if not principle. It is rare that we see how emotions and the conventions that warrant them change. In what follows I will explore a couple of examples where there might be – and I stress "might be" – novel emotions and their conventions emerging from the ways in which technoscientific objects affect bodies – leading to the novel emotion performances of novel technoscientific bodies. I am aware that the emergent, hybrid emotions I derive in what follows can be regarded as having precedents in other areas of social life: the main point however is not so much the content of these emotions as the form of the empirical study and analysis by which we attempt to trace the specificities of their emergence.

By way of further clarification, I should note that I see affect as a broader category than emotion that reflects the machinic aspect of assemblages, in Deleuze and Guattari's terms (1980; I also draw inspiration from authors such as Masumi 2002; Bennett 2010). Thus, affect concerns the ways that bodies are impacted upon by particular circumstances – in this case how bodies as physical entities with particular corporeal, perceptual and reactive capacities are affected by technoscience, its objects and processes.

2. Technoscience-in-action and Specific Emergent Emotions

So, in this analysis I want to say something about the way that emotional bodies and their related emotion conventions change in relation to the specificities of technoscience. In work on the ethics of human embryonic stem cell research with Stephen Wainwright and Clare Williams at Kings College London, we began to see hints of the emergence of some new configurations of emotion that reflect the peculiarities of the scientific object – embryonic stem cells (see Michael, et al. 2007).

To reiterate, by "object" I minimally mean an actual entity that emerged from and contributes to an assemblage that in the case of stem cells includes heterogeneous relations ranging from the policy imperative towards translational research through to the situated recalcitrance of stem cells themselves (Michael, Wainwright and Williams 2005).

Let us consider the Lumelsky protocol – a system in which as stated in a headline from *Science* "stem cells are coaxed to produce insulin" (Lumelsky, et al.

2001). The seminal nature of the Lumelsky paper is reinforced in the editorial comment in *Science*:

In a boost for scientists who hope to turn the potential of undifferentiated stem cells into *medical miracles*, researchers have found a way to produce insulin-producing cells from mouse embryonic stem (ES) cells. There is a ready-made demand for anyone who can achieve such *alchemy* in human cells: millions of patients with diabetes... An unlimited source of cells that can produce insulin in response to the bodies cues would...be a *hot commodity* (Vogel 2001, p. 615, my italics).

It is not difficult for those of us reared on the sociology of expectations to see the particular emotions coursing through this text. However, the key point is that the protocol, after generating frantic activity to replicate and extend it, turned out to be – that is, could be constituted as – an artifact. What was interesting was that the artifactuality should have been self-evident from the original paper – even a cursory reading of one of the key graphs would have shown that there was insulin already in the medium in which the stem cells were supposedly differentiating into beta-cells, and that there was statistically insignificant difference between the concentrations of insulin before and after the supposed differentiation.

Now, it was certainly evident from the interviews that dynamics typical of the core set seemed to operate. Some scientists accused others of getting over-excited and jumping on the bandwagon (that is, they applied conventions in which such over-excitement was illegitimate). The upshot is that bandwagon jumpers' epistemic judgment could not be trusted (i.e. they need to be excluded from the core set). However, the point I want to make is that something else was also going on. After all, the scientists who jumped on the Lumelsky bandwagon have not been abandoned – they are still working in the field (at least at the time of our research, around 5 years ago). How does this “rehabilitation” take place?

Crucial here is that chronic uncertainties characterize the field – epistemic, ethical, institutional, translational. This suggests that running alongside the dramatic narrative of seeming success and evident failure is a morass of experimental work whose success and failure is profoundly and chronically uncertain. In the core set analysis in which scientists compete for the epistemic – and, we might add, emotional – high ground, certain scientists were “discredited” partly because they were successfully accused of jumping onto the Lumelsky protocol. However, regarding this controversy in relation to the more diffuse technoscientific assemblage of chronic uncertainties, to jump onto the Lumelsky bandwagon is socially “understandable” where “understandable” connotes empathy, or sympathy. In other words, parallel to assessments of epistemic and emotional correctness or incorrectness – that is about the propositional or substantive content of knowledge – mapped by core set analysis, are feelings of “social understandability” under conditions of chronic uncertainty. Alongside the “punishment” of those who have failed in a controversy, there are ways in which they may be “pardoned”, “excused” or “forgiven”.

In one way this reflects the complex technoscientific object that is the human embryonic stem cell, not least in relation to the enormous uncertainty constitutive of the assemblage out of which it emerges. While our respondents did not jump onto the Lumelsky bandwagon, they might have done if circumstances had been slightly different. Indeed, they might be on a bandwagon at the present moment, but will only know it in retrospect, though they can certainly acknowledge the possibility – there is a “but for the grace of god” presumption – “it could have been me (or my lab) on that (the Lumelsky protocol) bandwagon”. In a sense then, there might be an emotion convention emerging, partly structured by the (complexly defined) object of their attention, which cuts across blame and forgiveness for bandwagon-jumping, that both discredits and warrants over-excitability and over-enthusiasm.

What seems to me to be particularly interesting in this story I have told is the prospect that we are witnessing an emerging hybrid convention that warrants a complex emotion that reflects and mediates the technoscientific complexity of the stem cell object. We have something combining blame and forgiveness, and a convention that warrants contrary emotions that encompass extreme enthusiasm and caution. In other words, we have the possibility of new hybrid emotional forms and their conventions emerging in relation to this technoscientific assemblage.

Obviously, I would not want to limit the possible emergence of new emotional forms and their conventions to this particular fraction of biosciences, or to lab-based technoscience per se. The simple point is that we can perhaps look at how recent technoscientific objects – through their complexity and uncertainty – corporeally affect scientists by generating immediate problems of pinning them down physically, ethically and institutionally and thus lead to the reconfiguration of emotion and emotion conventions.

However, perhaps we can also find the affects of everyday technoscience also generating new emotions. Let me now turn to the possible affective role of a mundane technology.

3. Products of Technoscience and Emergent Emotions

Many of us will have made our way here to the conference through a series of, what the anthropologist Marc Augé (1995) calls, non-places. These are transport hubs such as airports, train and bus stations largely devoid of those qualities said to be characteristic of place – familiarity, rootedness, a sense of history and memory, ‘organic-ness’. These non-places are spaces of consumption, of travelling-through, of solitariness where communication tends to take place through screens/ICTs. The notion of non-places has been critiqued in various ways (e.g. it neglects how it is a place for various workers and business travellers), most pertinently in relation Augé’s the under-estimation of the heterogeneity, histories and imaginaries of the associated assemblages (Merriman 2004). Non-places are highly designed – structured by the products of technoscience: not least in the ways

that bodies are marshaled, directed, pacified, surveilled through the design of distribution, security and media systems. Within this context, I want to look at one particular technological artifact and its possible affective role in the emergence of novel emotion and their conventions: wheeled or rolling luggage.

Invented by Northwest Airlines pilot Bob Plath in 1987 to transport his bags more easily through busy airports, the Rollaboard® as it was initially called, was innovatory because in addition to the wheels, it added an extendable handle and turned the suitcase vertically onto its end (there had been other forms of wheeled luggage, in particular, a horizontal model featuring four small wheels and a strap for pulling but this was not very efficient or controllable – obviously I would take these terms to be contingent). He started making and selling these to colleagues, and by 1989 due to pressure of public demand he moved from his garage to a factory proper founding the company Travelpro in the process. By 1991 he had retired from Northwest Airlines¹.

I think many of us are familiar with this luggage technology – it is now pretty much ubiquitous. It is routinely represented as a vast improvement on previous forms of luggage. The corporeo-cultural scripts implied in its typical representation suggest a single traveller, moving through empty, or uncluttered space (Fig. 1a) smiling or meditating at the sheer convenience of it all (Fig. 1b).



Fig. 1a



Fig. 1b

¹ See <http://www.travelproluggageblog.com/tag/bob-plath>.

Anecdotally, we know different, of course (Fig. 2). Moving through the concourses of busy transport hubs where crowds of travellers collect at certain points – such as around departures boards, or information points – has, arguably, become the occasion for a set of new body techniques, and emergent emotions and their conventions. The design of rolling luggage means that it usually trails behind the body rather than at its side. This means that we cannot see it directly. As such, we can monitor the immediate risks it poses (how it might potentially get entangled with others' legs and luggage) only by constantly looking over our shoulder, which means we don't look consistently where we're going. And we need to look carefully where we're going because we might get entangled in other travellers' rolling luggage. But if we do that, we increase the dangers we pose to other travelers... and so on and so forth.



Fig. 2

I am tentatively suggesting that signified in this, albeit caricatured, representation of “doing” rolling luggage within the sociotechnoscientific setting of a transport hub, are possibly emerging body techniques entailing a particular patterning of attention-and-attribution that is physico-moral-emotional. Attention/attribution is directed and distributed toward, simultaneously, the victimized self/guilty other (when you are banged into) and the guilty self and victimized other (when you bang into). My sense is that this rolling mixture of anger and apology is the stage we are at the moment.

Contrary again to the idea of a non-place, such chronic encounters might cumulatively, maybe cosmopolitically, occasion a different sort of heterogeneous patterning: a common recognition of a common condition that might serve as the

organic basis of a highly situated and contingent sense of community, and, ironically, a belonging in which conventions for these complex hybrid emotions might emerge. Of course, this scenario has flattened a range of cultural and political differences that militate against such *communitas*: some cultures take apology to a fine art; the status signified by self and other is not unimportant in the patterning of anger and apology. Nevertheless, the complex object of rolling luggage does open up certain possibilities for the emergence of these novel hybrid emotions.

Conclusion: Anecdote and Affect

Ironically, we seem to have, at least superficially, a similar emergent emotional form in relation to both Lumelsky and rolling luggage cases: hybrids emotions of, respectively, forgiveness and blame, and apology and anger. But how do we access their difference or similarity?

To be sure my accounts of the affective emergence of particular technoscientific bodies and their emotions have been highly speculative. So, I want to finish with a possible methodological strategy for better accessing these: the anecdote. The issue is how can we access affected technoscientific bodies when our data are so often linguistic or discursive or narrative. On this score, I'm trying to work with anecdotes as a heuristic tool for accessing these processes.

Anecdotes can be formally characterized in the following way (see Michael in press, for more detail):

1. The anecdote is at once literary (obviously a constructed story) and exceeds this literary status (manifestly, it is supposed to report or document real events). Thus, it is an openly ambiguous textual form, combining the real and the constructed, holding them in tension.
2. The anecdote, as a part of an historical record, not only reports events but also acts upon them. An anecdote reports an episode from social life, but by virtue of being a particular interpretation of that episode, and by virtue of its circulation as a story and reportage, it can go on to influence subsequent events. It is performative.
3. The anecdote is a narrative about difference and sameness. As noted above, it documents an "incident", that is, something out of the ordinary. It relates an instance of difference which allows us to interrogate the sameness of the taken-for-granted.
4. The anecdote can enable us to draw broader lessons. We move from the individual to the general: from this incident to this phenomenon.
5. Anecdotes, insofar as they refer to incidents that have befallen or impacted upon their author are a means to enacting self. More crucially, such anecdotes can connote how the anecdotalised events themselves contribute to the making of their author. That is to say, the author can emerge from the "event" that renders the incident "anecdotal" as it were.

Taking all this into account, the anecdotes told of particular past events are not simply a construction of those events, but are a partial effect of those particular pasts. Prior events that become anecdotes serve in their own anecdotalization, even as the telling of those anecdotes makes those pasts recoverable or narratable or constructable. This is because those events impact, often corporeally or affectively, upon the persons involved – the events are partially constitutive of those persons. This is a complex view of the anecdote has a number of potential advantages.

Most importantly, we can see how emerging emotion performances might be grounded in particular past events. When stem cell scientists or rolling luggage users do emotion and its accounting, we can ask for anecdotes. Is there a specifiable event that triggered emotions – say in relation to a scientist friend seduced by a dubious experimental system or scientific bandwagon that goes nowhere? Is there a particular incident where a traveller felt a peculiar mixture of embarrassment and anger during the simultaneous banging into and being banged by other travellers with rolling luggage? In this way, we can partially ground these emotion acts in specific events while of course noting how these events themselves have been constituted in the present moment as anecdotalizable events that can be used in the accounting of particular enactments of affect or emotion. This does not of course deny the importance of other sorts of relations and events – it simply aims to concretize these affected technoscientific bodies in specifiable events.

But anecdotes might also work in relation to what is unclear or incomprehensible in them. They might be a way of grasping affects upon the body in the past that could not be grasped – affects mediated by the complex objects of technoscience. If such affects trigger new configurations of emotion, then perhaps the anecdote becomes an initial means to their conventionalization. So telling the personal story of the complexity of affects and the heterogeneity or hybridity of emergent emotions is also an initial way of finding their warrants. This is another instantiation of the performativity of the method, which partly constitutes that which is studied.

Another possible advantage of the anecdote is that it offers an always already mediated, voice to the nonhuman and norepresentational. The situated recalcitrance and vitality of embryonic stem cells, the contingent limits and capacities of human bodies within certain technoscientific assemblages, the local simultaneously tricksterish and standardized behaviors of mundane technologies – the anecdote is an oblique means to touching upon their role in the emergence of novel emotions and emotion conventions.

So, such anecdotal accounting is always partial and ambiguous, real and constructed – but able to hint at the affects that enable emergent emotions. But, further, our own analytic use of such anecdotes is itself no less anecdotal. The doing of social scientific research abounds with events that affect us by being physically and corporeally, as well as socially and culturally, surprising, upsetting, nonsensical, idiotic. Often such troublesome events (for example, where a participant does something that fails to make any sense within the frame of the re-

search; when a research engagement falls apart because of some technical or bodily mishap) are sanitized out of our more formal written work or presentations. Yet sometimes these events “linger” in us, sometimes they become anecdotalizable by affecting us in ways which make them subject to anecdote. And along the way, perhaps, our emotional (and epistemic) relation to our own subject matter shifts.

Thank you.

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Race, beyond Fact and Fiction

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Abstract What is biological race and how is it made relevant in specific practices? How to address the materiality of biological race without fixing it? And how to write about it without reifying race as a singular object? These are the central questions in this short essay. Instead of debunking or trivializing biological race, it wants to attend to race and investigate how it is made relevant in practices. I am interested in what it is made to be in them. By engaging with race in practices, I want to move away from two dominant and mutually exclusive notions: race as a fact, and race as a fiction. As a contrast to these approaches I present one short case to show how race is enacted but also that it is both factual and fictional.

Keywords materiality; practice; body; race; fact; fiction.

I. Beyond Fact or Fiction

The astonishing developments in the life sciences and in genetics more specifically has put biological race back on the table as a growing 'matter of concern' (Latour 2008). A growing corpus of more or less STS literature on race is showing that the new genetics is simultaneously reifying old categories of race and producing novel configurations of differences (e.g. Duster 2005; Reardon 2005; M'charek 2005; Nash 2005; Abu El-Haj 2007; Fullwiley 2007). This indicates that race is not easy to categorize and might even suggest that it shifts and changes (see M'charek 2010). Thus, instead of treating it as a singular object 'out-there' in nature as it were, I want to suggest that we should attend to how race is made 'in-here'¹. How it is *enacted* in practices (e.g. Mol 2002).

With this take on race, I want to move away from two dominant approaches to biological race: race as a *fact* and race as *fiction*. Although I am very brief here, let

¹ On "out-there-ness", "in-here-ness" and singularity, see Law (2002).

* This essay is based on my Keynote address at EASST010. An article based on this lecture, titled *Beyond fact or fiction: On the materiality of race in practices* is now under review and will become available shortly.

me just say a few more words about these approaches. In the approach of *Race as fiction*, there is no such thing as biological race. And, if we encounter it in science or society, it really is an ideology that we are talking about. Something in the head of people, or, of institutions.² This approach contributes to the trivialization of the biological, the trivialization of biological differences.

This approach obviously leaves us empty handed in a time where the life sciences are gaining pride of place in knowing ourselves, in which practices where biological race is made relevant seem to proliferate on a daily basis. The problem is that by trivializing or debunking biological race, it is completely left to geneticists and other biologists to determine what it is. The issue is not that we should reject the biological. That would be a ridiculous thing to do. But rather, as David Skinner (2006) has suggested, to see that anti-racist politics has become a struggle over biology rather than against it. What biology is made to be or how it comes to matter in people's lives is my concern here. The second well established way of thinking race is: *Race is a fact*. In this line of thought race is a collection of biological markers that help to sort people out and to cluster them in natural kinds. If we want to know what race is, we have to look in the body. It is there that you will ultimately find it, in the form of a blood-group, a gene, a protein, or, as externally visible characteristics such as skin colour.

But something strange, or rather interesting, is going on with this fact-making. It suggests that all markers of difference contribute to the discovery of the same fact of race. Whereas in practice we e.g. see that the difference between one population and the other changes depending on the kinds of DNA markers that are used (M'charek 2000). And if two groups of people would be clustered based on externally visible characteristics these differences might get diluted when using DNA technology. The reason is that there are no genetic variations that are exclusively found in one population and not in the other (e.g. Serre and Pääbo 2004). Any genetic variation will be found in all populations but in different frequencies. So whereas the fact-making approach suggests that all technologies contribute to the discovery of the same fact, and to constructing or solidifying the same boundary, in practice, technologies may point in different directions.

2. Getting Practical

The case I discuss below shows that in practices race is simultaneously factual and fictional/ideological. Also, if different technologies produce different versions of race, we cannot but follow these around in practices as to unravel what they make of race. Are the different versions compatible or do they conflict? Are some versions dominant over others, and to what effect: silencing them, translating them, or something else? And in the end, what do different technologies make of us and of the not-us? I contend that the two dominant takes on race, "race as fic-

² In the extended version (see the first footnote) I use statements on race that have been commissioned by the UNESCO as to unravel these positions about race.

tion” and “race as fact”, are not helpful to understand the omnipresence of biological and racialized differences. Not only do these approaches contribute to the idea that race is one unified thing (to comprehend or to combat), but also, as I briefly indicated, we cannot know beforehand whether race is made into a fact or a fiction.

How To Do Identity with Bones and DNA

On March 13, 2002, Nico Arts, the city archaeologist of Eindhoven, discovered a grave dating back to the 13th century. It appeared to be the grave of a ten-year-old child. Based on the DNA retrieved from the teeth, the Eindhoven skeleton was identified as that of a boy who came to be called Marcus. The skull was sent to the Netherlands Forensic Institute for a facial reconstruction. The excavation of Marcus’ remains indexed a much greater discover, namely a collection of 700 graves of burials spanning from the 12th till the 18th century. The project soon became a collaborative project between archaeologists, genealogists and geneticists. The added value of the collaboration with geneticists was to learn more about genetic genealogy and therewith about the identity and history of Eindhoven and eventually of the Netherlands.³ The reconstructed skeleton of this young boy became a key figure in the Eindhoven project. For Marcus had become a genuine star. A biography has been written about him (Arts 2003), he was exhibited at various locations, his reconstruction was viewed by thousands of visitors, and he figures in many publications about the Eindhoven project. For Marcus had become a genuine star. A biography has been written about him (Arts 2003), he was exhibited at various locations, his reconstruction was viewed by thousands of visitors, and he figures in many publications about the Eindhoven project. One of these publications was cast as a quasi-interview conducted by Marcus himself with his ‘father’, the city archaeologist Nico Arts. This interview as a whole is highly interesting but in what follows I will refer to just two short instances.

Marcus opens the interview as follows:

My father Nico...

Ever since the emergence of human beings, great importance has been attached to the relation between a father and a son. The ecclesiastical history even begins with a Father, who long after that origination sacrificed his Son for the benefit of humanity. Also for me, a ten-year-old whippersnapper from the 13th century, this relation is pivotal. I am therefore happy that I can turn to Nico Arts, city archaeologist and my spiritual father to ask him some pressing questions. After all, he has given the history of Eindhoven a face. My face.

³ As in many comparable projects nowadays, the stakes are high. In the well-funded high profile Eindhoven project the goals are no less than unraveling the secrets of a number of common diseases, such as diabetes, hypertension, but also the secrets of HIV.



Marcus is highly interesting; in his time is crumpled (Serres and Latour 1990). Practices that are as distant as eight centuries apart are folded together in a surprising and engaging story. How is that done? Given the young age of Marcus, it was not possible to sex his body based on archaeological techniques, that is, by studying the bones. His sex was determined based on DNA analysis. This DNA however, was also used to determine his genealogical descent, in terms of a belonging to a specific population. The city archaeologist reports that, '[t]he results indicate a relationship with population groups found across the central Mediterranean and North-West Europe region' (Arts 2003: 63). To be sure, such DNA analyses are probabilistic and do not guarantee that an individual stems from one population or the other (Serre and Pääbo 2004; M'charek 2000, 2005). Yet, given that Mediterranean as well as North-West European populations are mentioned, it is striking that Marcus' facial reconstruction had led to a fair looking boy with red-gold coloured hair. Or, in the words of his makers, '[n]eutral colours were chosen because we have no information about the actual hair, eye and skin tones' (Arts 2003: 100). One could say that to make Marcus into the face of Eindhoven, that is, a passage point into the history of this city, Marcus himself had to become somebody that a mainstream Dutch audience can identify with – a beautiful, 'neutral' white boy.

Marcus: What kind of a boy was I in former times?

Nico Arts: You were buried at an important spot in Eindhoven: near the altar of the old Catharina church. On your body we have found a silver coin, probably a souvenir of a crusader. [...] You are a child who stems from an important and wealthy family. You did not have a nice life though. You were often ill, since your teeth are not full grown. You suffered from anaemia and during your first life there was no cure for that. You died much too young: only 10 years old. Maybe you never had a chance to play outside and spent most of your days in bed.

Again Marcus' complexion makes us wonder. For to imagine a medieval child who was chronically ill, and probably never had a chance to play outside, does not

quite match the facial reconstruction that Marcus has obtained. We see a young boy in the pink of health, a boy with a chubby face and blooms on the cheeks. This all suggests that Marcus brings about more than his own life story.

In his biography, Marcus is connected to a whole range of historical figures, involved in crusades during the 12th century (Arts 2003: 74). On Marcus' body a coin was found which evoked that history. It was identified as a coin from Venice, one that was stamped with a portrait of St. Mark. Hence Marcus' name. The link between St. Mark and Venice had not always been there. St. Mark was in fact imported to Venice around the year 828. At that time the Venetians felt that they deserved a more prestigious patron for their prosperous city. So they had cast their eyes on St. Mark. His skeleton was, however, in Alexandria. So the Venetians had it stolen. 'Their excuse for this was that the Muslims wanted to put the church which contained the relics of St. Mark to new use, non-Christian use' (Arts 2003: 66). The relics were smuggled out of Egypt. The story goes, that the smugglers had covered it with pork, forbidden food for Muslims. This history is not left behind. By contrast, the opening of the interview sets the stage for the link between Marcus van Eindhoven and his relevance in the 'here and now' on the one hand, and the history of the crusaders, the presence of St. Mark's skeletal remains in Venice, and the historical conflicts between Christian and Muslim societies, on the other. They are drawn together in Marcus in a topological fold (Serres and Latour 1990) reflecting the proximity of alleged distant histories and places.

Now, anthropologists, such as Marilyn Strathern (1992) have a longstanding tradition of thinking genealogy, kinship and nation together. And recently, given the prevalence of genetic in doing genealogy and kinship, race has moved centre stage in these analyses. Marcus, I want to suggest, draws together the history, present and future of Eindhoven and beyond. His racial identity contributes to what Dutch-ness is made to be. It contributes to a racialization of Dutch-ness. The example of Marcus however, makes clear that race is not a matter of DNA. But it also adds something to the previous examples. Namely, that the different entities that are linked to one another carry with them a history, a culture. The invested-ness of such entities can be and were mobilized in Marcus and they helped to enact race.

3. Concluding Remarks

We cannot a priori know fact from fiction! But how were they present in our example?

The example of Marcus has taught us that facts about genetic differences were mingled with stories about descent, historical ties and national belonging. It was made clear that the archaeologists in our case were not particularly interested in genetic diversity or kinship as such but in local and national histories and identities. This fiction (narrative) has racialized Marcus, and turned him into a personification of Dutch-ness. We have thus moved a long way from our starting point, namely the idea of race as a simple fact. This is not to say that race is fictional or that it does not materialize. By following the strategy of locating and by attending

to the various technologies of doing similarities and differences, I have shown that race does not simply inhere in bodies. Rather it materializes in the very relations that are established in practices. It is in this sense that race is relational.

In his classic paper "Drawing Things Together" Bruno Latour (1990) elaborates on his notion of *immutable mobiles*. Latour (1990, 56) raises the question "how can distant and foreign places and times be gathered in one place in a form that allows all the places and times to be presented at once [...]?" Thus how can knowledge about a world out there move between sites without losing shape and content? His answer is: make immutable mobiles, flat, two dimensional inscription devices. Although Latour might have a point, I want to suggest that in order for facts to travel *and* to arrive, they need fiction too (see e.g. Strathern 1987). To be sure, facts and fiction are not in and of themselves either the one or the other. A fact in one practice can be enacted as a fiction in another.

So facts need fiction. Fiction is obviously a broad category. Work conducted in STS has brought about similar concepts, such as the work of John Law (2002) on how narrative helps to enact technological objects, or Steven Shapin (1984) on literary styles and their role in the production of matters of fact. Yet I want to insist on the notion of fiction for a number of reasons. Here I want to highlight two.

Firstly, we need to attend to fiction for it contributes to the making of wholes out of parts⁴. As we have argued race can be many different things. And different markers produce different configurations that do not add up. Yet, e.g. the 'fiction' of human evolution or the Out-of Africa theory contributes immensely to an illusion of wholes, by providing a narrative that supports the existence of integer groups that are separated in territorial and temporal ways. Secondly, there is a tendency to attribute fictions to some knowledge practices and not other. Archaeology is a case in point. I suggest that knowledge practices such as archaeology function like a prism indicating the crucial role of fiction in other allegedly 'fiction-free' practices. There might be different styles or genres but "there cannot be a choice to eschew fiction altogether" (Strathern 1987, 257). Insisting on the persistence of fiction is attending to the fact that race is not an entity in the body but a relational object. If not only, it is a relation between bodies and the kinds of fiction that matter to us.

Thank you.

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⁴ "[T]o be One is to be an illusion", thus Haraway (1991, 177).

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Care in Practice. On Normativity, Concepts, and Boundaries

Annemarie Mol, Ingunn Moser, Enrico Maria Piras, Mauro Turrini, Jeannette Pols, and Alberto Zanutto

Abstract In recent years many STS scholars have dealt with care practices in different fields. Starting from *Care in Practice. On Tinkering in Clinics, Homes and Farms* [Transcript-Verlag, Bielefeld, 2010, 325 pp.], a book edited by Annemarie Mol, Ingunn Moser and Jeannette Pols, this debate aims to discuss the meaning and development of the concept of care and its accomplishment in practice. Mauro Turrini, Enrico Maria Piras and Alberto Zanutto wrote two commentaries on the book, while the editors answered to their observations. The result is a vibrant discussion that goes beyond the care to address issues such as the need / refusal to define and delimit concepts in doing social research and what these boundaries mean / do.

Keywords care in practice; normativity; concept boundaries; situated practices.

The Normativity of Care

Mauro Turrini

Looking after those people who, for reasons of health, disability or isolation, require continuous attention is a growing concern of our contemporary societies. The ageing of population, a major sensitivity to impaired people and other social changes have increasingly focused the attention on care and its bodies of expertise, organizations and technologies. However, social sciences, maybe due to an intellectual bias towards repetitive daily routines, have so far paid scant attention to these topics. *Care in Practice: On Tinkering in Clinics, Home and Farms* is an important

attempt to inaugurate innovative questions and areas of research oriented towards the multiple sites and aspects of the care work.

Drawing on the pioneering enquiries of the so-called “nursing theory”, which is oriented to empower and elevate the nursing profession, as well as other approaches, predominantly feminist, which have investigated the invisible, domestic work usually carried out by women, the book tries to rethink the work of care in the light of its social expansion, cultural centrality, irreducible specificities and normativity. Assembling 13 empirical studies carried out by well-acknowledged researchers, among whom John Law and Mary Winance, a wide range of situations are explored. They span from the intimate relationship between a daughter and a mother who suffers from progressive dementia (J. Taylor) to the personal memories of animal farm stories drawn from the author’s childhood (H. Harbers); from new technologies of care – such as wheel chairs (M. Winance), an Internet-based service for information sharing among patients and professionals in Denmark (B.R. Winthereik & H. Langstrup), diverse telecare services (D. López, B. Callén, F. Tirado & M. Domènech; J. Pols) and high-tech home care devices, among which pulmonary ventilators (D. Willems) – to several programs for improving care practices – including a program for increasing nourishing practices in Dutch nursery homes (A. Mol), a British computerized system for tracing cattle movement to control and prevent any epidemics spread (V. Singleton) and Marte Meo, a Swedish video-recording system used by nurses to improve the quality of dementia care (I. Moser). The heterogeneity of the contributions points out the importance of a collective effort aimed at developing analytical concepts and problems to unravel care practices in a wide range of situations. The great variety of the case studies considered is not integrated into a unitary theoretical framework. In my opinion, the authors’ main goal is not to put a theory in practice but rather to put practice into theory. Not by chance, the book does not offer a univocal definition of care, but multiple formulations defined each time according to the specificities of the situation scrutinized. The theoretical introduction written by the editors offers the reader a very open meaning of “good care” as a “persistent tinkering in a world full of complex ambivalence and shifting tensions” (Mol et al. 14). This extremely broad definition refers to a double meaning that is implicit in the book, according to which care does not only consist of those professions, organizations, technologies and expertise committed to look after diseased or impaired people, but also involves all those daily activities that are in to some kinds of care such as, for example, the provision of food and shelter. In other words, the care work we see in nursing houses, clinics and farms can be potentially found everywhere. This definition, thus, leads to some of the most intriguing and, at the same time, problematic aspects of the book.

Firstly, I will mention the extensive and fuzzy definition of care in relation to the private/public dichotomy. Care is here understood as a complex, ambivalent and shifting phenomenon, and, thus, there is no distinction between the provision of formal care through the public, private or not for profit sectors, and that provided informally by relatives or friends. In this way, the very dichotomy between public and private is questioned: according to the authors, the care work should be

considered of public relevance, but without losing the specificities that are inherent to its (*good*) practices. The crucial role attributed to contextual nature of care is a point that can not be undervalued. From a methodological point of view, it corresponds to an eminently ethnographic approach particularly interested in the details and subtleties of practices that are local, embodied and responsive to a variety of heterogeneous and unpredictable elements. Theoretically, it poses the necessity to rethink the carer/cared relationship. Other recent approaches on this theme have shed light on the asymmetries between caregivers and cared people in order to criticize the paternalist role of caregivers (doctors, nurses, farmers and so forth) and propose that also impaired people should claim individual rights, the free of choice and so forth. On the contrary, *Care in Practice* does consider people who need care not in light of their autonomy or abstract categories, but of their bodily failures and fragilities and their collocation in collectives. Rather than limiting itself to recognize the public relevance of the care work or to claim rights, the approach of care intends to analyze *carefully* any singular situation in order to let their specificities surface. By analogy with the feminist critique, bringing public attention to care should not imply losing its distinctive aspects, which, in the case of care, basically consist of the bodily needs, the lack of autonomy and the necessity of continuative relationship.

To better understand this point, we should go back to the studies that anticipated and introduced a new research on care (Pols 2003; Moser 2008) and recall, in particular, the most important volume issued on this topic, Annemarie Mol's last monograph, *The Logic of Care* (Mol 2008). A sort of manifesto, it offers a succinct, critical engagement with the current, predominant model of patients as consumers or citizens who have both a right and a responsibility to care for the self by making informed choice. Differently from this "logic of choice", which relegates the patient's involvement to some individual, intellectual or, in the case of market transactions, even economic *choices*, "the logic of care" is focused on the broader process of diagnosing, informing, injecting, encouraging and so forth, of which the patient is not only the object but one of its principal actors. In this sense, *caring* is constituted by collectives, uncertain practices shared by doctors, nurses, patients, relatives and friends, and even technologies.

Care is thus foremost described as a work of arranging, modulating and resolving bonds. Anyway, it is not presented only as a matter of good sentiments and warm relations between people. This consideration leads us to a second aspect of the book I would like to highlight: even if the ethnographic descriptions and stories presented are rich, moving and, sometimes, touching, the book is not sentimental at all for many reasons. First, the networks here investigated include the crucial role of "cold" non-human elements, such as farm animals (which, differently from pets, are usually seen as economic means) as well as machines and artifacts, i.e. telecare or wheelchairs. Not by chance all the contributions, although draw on and are addressed to multiple disciplines such as medical anthropology, medical sociology, disability studies, assume a typical Science and Technology Studies posture in recognizing the sociality of animals and technologies. Most of the authors have a background in STS and, even if they have moved out to study other practic-

es, they take in serious consideration the pervasive role of technology. Second, the silent, “cold” process of attuning bodies, technologies and knowledge that constitutes care does not necessarily implicate empathy-with-the-other, but also distance and separation. As John Law shows in his article on the huge cattle slaughter after the spread of foot and mouth disease in England, “the choreography of care [...] necessarily depends on the organization of separation” (Law 2010, p. 68). In a similar way, Mary Winance in her study describes how disabled people attempt or refuse to acquire autonomy observing wheelchairs tests and rehabilitation programs. She concludes that “the aim of care as shared work is to construct a person who is both attached and detached, “dependent” and “independent”, moving on his/her own and being moved by others” (Winance 2010, p. 111). This aspect is very important in that it distinguishes this book from other approaches on care and, in particular, from the so-called movement of the “ethics of care”, according to which the normativity of care lies in the relations of dependency implicated in care activities. Instead of interpreting care as a unitary, monolithic phenomenon based merely on the mutual dependency among human beings, this book is focused not only on the organization of closeness and distance, of dependency and autonomy among bodies, technologies, organization, knowledge and so forth, but it also points out the incompatibility among the values of care. This last point is argued in Mol’s article on food provision in nursing homes for dementia people, where sometimes the attention towards *nutritional values* related to the quantity of the food provided interferes with the *cosiness* of eating practices. Or the *choice about food* can worsen the *taste of food*. These tensions can be solved by an artful way to accommodate specific individuals and circumstances. As Janelle Taylor concludes about her personal experience as a daughter who cares for her mother who suffers from Alzheimer’s disease, the most important question about caring is how to keep together all the complexities and frictions involved in care. While at the mention of her mother’s memory loss everybody responds with the question: “Does she recognize you?”, she thinks that the right question to ask to a person who cares for someone else is a different one.

I wish that just once, someone would ask me a different question [...]

«Janelle, are you keeping the cares together?»

«I’m doing my best», I will answer.

«And you?» (Taylor 2010, p. 53).

This consideration leads us to a third, crucial aspect of *Care in Practice*, namely the *normativity* of care. The subtle deconstruction of all the elements, aspects and values is not here considered a mere intellectual exercise, but it is aimed at identifying what “good care” is and where to find it. All the contributions in different ways seem to try to answer the question: what do we care about deconstructing things? Of course, there is no attempt to construct an ethical paradigm based on universal principles, but rather to explore specific *modalities* of handling questions to do with the good. The approach focused on practices makes space for ambiguity and ambivalence and, thus, it is impossible to predetermine what is good, but it is

possible to achieve it contextually through “a persistent tinkering” of the elements. What is emphasized is a reflexive and experimental nature of care that comes from all members involved in the process. This interpretation of ethics resonates with what John Law has recently termed the “ontological politics” inherent to the method of social sciences:

There *is* no general world and there *are* no general rules. Instead there are only specific and enacted overlaps between provisionally congealed realities that have to be crafted in a way that responds to and produces particular versions of the good that can only ever travel so far (Law 2004, p. 155).

Social analysis is thus embedded in reality and attempts to be engaged with it under multiple levels. From this eminently political point of view, one of the most interesting aspects of *Care in Practice* is the opposition to the systems of control that are pervading many areas of work and the care work in particular. Exerting a control on care activities through the proliferation of checks, rules and regulation is a strategy that is not innocent, in that it implies the objectification, centralization, disembodiment, formalization and standardization of work practices. On the contrary, the quality of care may only be improved through the recognition of the generative and creative nature of care practices.

All these three aspects mentioned constitute what is not only an object of study, but also a coherent research approach, which, to be unequivocally normative, is promising and brilliantly sketched in this book. Whilst the care approach has obvious merits, it also raises important and unresolved questions. Firstly, the book offers a very broad and fuzzy definition of care, according to which care can be analyzed everywhere, not only in clinics, houses and farms, but also, for example, in places that are not usually seen as places of care. Think for examples to scientific laboratories and the practices to “seed”, “culture”, “staining” and “harvesting” these cells to be observed under microscope. In my opinion, this can be seen as activities that have to accommodate bodies, cells, technologies and knowledge within complex and specific circumstances. Can these practices be considered part of care? Again, what about the practices of breeding and sacrificing animals in laboratories? Can be these considered care practices? To which extent is it possible to consider as care the treatment reserved to farm animals or guinea pigs? If care and instrumentality are not inseparable entities, can we find care also, for example, in the relationship between brokers and their clients? An extensive definition of care giving, however, does not only raise these problems, but it also offers new opportunities. According to this meaning, care seems to sketch an innovative scrutiny to reality. It can be almost considered an alternative, more normative, that arrives when the relativism of science studies is being accused of having aided the politicized treatment of science (which was adopted, for example, by the George Bush administration).

Moreover, if this definition of care, on the one hand, can be potentially found everywhere, on the other hand, in the book, there is not actually very much on clinics in the foucauldian sense of clinics. The contributions investigate a wide range

of institutions that are not clinics in a narrow sense, whose complexity, however, would be important to highlight. In a moment when the one-on-one doctor-patient relationship of clinical medicine is increasingly replaced with a science-based rationalization and standardization of health services, the care approach seems to suggest an alternative solution, which avoids to formalize and reduce the complexity of clinical decision making or to fragment the expertise of medical professionals and, at the same time, proposes a contemporary vision of care embedded in technology and science. Yet, no contributions deal with this topic and, aside from the case of the on-line, clinical records for pregnant women, no medical practices are discussed. So, what are the implications of care for individual professional responsibility? From an organizational perspective, the creative, experimental and incremental care approach does not seem to be able to give an answer to the crucial question of professional as well as juridical responsibility of physicians. Perhaps, the care approach is to be understood as part of the recent paradigm shift in terms of thinking about errors, where the lens of responsibility is being refocused away from people and towards organization. However, if care practices seem to be the most efficient way to improve the quality of care and avoid failures, systems of control are undoubtedly more attuned in allocating the responsibility in the case of an error occurrence. Another still more important question, the relationship with risk, in the last decades, has become a central question not only for societies, but also for organizations, especially for health services. I argue that the logic of *risk* is at the very antipodes of the logic of care. Typically, the ways to increase the patient autonomy of choice – i.e. informing him/her about the dangers of a surgical operation or handling to him/her an informed consent to sign – are an obstacle in the construction of the care team whose elements participate with different roles in the relentlessly adjustment of the treatment to adopt. To put it briefly, risk is intrinsically part of a subjectivity oriented towards an entrepreneurial maximization of health through rational assessments based on scientific data. Belonging to the disembodied, abstract “logic of choice”, it has nothing to do with the activities of persistent, shared tinkering involved in care. At the same time, I also think that the normative aspect of care, which is interesting to consider and to explore, can not avoid to be compared with the normative aspect of risk, whose discourse is well articulated in the clinics including informed consents, patients’ rights, medical insurances, physicians’ organizations and so forth.

Meaningfully, in the introduction of *The Logic of Care*, Mol describes three episodes where the mobilization of the logic of choice leads to poor care. Among them there is one about the author’s experience of amniocentesis. Prenatal diagnosis is a medical practice deeply embedded in risk: pregnancies at risk are invited to carry out amniocentesis for the risk of fetal anomalies, even if this practice implies an increased risk of abortion, of which every woman is informed by means of the informed consent. In the author’s episode, Mol is disappointed by the rude reaction of the nurse who reacts to the preoccupation of nurses replying rudely: “Well, it is your own choice” (Mol 2008, p. xi). According to the author, this episode witnesses the lack of care determined by the logic of choice. I would like to add that the logic of choice seems to be inherent to certain medical practices that raise

question on how difficult it is to keep together the relentless work of care and the management of risk, which includes crucial decisions to make and medical responsibilities to take *care* of.

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What exactly are "Care" and "Practice"? Some Notes on Concepts and their Boundaries.

Enrico Maria Piras and Alberto Zanutto

It is not uncommon to describe a book as a must-read for different audiences. In reviewing *Care in Practice*, though, it is hard to limit the potential academic/practitioners community that might benefit from it. *Care in Practice* is an edited collection that speaks to different audiences and it does so by freeing care, tearing down the walls the confined it in the domains of the sociology of family and nursing studies. These two communities might certainly be interested in the essays, but also scholars in the field of social services, organization studies and farming could find interest in (at least some of) the essays proposed. Moreover, Science and Technology Studies theoretical underpinnings are a common background for most of the authors, a reason for their colleagues in the fields to become interested in the book.

The main reasons to read it, though, are more basic than its ability to cross academic boundaries. The first is simply the overall high quality of the essays. The second is the possibility offered to the reader to explore many different social contexts only by following the thin red line of care and the diverse material forms in which they occur. The third is that the whole volume and some essays in particular are infused with a passion for the care practices described that perfectly fits the political scope of the book, which is to rescue them from the private realm and show their public relevance.

The aim of the editors and authors is twofold. Firstly they want to look closely at the care practices, analyzing the assemblage of professionals, family members, and low or high tech artifacts that need to be aligned in the process. Processes that involve tinkering, mediations and frequent reshaping of the care collectives. These fine grain descriptions (most of the works are based on ethnographical research) take the reader in contexts where care practices are never accomplished once and for all but are precarious compromises that are always in need of fine tuning. Secondly, the book aims at “opening” the care practices themselves; the book does not ask the reader to investigate deeply the contexts for themselves but rather to deconstruct and analyze the practices to explore their richness.

The essays on the one hand highlight what makes every care practice unique, its situatedness and its being tailored to the setting in which it occurs, and on the other they underline the intertwinement of the elements they are made of, being it ethical values, technical dimensions, social routines and collective representations.

The stories portrayed highlight that caring means keeping together the hybrid collective made of knowledge, artifacts and people, and how it cannot be managed to reach a perfect and stable alignment but rather implies to keep working carefully (with care) around the details. It is this attention in acting without taking “the heart out of care” (introduction) that turns the actions described into care practices.

As said before, one of the strengths of the book is that “typical” care practices, those that deal with humans in need of assistance, are alternated with other stories in which the subjects of the careful attention are animals. John Law, for instance, describes the work of vets in the case of a mass killing of animals under the policies to reduce the spread of a possible epidemic, stressing the fact that caring means to provide a cure in some cases and to make sure the animals have a decent death in others. Hans Harbers recalls his memories as a child in a Dutch farm discussing the forms of attention for the different animals, practices that ranged from allowing them into the house to killing them, providing rich evidences that care is multifaceted rather than uniform.

Among the essays that deal with care aimed at people, there are some interesting works that are focused on practices of assistance in nursing homes and health institutions. In these contexts, an increasingly important reality especially in the urban areas, some works allow to observe how providing care to the people in need intersects with values, ethics, and the choices about welfare policies. This intricacy creates an ambivalent and somehow ambiguous context in which caregivers and the ones who receive care are constantly called to tinker to adjust to the contingencies at hand. This happens when care practices are about feeding people (Mol) or they are questioned in order to evaluate the indicators of quality of service (Moser).

Some works deal more explicitly with the relationship between care practices, people and technologies. Care for the artifacts and care for the people are indistinguishable when the latter live and move only thanks to machines (Willems, Winance). In these extreme situations becomes clear that caring is not only providing a one-way attention to the “people in need” but rather to take care of the hy-

brid networks that sustain them. A final group of works explores practices of care mediated by information and communication technologies showing how both professionals and people receiving care do not limit themselves to the scripts in the artifacts but rather exploit them in unanticipated ways (Lopez and colleagues, Winthereick and Langstrup, Pols).

One aspect that distinguishes the book is the desire that it may contribute not only to the scientific debate but also serve as a stimulus to a broader reflection on the importance of care practices in various social contexts explored. Far from keeping a neutral stance, in fact, the editors hope that the care practices (in general, not only those described here) get more visibility and recognition in the public debate in which they are currently underrepresented. “Perhaps care practices can be strengthened if we find the right terms for talking about them”, claim the editors in their introduction (p. 11). We can only agree with this statement. However, it is precisely these “right terms” we would like to focus on in the conclusion of this review. More specifically we argue that authors could have taken more care of the words “care” and “practices”.

Show care, through words, photographs (see Law; Harbers) or drawings (see Xperiment!) is what is done by each individual author. Readers are led by the hand from farms to big rooms where wheelchairs are tested, from memory clinics to private houses, they are shown the tinkering through which care is enacted, the ongoing and ever-changing remodeling of the hybrid network of actions, living beings, spaces, artifacts, rules of which care is made up.

The words of the writers reshape the reader’s idea of the concept of care, offering new grips and new visual experiences through which reading it again. This constant change of scenery invites readers to a radical exercise of comparison, in a constant search for common ground between practices radically different at first sight. In a provocative way, offering the same volume of care practices that take place in farms and or memory clinics, in the treatment of dementia and pregnancy, the volume as a whole suggests the reader that even though there are differences in these experiences, these are nonetheless similar in many respects.

However, the process is only partially completed. Neither in the introduction nor in the individual essays there is a definition of what is meant by care. Defining etymologically means putting a limit, drawing a line to tell something from something else. Accepting a boundary, no matter how temporary and precarious it could be. The decision not to give a definition of the concept is a rhetorical strategy used by editors and the authors to appropriate “care” and “steal” it to nursing studies and sociology of the family, the disciplines that “own” the concept, showing how care is relevant in other social and institutional contexts.

At this point, however, one would expect an examination of the effects of the abolition of definitional boundaries. This additional step is absent in the book: the care is not in any way “re-defined” and it remains a concept of an uncertain status. Care appears like an intuitive construct, a “natural” and self-evident concept. This is not (obviously) the intent of the editors and authors of this book who, in fact, dedicate their efforts to describe in detail the hybrid collectives involved in implementation of care practices. However, if care can be found everywhere and it is not

defined in any way, what is left of it? The risk is that the care appears more a style than a practice, a vague label that could be associated with any activity and consequently poorly defended.

Practice, the other word used in the title, requires a different approach. In the book practice is more a word rather than a concept and it is generally used to refer to “what is opposed to theory” or as a synonym of “mundane activity”. In academic literature, though, “practice” is a concept that has gained a considerable interest in the social analysis (e.g. “communities of practice”) and in particular in the field of organization studies. Among the many “turns” (postmodern, linguistic, narrative) proposed in the last decades, there is also a claim for a “practice turn” in social theory (Schatzki, Knorr-Cetina, von Savigny 2001). While practice has been defined in different ways, all the conceptualizations share the assumption that it refers to materially mediated activities that require a shared practical understanding (id.). Practices hold together socio-material arrangements, discourses and classification systems, understanding and learning; they are, to put it into Silvia Gherardi’s words, “[modes] relatively stable in time and socially recognized, of ordering heterogeneous items into a coherent set” (Gherardi, 2006).

The care practices described and analyzed in the essays fit quite well in this definition of practice, except that the relative stability and the social recognition are not much stressed. We do not mean to superimpose a theory or a definition, still we believe that these two features of “practices” could have been of some use in the re-definition of the concept of care by stressing the patterns of action, the production of practical knowledge involved and the social effects of practicing care.

In conclusion, in our reading the major merits and limits of the volume derive from the same editorial decisions, first and foremost by the lack of an explanation of what is meant by care. Not only the editors do not provide a definition of the concept of “care” but even individual authors do not venture into definitional issues preferring a description and analysis of the observed activities. The absence of boundaries produces a wide and varied discussion that is certainly a strength of the volume.

This richness, however, is likely to become a weakness if the detailed descriptions and analysis proposed are not followed by a re-conceptualization of the care itself. There is a risk that care, without semantic boundaries, becomes a fluid label to describe any process or simply a style rather than a situated practice.

“Words can only say so much” when it comes to care, state the editors in the introduction. This is true but the lack of new words to reframe care is likely to weaken the political effort that is one of the aims of the book, namely the stated emphasis on the need to “strengthen care practices – and whoever is involved in them” (introduction, p.11). This would require a redefinition of care aimed at providing a conceptual support to the articulated, changing, and hybrid network of relationships between living things, technical artifacts, living spaces and nursing professions, and rules that constitute the care for us as it is presented in the book.

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Authors' Response

Annemarie Mol, Jeannette Pols, and Ingunn Moser

We are obviously very happy that the book we recently edited, *Care in Practice*, gets such detailed attention by concerned commentators. And we gratefully accept the opportunity to respond to the comments that have been made. This offers us the occasion to reflect on one thing in particular: the question of what it is to define a term that is crucial to one's academic work. For this is a concern that both comments share: that, while writing about "care" we have not *defined* it. Neither the editors, nor the authors of the various contributions, our reviewers remark, lay boundaries around "care". Thus, or so we read in the comments, it might be everywhere, this care. It loses its distinctiveness, is all too fluid and cannot be defended. Turrini quotes what we say about "good care" in our introduction, that it is a matter of: "persistent tinkering in a world full of complex ambivalence and shifting tensions". But this does not seem to count as a "definition" because it is "too broad". Please, pause for a moment to look at the spatiality implied in this "too broad". It evokes a regional kind of space – we should apparently have delineated a smaller turf. Piras and Zanutto draw on a similar regional imaginary of space when they remind us that to define is "to put a limit, drawing a line to tell something from something else". This is my land, there is the boundary and beyond it, dear neighbour, is yours.

Interestingly, in the case at hand the question of what may (or may not) be bounded in this regional way, emerges at two levels at once: first that of care "itself" and then that of words, terms such as "care". Let's look at each of these in turn.

First care. Is this a regional phenomenon, that is a field, a terrain that may be delineated? Our critics seem to think so when they write that: "There is a risk that care, without semantic boundaries, becomes a fluid label to describe any process or simply a style rather than a situated practice". What we are being asked here is to understand care for what it *really* is, namely a "situated practice" – something that is somewhere, somewhere bounded, and not somewhere else, beyond its de-

fining boundaries. The danger evoked is that of falsely taking care to be “simply a style”. Thus, not a region, a terrain, but a way of working, a mode of doing things. Somehow we must have been unclear. For understanding care as “a style” (or an assemblage of different but related styles) is exactly what we aim to do in *Care in Practice*. We thought we were explicit about this when we specified caring styles, their *logic*, as: “persistent tinkering in a world full of complex ambivalence and shifting tensions.” But given our critics’ way of wording, we have not been explicit enough. So let’s try to be more explicit here. We did not seek to ask where-questions, as in where is care – and where is it not? Instead, we sought to ask a how-questions: how is “care” being done? Which modes and modalities of “caring” may we trace in various practices? How can each of these, different as they are, shed light on and help to specify the others? Or, in other words, in the essays that we assembled, “care” was a verb, and not a noun.

This takes us to the second level, that of words. For verbs, like nouns, may be defined or left unbounded enough to adapt them to local needs and circumstances. What is wisdom? There is an impressive theoretical tradition that takes it that while in daily life words may be vague, in the social sciences one should use them in a thoroughly disciplined way. That is to say: bounded. Science, or such is the presumption here, should build on and mobilise not just words, but well delineated words. Only such well delineated words get the honorary status of “concepts”. Measured against the standards of that tradition, our work fails. But that tradition is not self evident. We disagree with it. Thus we do not “fail”, but try to foster another set of standards. Here, words should be fit to sensitise research, but not close it down prematurely. This, or so we take it, allows for another type of research. Let us try to elucidate this with an example. If you would want to count apples, you would first have to define “apple” so that you would know which entities to count and which others to exclude from your calculations. Again, if you would want to know about the colour of apples, you would first have to define the entity “apple” whose colour you are curious about. But what if you want to know what an “apple” *is*? Then you need to have a sense of where to go look for it, but starting out by clearly defining “apple”, is not the way to go. For then you answer you own question before you have asked it and kill your curiosity before you have learned anything new.

The apple example may seem somewhat simplified, as the term “apple” is strikingly stabilised in most practices. However, this isn’t true for worlds were apples are being cultivated and traded. There, questions rise about them: is this sour fruit still an apple, should it be marketed as such, what about wild apples, etc. This is typically the case: where objects are tinkered with, where ways of working are developed, boundaries get contested, instable, take a variety of shapes. This is why we are weary of definitions. If we were to define, say, “autonomy” then we would be able count it, or at least wonder if people in this or that situation are granted enough of it. However, if we abstain from defining “autonomy” we may yet learn new things about “it” when researching practices where people try to find a wheelchair that is appropriate for the bodies they live with and the situations they live in. And which shape, we may then wonder, does “autonomy” take in situations where

people live at home but have an electronic guardian angel? If we do not set out by knowing what “subjectivity” is, but keep this open, then we may yet encounter “it” – and learn strikingly new things about it – among people with dementia and even in a ward for people who are living in a vegetative state. So it goes with “care”. It is what we study. We would have killed our curiosity had we defined it before going out in our various fields!

It is also possible to frame this in a slightly different way and ask the philosophical question what a language is. The words of a language may be taken to refer in a stable way to an objects or a process – and in that case they can be defined. Such defining depends on explicating the link between a term and the objects or processes that it is supposed to refer to. A first problem is that such explications in their turn have to make use of others words and how to define those? The activity is potentially endless. But there is another problem as well: this understanding of language as a collection of labels, does not fit with the way words are being used in practices. For in daily life, but also in writing, words are not tightly linked to specific objects and processes. They are not labels, but move around, they slide and shift. And if a researcher sets out by tightly defining her terms, she is unable to move along with the way words are being used in the practices she studies.

Practices: there they are. Piras and Zanutto deplore it that we have missed the “practice-turn” in “social analysis” (as they call it). They conclude that we have done so because, again, we have not defined the term “practice”. But the quintessence of the practice turn is to study practices – not to define the term. It is to follow objects and/or processes, like autonomy, subjectivity, respect, killing, tagging, buying, tasting, filling in forms, using a webcam, and so on, without beforehand fixing what these things and activities are. Or, more specifically, without fixing their *essence* in a definition to then restrict one’s research efforts to studying their extra, accidental *attributes*. The quintessence of the practice turn is to abstain from such fixing and to stop making the division between essential and accidental characteristics. Even one’s central concerns, especially one’s central concerns, deserve to be opened up, rather than defined. Opened up, that is, for study. After the practice turn, words are tools within a practice rather than labels that may be firmly circumscribed. This is why our “editorial decision” to not define our terms is not a failure of our work, but a precondition for it. It is what has allowed us to contribute to the collective, ongoing, study of *care in practice*.

We engage in this study, or so we said, to strengthen care. Which brings out the question if “care” is good. Is it? Well, that depends. Turrini suggests that “care” is not a proper way of ordering ways of working in situations where there are risks, because when things may go wrong it is better to be able to point out responsibilities. Is it? Again, that depends. If some doctor denies responsibility for a medical fault because he was off playing golf while letting a students do the medical work, casting some blame may be in order. But what if a care assistant is blamed for errors she made while she had only five minutes for a task that can be done in five minutes under test conditions, but not in conditions where people are afraid or start yelling – and while lots of other tasks are waiting to be done? We would hope

that an analysis in terms of care might help to ask such questions. There are no definite answers, for the complexities are endless. Different settings, different people, different goals, different frictions, different materials, different concerns, different goods. They may all be studied and analysed in their specificities, but not in general. Instead, different ways of caring and different care practices deserve to be held in tension. The art is to compare and contrast different situations of care and to wonder which lesson might transport between them. Between farms and clinics; between care for eating and care for breathing; between care with webcams and care depending on patient files; between counting newborn piglets and wiping away tears. Investigating a broad variety of cases in detail, trying to learn from all of them on their own terms, while juxtaposing them comparatively, does not provide a sense of security. It does not provide definite facts, let alone definite normative conclusions. It has an altogether different aim: to contribute to strengthening and improving care, while searching how to do so. The chapters that we assembled in *Care in Practice* seek to be *caring*.

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Biology, Ethnography and STS: An interview with Christine Hine

Christine Hine, Attila Bruni, and Paolo Magaudda

Abstract Christine Hine talks with Tecnoscienza about her academic trajectory and passions, from botany and biology to her entry into the STS field. In this interview she comments on her most famous book (*Virtual Ethnography*) and her latest work (*Systematics as Cyberscience*) which traces linkages between science practice and knowledge, ICTS and biology. Going back to her first academic background as a natural scientist, Christine Hine also recalls her experience as past president of EASST and asked about what young STS scholars would nowadays need, emphasizes the absolute centrality of networking and collaborations to foster the field with new yeast.

Keywords biology; virtual ethnography; cyberscience; academic trajectory.

Introduction

Assembling a special issue on the EASST010 conference, in the mood of reflecting on the state of the art of STS and their academic organization, we thought it would have been interesting having an interview with Christine Hine, Professor of Sociology of Science & Technology at the University of Surrey (UK).

Author of one of the most quoted books in the field of contemporary STS and past president of EASST, the name of Christine Hine is well known among STS scholars and in the interview we discuss her work (and academic trajectory) referring to her first and last book (namely, *Virtual Ethnography* and *Systematics as Cyberscience*). Moreover, we ask her to comment about her experience as EASST President and, on this basis, we take the chance to question the contemporary role and future strategies of STS, at a scientific and academic/professional level. Finally, we try to grasp a few (good) advices for young STS researchers.

Beside all this, interviewing Christine Hine has also a symbolic meaning for us. In 2008, when STS Italia was about to start its second national meeting, Christine (EASST President, at that time) contacted us saying that she saw the announcement of our conference, that she was impressed by its program, and that she

thought STS Italia could have been a good candidate for the organization of the EASST conference in 2010. Also during the organizing process of EASST010, although not in a 'presidential' role anymore, Christine has always been kind and supportive with us.

Thus, at a symbolic level, this interview is to acknowledge somehow the co-responsibility of Christine in the making of EASST010, as well as the importance for STS scholars of constantly looking for new collaborations, friendships and impeti.

TS: *First of all, we would like to understand your scientific trajectory. You started as botanist, then moved to biology and then finally arrived to sociology and STS. You have already written this history, but can you say something more on that? One important passage is how you met the field of STS: who are the «open-minded sociologists» (to quote the Introduction of your last book) who helped you? And how did you start to develop your research on ICT and internet?*

CH: Certainly my academic trajectory is a little unusual, and although I do not regret any of it I am not sure I would recommend that anyone should set out to be quite so mobile across disciplines. I am sure it has left me with some gaping holes in my theoretical knowledge, and as a sociologist I think I will always lack the feeling that sociological theory is my native language because I learnt it so late in my intellectual development. Looking on the bright side, though, some of the scientific ways of thinking are quite "native" to me, and throughout various changes of direction I was always drawn to conversations about how we know what we know. That thread runs from early interests in the philosophy of science that I picked up as a scientist, through my move into STS and then my interest in the development of methods for understanding the Internet.

Starting out with botany was very much a reflection of my interests as a child. In school I was a bit of a botany geek, with my own collection of pressed plants and a shelf of old botany books: I was very clear at that point that I wanted to dissect plants and not animals so it had to be botany. I enjoyed a lot of my undergraduate studies but I was not a good laboratory scientist. I was happier with whole-plant studies, and with some of the more philosophical aspects of the study of naming and classification. I wish now that I would made connection with the History and Philosophy of Science at Oxford, as some of my coursemates did – maybe I would have taken a different path. As it was, after my undergraduate degree I chose to do an MSc that acted as a conversion course to teach biologists about computing, with the aim of making us more employable in general, and feeding the emerging need for bioinformaticians. For a year after my MSc I worked at the Biological Records Centre, creating an atlas of moss distribution, but soon got restless and looked into the possibility of going back to further study.

I was lucky enough to gain a “quota” award for a PhD in the Biology Department at the University of York, which allowed me a fairly open scope to define my own field of study. This is a rare luxury for a funded student these days, and I think it gave me crucial time to open my mind to different ways of thinking about problems. Over the course of two years, I explored different ways of understanding the problems that biologists were having coping with the tensions between a scientific urge to have classifications schemes that were as meaningful as possible and the practical requirement to have stable names for organisms. I found an intriguing section in the University of York’s library, containing books about the sociology of scientific knowledge, and started to use those ideas to develop my thesis. Towards the end of this time my supervisor suggested I go and talk to someone he knew in another college who studied in this field – and that turned out to be Michael Mulkey. He was very kind, because I must have been extremely naïve, but he talked to me quite seriously about the prospects for a scientist moving into the sociology of science, and described for me the landscape of the field in Britain at the time. One of the groups he told me about was at Brunel University, and Steve Woolgar at Brunel subsequently took the risk of hiring me for a post-doctoral year, which turned into several years as grant funding followed and then a gradual move into lecturing in the Sociology. The Centre for Research into Innovation, Culture and Technology (CRICT) at Brunel University was a fabulous place to learn STS and I gained a huge amount from people that I met there.

TS: *Ok, now we would like to talk about your study of the Internet. The book “Virtual Ethnography” is a huge success (the book has 1350 quotations in Google Scholar... really huge): did you expect this when you published it? More generally speaking, could you tell us something about the ‘backstage’ of that book?*

CH: I will be honest here – the name came before the ideas. I knew that I wanted to write a book about Virtual Ethnography quite some time before I knew exactly what I wanted it to say. Up to this point my STS interests had been focused on the combination of information technology and biology, but here I started to have the confidence to move away from my original discipline and actually to write about sociological methods as well. I was granted a teaching-free semester by my Department, and the whole thing poured out over a six month period. Those were very heady days, full of excitement about the Internet and the ways that it might transform society. I suppose I felt quite troubled, as a new convert to STS, that here seemed to be a technology that we were being told actually was transforming society all on its own. As far as I understood STS, things were going to be more complicated than that. I tried very hard in that book to think through what an “STS sensibility” would bring to the Internet, and the upshot was the idea that we could embrace the prospect of the Internet being both a site for cultural dynamics and a cultural artefact at the same time. I was fortunate to be first in the queue with this kind of book. I am quite surprised actually that it continues to be cited and bought now, given how much the Internet has changed since 2000. I need to work on a sequel...

TS: *Let's turn to your last book, "Systematics as Cyberscience: Computers, Change and Continuity in Science". Here you discuss how computing affects the way scientists work and the kind of knowledge they produce, a somehow 'classic' topic in STS. In particular, you focus on systematics - the classification and naming of organisms and exploration of evolutionary relationships. It sounds like a return to your origins (you did the research in the same department of your undergraduate period) and at the same time a consequential development of your interest on ICT. Can you tell us something more about this research?*

CH: *Systematics as Cyberscience* is very much me coming home to my roots again. I never published my thesis – it simply was not good enough – but I think this is probably the book that I would like my thesis to have been. As part of the research I did go back and interview someone in the department where I had been an undergraduate, and the reference to “change and continuity” is heartfelt. I could see things that had stayed the same, but at the same time the change was radical. I think the book is very much a reflection of my interest in how the Internet seems to change everything but still they seem to stay recognisably the same, and my prior knowledge of biology gave me a starting point for working through exactly how that dynamic might play out in one particular context.

TS: *In a review of your last book appeared in the Journal "Leonardo", Amy Ione writes:*

I was drawn to Christine Hine's Systematics as Cyberscience: Computers, Change, and Continuity in Science because the synopsis of the book suggested it was a study of the ways that biologists working in this field have engaged with new technologies as the field sustained its heritage and changed to accommodate new possibilities. While some information about research techniques and practices was included, I was disappointed to find that the book's concern was not with the practices that advance the field but, rather, the dynamics of the community as its tools change. More to the point, as Hine acknowledges in the final pages, the project paid "less attention to the detail of scientific practice and more to the varied sites in which the discipline [systematics] was manifested" (p. 260). As a result, in my view, Hine missed a real opportunity to educate the public in a meaningful sense about a field that is increasingly a part of the current ecological debates. In focusing on the discipline as a community, rather than on the change and continuity within the scientific practices employed, the book seemed more interested in the field's veneer than the substance of what the people who drive the field's accomplishments do.

Would you like to reply to this comment?

CH: These are probably fair points – but this is not the book that I wrote. Because of my interests in the dynamics of change and continuity around the Internet, and my wish to explore its perplexing ambiguities, I did focus on what the Internet meant for the systematics community, rather than looking at their generation of classifications *per se*. I think Ione's proposal for a book sounds interesting,

and I would like to read it, but it is not one that I would write. However, I would reject the substance versus veneer distinction that Ione makes and I think many of the participants in projects that I described would do so too. It is really important to me that I did make points that at least some of the biologists concerned think are relevant and insightful. They do see as ICTs as intrinsically involved in the sustainability of their field as both scientifically credible and useful, and what Ione dismisses as “veneer” is immensely important to them. It has been really interesting since writing that book to be more closely involved in some biodiversity informatics projects in which the participants want to have a sociological input to help them in doing that work. I am not an impartial observer here.

TS: *Now we would like to ask you something about your experience as EASST President: how would you describe it? Did you have any particular commitment or general purpose?*

CH: Being EASST President was busy, enlightening, often stressful, and a bit like setting up a small pan-European business. I was, I felt, very bogged down with administration, since moving the presidency also involved moving the whole administrative and financial apparatus from the Netherlands to the UK and in many ways starting from scratch. I am really hoping that the changes Fred Steward and the current council are making to membership management will mean that the next President does not have these things to worry about, and can concentrate on being more strategic, and more outward looking that I was able to achieve. I think there is still a lot for EASST to do in forging links with other disciplines, and with policy makers and funders as a group rather than as individuals. But still, I think it is micro-level EASST – person-to-person - allowing people to meet each other and talk, that is still the most important thing about EASST. I agreed to take on the Presidency because EASST was very important to me when I started out in STS – it helped to feel that I was part of a community with an identity and a sense of history. My main idea as President was really to make sure that the structure was secure, and the conferences and workshops and reviews where people enacted that community continued to happen. I was quite concerned when people told me they saw EASST as a northern European organization so I did hope very much to bring an EASST conference to southern Europe and I was really delighted that the Trento conference came about.

TS: *How do you perceive the field of STS today? Somebody says there is an ‘impasse’ due to the lack of new perspectives and concepts; some others argue that STS should dialogue more with policy makers and private companies. What is your opinion? What about the transformations of British (and European) academy?*

CH: As I said just now, EASST, and STS, has a sense of identity and history, but I think sometimes that can turn against us if we become too respectful of our past and leave radical ways behind. Sometimes it can seem as though we are all doing similar kinds of study and citing the same set of canonical texts, and that is a

long way from the risky, dangerous kind of sociology of scientific knowledge that first attracted me. You start wondering what there is left to be done. But just when you start thinking in that pessimistic way a new text comes along that gives you a surprise and sends your theoretical thoughts off in a new direction, and these moments of surprise are all the more precious for the fact that you thought they could not happen any more. Annemarie Mol's work catches me that way, for example. So, I am not particularly looking for more engagement with policy or commerce, although plenty of that is happening and it is all to the good for a mature STS finding its way in the world. I am just hoping for some more great surprises. Sadly, I think the current funding climate, at least as I know it in the UK, makes it harder and harder for people to find spaces for that kind of work to happen.

TS: At the end of this dialogue we would ask you if there is any particular (or general) advice you would give to a young STS researcher?

CH: I think my advice to young STS researchers has to be that they should be aware that funding shapes so much of our lives as academics. Try to find ways to work with the constraints of what is fundable, to find your own sense of what you want to achieve, and within that try to be innovative, to be radical and to orient to the development of the field as much as to the policy impact or short term payoff.

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Cartographies from the Margins: Outline of the Development and Applications of Actor-Network Theory in Spain

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Abstract In Spain, since the start of the 1990s, there has arisen a joint movement of recognition, production and hybridization in the social sciences with one of its apexes being the field of STS. This has acquired a specific form in Actor-Network Theory, which in certain research groups, has become a tool for translating the reflective activity and research conducted so far in relational and material terms. This text traces the path of development of Actor-Network Theory in Spain based on the consideration of three themes. First, its evolution over time and the identification of certain periods, differentiated in terms of the work carried out during them; second, the spaces, texts and people recognizable in these processes; third, the naming of certain areas of research interest. Finally, some reflections made public at the *Primer Encuentro Estatal ANT* will be mentioned. These may serve to highlight certain aspects of work currently being carried out and the future of this theory in Spain.

Keywords Actor-Network Theory; Science and Technology Studies; Spain; History.

Introduction

Now and again something escapes and becomes new, restless and creative. Product of meetings, connections and mediation, there are events that create distinctions, feeding off a number of other events that have happened either hidden or exposed, but alternative to what might be called "traditional patterns of thought". Similar to a *ligne de fuite* (Deleuze and Guattari 1980) they seem to escape the resonances which have codified the ways of conceiving the natural and artificial, the normal and abnormal and, together, position themselves between these dichotomies.

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Actor-Network Theory (henceforth ANT) may throw light on this phenomenon¹. From the field of Science and Technology Studies (STS) this theory (or focus, as it is often classified) has returned to mend the domains that make up the real in order to develop narratives which do not lose sight of the continuity with which the various techno-scientific phenomena often intertwine themselves with other phenomena of a multiple nature, both human and material. Though subjected to many criticisms and attempts to stabilize it this sensitivity to associations has awakened research and reflection motivation in various academics around the world. The ideas involved include translation, generalized symmetry, actants and hybrids and they have been disseminated in various scientific circles and transcended their field of origin to reach questions related to the social order and even to question fairly well-rooted beliefs in sociology (Domènech and Tirado 1998). At the same time the academic production of English speaking countries has moved beyond their borders and reached countries such as Greece, Portugal, Germany, Italy, Spain, Brazil, Argentina, Mexico and Chile among others. Hand in hand with this literary expansion ANT has grown and diversified (Callén *et al.* 2011). How has this theory articulated itself on the basis of developments which have taken place on the margins of dominant academic circles? What events might serve as sources to continue developing this theory, or a different one?

This article tries to trace the path taken by ANT in one of the territories where it has only been disseminated and achieved a certain level of recognition relatively recently. In Spain, as probably occurred elsewhere also, STS gradually acquired visibility and their epistemological and empirical contributions gradually consolidated themselves into a productive though also diasporic and transitioning intellectual scene (Callén *et al.* 2011). In the process, various universities integrated its structures into postgraduate training programmes and developed specific research projects on a trans-disciplinary basis (Ayús 2001). In this context, ANT has been recognized as being a useful and fruitful tool to update stalled ideas in social thought. And this has occurred not only in the area of science and technology but also in relation to the fields of politics, economics and education. This article is conceived as a map of this approach in Spain, that is to say, a tracing out over its present but also over its development. This paper should thus be seen as one view, one among the potential diversity of existing views of a story. In the sense developed by Tim Ingold (2007), a view to be found in relation to textures and surfaces, in which these dissolve, reconstitute themselves but also in which it is possible to establish certain supports which generate a sense of location. And so, this is a totally one-sided portrait, based on contacts made, stories recaptured from a particular

¹ In Spanish the term Actor-Network Theory has been translated as *Teoría del Actor-Red* although examples of it being translated as *Teoría de Redes de Actores* [Theory of Networks of Actors] can be found as well. Both translations have divergent epistemological and semiotic effects. For example, the first allows the understanding of a figure that is an actant (or actor) and network simultaneously, while the latter emphasizes the concept of network over the actors (as an element *per se*). For a thorough examination of the preference for the first translation see (in Spanish) Domènech and Tirado, 1998.

position and perspective and for this reason many actors will probably not be represented. It is to be hoped that it is just a beginning.

Returning to the idea of the map, the territory that will be described here has qualities that are difficult to capture. The space concerned is dispersed, diffuse, still changing and it is hard to locate all aspects of its background. Nevertheless, the view presented here is relatively validated by those experienced the arrival of ANT in Spain. Interviews were carried out with various researchers who visualized and contributed to the utilization of ANT in certain academic spaces and they were presented with a preliminary version of the material set out here to examine and enrich it. The central intention of this paper is to contribute to the perception of “locatability” of ANT in a territory which is itself in constant transformation. It seems to emerge as a poorly defined archipelago, the material substance of which condenses itself into some research and meetings, the acts of small groups or academics who establish their bases but at the same time roam about precipitating theoretical densities and activating certain connections without agreeing on a stable map of its form. They are acts of incorporation of a territory, mutual movements in which a space for reflection and interaction is performed. A marginal space, if you will, when one considers the mainstream elements of sociology, anthropology and social psychology (Callén *et al.* 2011) but from which this position still remains a territory, with a transformative potential, at the edge of the reach of the sources which situate themselves as a centre. A map of ANT becomes: “stories in emergency contexts in which a concept is continually re-invented. In them the origin is dislocated and blended into the joint movement (...) of practices which have distinct rhythms and emergency spaces” (*ibid.*, 7). Here the idea of marginality emerges as a resource and not necessarily as the acceptance of the existence of a sole and immutable centre. As may be expected from an ANT viewpoint, central or marginal location refers to the effect of a relationship, of a heterogeneous work always in progress, limited to particular circumstances and constantly changing.

In this framework the intention is to construct a certain ubiquity constructed along three scales: one temporal, one spatial and the other conceptual. The first examines the situation of ANT over time in Spain. In order to do this, the descriptions are presented organized into various periods so as to facilitate the capture of this dimension, divided up according to the type of work involved in each one. The second scale deals with the organization of the ANT perspective in various Spanish regions as well as the various publications that have facilitated its diffusion. In order to do this, names, places, centres of studies and publications are indicated as a reference to certain processes. The third scale signals the exposure level of certain themes that have been dealt with and which have developed into areas of study from an ANT perspective in Spain. In this regard areas of interest and projects underway are named. The conclusion will consist of reflections, which may account for certain aspects of the presence of ANT in Spain. But let me start with the definition of some coordinates.

I. Coordinates

How is it possible to recognize the themes and ideas that are specific to ANT and differentiate them from the generality of those of STS? The location of points and crossovers at which this focus has been presented and developed directs attention towards certain historical and epistemological questions, which it may be necessary to address.

As Law (2009, 3) has stated: “If the actor-network approach started at a particular time and place then this was in Paris between 1978 and 1982”. Michel Callon coined the term in 1982, “but the approach is itself a network that extends out in time and place, so stories of its origins are necessarily in part arbitrary” (3). Previous to this period, there were two schools of thought which dominated the generality of social studies of science: the “Strong Programme” of David Bloor and the Edinburgh School and the “Sociology of Error”, derived from the work of R. K. Merton (Sánchez-Criado 2006; Aibar 2006). In his papers “Wittgenstein and Mannheim on the Sociology of Mathematics”, and “Knowledge and Imagery Social”, Bloor (1973, 1976) established the basis for what could be regarded as a sociology of scientific knowledge that went beyond the “Sociology of Error”, which had been the predominant school of thought up to that point. To do this he established four principles among which the Principal of Symmetry may be regarded as the most important. It holds that sociology should be symmetrical in its forms of explanation and so employ the same kind of cause to account for both errors and successes. What has come to be known as the Generalized Symmetry Principle (Callon 1986, cited in Domènech and Tirado 1998), on the basis of which ANT has constituted itself, consists of a critique of the social as the sole cause of these explanations and also of it as a category formed and sustained by humans alone. This symmetric hyperbole integrates into research narratives not only the ideas of success and failure as effects of socio-technical productions but also the participation of humans and non-humans as agents that participate in the constitution of these phenomena (Latour 1991).

ANT emerged as a critique of the reification of the social as the sole cause of scientific and technical phenomena (Tirado and Domènech 2005): without assuming the existence of essences previous to any movement towards association, ANT proposes a way forward in which the distinction between human and non-human ontologies is not the most important factor. It thus affirms that technology and society are the joint and alternate result of a heterogeneous work of engineering in which the material, social, technical, textual and discursive interweave, associate and mutually transform themselves. It privileges neither accounts of a natural order (realism), nor those based on culture.

It may be difficult to build a concrete definition of ANT, given its continuous hybridization with other fields, disciplines and concepts (Law 2009; Callén *et al.* 2011). Nevertheless, Law (2007, 4) holds that, in broad terms, it can be characterized as a “disparate family of material-semiotic tools, sensibilities and methods of analysis which treat anything or issue in the social and natural dimension as simple effects which are continually generated in the heart of relationship networks that

are always localized”. It shows qualities which situate it in the first place - in Law’s terms – as a sensibility, a way of approaching scientific or techno-scientific phenomena which emphasizes all that which might be omitted by approaches that are exclusively social or principally natural. It is an approach that uses a “seamless web”, a map without frontiers.

2. Why ANT in Spain

A question which perhaps might be relevant is: why the focus on this theory, and not on STS? The answer has two aspects, one historic and the other conceptual.

In Spain, as in academic circles in many other countries, there has developed an important school of critical thought (which condenses many perspectives in itself, but which are often placed in relation to this designation) which while remaining outside the mainstream, carries out an intense intellectual project relating to the dismantling of essentialist and naturalizing conceptions of social and cultural events.

Various schools and departments of sociology and social psychology (mainly in Barcelona, Madrid, and Bilbao), organize discussion groups and teach courses related to the work of authors such as Michel Foucault, Gilles Deleuze, Félix Guattari and Donna Haraway, among others. The central axis linking the work of these authors might be said to be power as an area of concern and study and a post-structuralist orientation toward the analysis of the social. Thus, from multiple sources, the arrival of ANT was easily translated according to the research interest of each group, offering as it did a way to unite the work of these authors with an empirical practice. ANT has various similarities with lines of work already being carried out in Spain and presented itself as “one of the most complete (and with most future) proposals for the denunciation of the obsolete character of modern thought” (Tirado 2005, 1). This process is analogous to that described by Law (2009, 145) in his text on the history of ANT:

Precarious relations, the making of the bits and pieces in those relations, a logic of translation, a concern with materials of different kinds, with how it is that everything hangs together if it does, such are the intellectual concerns of the actor network tradition. However, this is a combination of concerns also found in parts of poststructuralism. (...) actor network theory can also be understood as an empirical version of poststructuralism. For instance, “actor networks” can be seen as scaled-down versions of Michel Foucault’s discourses or epistemes. Foucault asks us to attend to the productively strategic and relational character of epochal epistemes (Foucault, 1979). The actor network approach asks us to explore the strategic, relational, and productive character of particular, smaller-scale, heterogeneous actor networks.

Another aspect has to do with a question that might be regarded as historical. Only in 2010 was the *Primer Encuentro Estatal ANT* held in the city of Barcelona,

though it should be pointed out that it was preceded by the *Primer Encuentro Estatal de Estudios de la Ciencia y la Tecnología*, held in 2006, also in Barcelona. The 2010 encounter presented itself as a space for meeting and critically debating on “the conceptual tools and methodologies offered by Actor-Network Theory in various areas of social science (sociology, anthropology, geography, psychology, political science...) (...) [assessing] the transformations they have suffered and will suffer in the future” (*I Encuentro Estatal ANT 2010*, 1). It thus constituted itself as a purposeful space for reflection on the conceptual and methodological challenges faced by the area. The 2006 meeting, broad as it was in nature, took place in an atmosphere of recognition, with an impulse to establish working platforms and contacts between professionals and tried to differentiate STS from other disciplines like the sociology of knowledge, the philosophy of science and social psychology. These events account two aspects for the practices of knowledge in the field of STS and specifically ANT in Spain. First, they indicate the occurrence of acts of connection and recognition that point to the existence of various actors involved with the theory. Second, they diffract a field of research that acquires specificity in the developments of ANT, shaping the existence of some academic groups tangentially or directly interested on it. There follows an outline which tries to illustrate one of the forms by which it might be considered that this occurred.

3. ANT in Spain

3.1. From the End of the 80s to the Middle of the 90s: Panorama

A panorama consists of the local production of the perception of totality. In the words of Latour: a vision of wholeness in a closed-off box (Latour 2005). Though, as has already been mentioned, ANT arrived in Spain from multiple sources, but there exists a certain convention that the first reference to it was made in a chapter written by Teresa González de la Fe and Jesús Sánchez Navarro titled *Las sociologías del conocimiento*, published in 1988 in one of the sociology journals of the period. Both authors are part of the academic staff at the *Universidad de La Laguna*, of the Canary Islands, and are, respectively, a sociologist and a philosopher. Their chapter offers a general view of various sociological approaches concerned with the study of scientific culture and knowledge and contrasted each with Merton’s Sociology of Error. Thus, the first arrival of ANT took the form of a fairly coherent portrait depicting various research innovations abroad. At that moment there existed no kind of application, or appropriation, of material-semiotic postu-

lates in Spanish research. The interest shown by the chapter was, therefore, mainly, theoretical in nature².

The first Spanish translations of key ANT texts soon began to appear. In Barcelona in 1991 Woolgar's "Science: The Very Idea" (1988), appeared with the title *Ciencia: abriendo la caja negra*³. The translation was by Eduard Aibar, who had done postdoctoral work abroad and was a specialist in STS. In 1992 "Science in Action: How to Follow Scientists and Engineers through Society" was translated and published with the same title⁴. In 1994 came the turn of *Nous n'avons jamais été modernes. Essai d'anthropologie symétrique*, written by Latour in 1991, this translation being published in Madrid⁵. A previous book by Latour and Woolgar (1979) - perhaps foundational - was published in 1995.

In this period, in certain academic circles reflection and research was still being done from a Mertonian perspective. In 1994, Emilio Lamo de Espinosa, with Cristóbal Torres and José María González, presented *La sociología del conocimiento científico*. These academics from the *Departamento de Sociología y Teoría Sociológica (Sociología V)* of the *Universidad Complutense de Madrid*, are today recognized for their work on the sociology of knowledge and reflexivity. At the *Universidad de Salamanca* Fernando Broncano and Miguel Angel Quintanilla form part of a group exclusively dedicated to the philosophy of science and technology. They have dealt with the participation of technological artifacts as entities which shape human behavior from a discrete and linear rather than a dense and hybrid viewpoint. ANT only appears in the form of texts (both in their original languages and in Spanish translation) which fell into the hands of various academics interested in updating and re-problematizing certain categories not already subject to critical social thought such as, the idea of the object and its relation to the notion of the subject (see, for example, Tirado 2001).

² Even though the term ANT had already been coined at the international level, the text centres itself on the classification of the type of research carried out, rather than their epistemological presumptions. These are, therefore, described as ethnographic studies in laboratories carried out by Steve Woolgar, Karin Knorr-Cetina and by Latour. Later these were classified as studies based on relativism and constructivism, situating it in coexistence with other research programs such as the Strong Programme (with Bloor and Barry Barnes), the Relativistic Programme of the Bath School (with Harry Collins and Trevor Pinch), Scientific Discourse Analysis (with Mulkay, Gilbert and others) or the ethno-methodology of scientific work (with Garfinkel and Lynch, among others). The Laboratory Studies were integrated into the Constructivist Programme, making it clear that the scientific events they studied were produced in circumstances defined by specific practices (González de la Fe and Sánchez 1988). It was a revision which emphasized the ethnomethodological nature of these studies, so distinguishing it from other sociologies of scientific knowledge which deal with the practices and methods used by scientists in their contexts (Lynch *et al.* 1985, cited in González de la Fe and Sanchez 1988). They are presented as a perspective in development arising from necessities present in foreign contexts and without application in Spain or in other Spanish speaking countries.

³ "Science: opening the black box". Published by Antrophos.

⁴ Published by Labor.

⁵ Published by Debate. Currently published by Siglo XXI.

There exists no work done in relation to ANT in this period, rather there was a tendency to see it as a viewpoint limited to the functionality inscribed in its origins, namely, research in laboratories. It was performed as a specific kind of research carried out by foreigners, that is to say, a practice carried out in the exterior, circumscribed by the circulation of certain works in the academic world, imported or translated. Nevertheless, there was an incipient interest in its dissemination arising from the postgraduate work done abroad by various people, people who currently make use of this approach.

3.2. From the Middle to the End of the 1990s: Anchorage

Thus was it that in the 1990s STS and, in particular, ANT, started to be recognized as a research tradition independent from the sociology of knowledge, differentiated, perhaps, by its transdisciplinary nature (Ayús 2001). In this way, various disciplines attracted by the poststructuralist trend, conceived this field as a kind of island at which to anchor, at least for a while, in order to develop research that differed from the body of work that existed at that time. Interests were multiple but they can be grouped along axes such as the process of construction of stabilities of knowledge, the relation between knowledge and social formations and the interaction between power and knowledge. ANT was intended to be a practice to go beyond the purely epistemological or philosophical, and the eminently discursive. There was, thus, a momentum to link these interests with research praxis (Tirado 2005). Different particles composed of academics became specialized in the ANT approach, attending international meetings and hearing about the most recent publications in the field (*ibid.*). On another level, study groups at universities and research centres began to gain theoretical density at the same time, forming groups and academics recognizable for their work in these areas. These possessed different profiles and had different degrees of stability but, nevertheless, they can be clearly identified: the *Departamento de Sociología V* of the *Universidad Complutense de Madrid* (UCM)⁶, the *Centro de Estudios sobre la Identidad Colectiva* at the *Universidad del País Vasco* in Bilbao (CEIC)⁷, the *Instituto de Filosofía* of the *Consejo Superior de Investigaciones Científicas* (CSIC), under the orbit of the *Ministerio de Ciencia e Innovación* and the *Departamento de Psicología Social* of the *Universitat Autònoma de Barcelona* (UAB), where the research group on *Fractalidades en Investigación Cualitativa* (FIC)⁸ and the *Grupo de Estudios Sociales de la Ciencia y la Tecnología* (GESCIT)⁹ embraced a material-semiotic perspective. This latter has formed strong ties with the group of young researchers who make up *Tecnología y Acción Social* (ATIC) at the *Universitat Oberta de Catalunya* (UOC)¹⁰,

⁶ See: <http://www.ucm.es/info/teoriasc/>

⁷ See <http://www.ceic.ehu.es/p285-home/en/> and <http://www.ifs.csic.es/>

⁸ See: <http://psicologiasocial.uab.es/fic/en>

⁹ See: <http://psicologiasocial.uab.es/gescit/en>

¹⁰ See: <http://aticuoc.wordpress.com/>

academics at *Universidad Autónoma de Madrid* (UAM), as well as the other centres mentioned.

With regard to the UCM, in 1994 the journal *Política y Sociedad* published a special edition on STS which included texts by Latour, Woolgar, Bloor and Mulkey among others, as well as work by Spanish authors. Fernando García Selgas and Rubén Blanco, who spent time at the Edinburgh School, developed a line of research based on the SCOT Programme and ANT. Their initial work was based on the philosophy of social studies of science and the new social contract for science, leading to the sociology of the body and gender, digital culture and virtual communities. The work of the *Departamento de Sociología IV* at the Somosaguas campus of the UCM, where Ángel Gordo and Igor Sádaba (*Cibersomosaguas* 2010, 1) work, can be read in terms of this logic.

At the CEIC, can be found works of Ignacio Mendiola, Gabriel Gatti and Daniel Muriel. Their research topics have to do with the management of cultural heritage, identity, gender, transformation of space and confluences of migration flows. Though at one time this group was productive with relation to STS and ANT its work has since moved in other directions. In any case it maintains a website to display its activities and an e-journal, *Papeles de CEIC*¹¹, which publishes a diverse range of work related to these fields.

The CSIC, is a public entity formed as a network of various research centres. In the *Instituto de Filosofía*, Eulalia Pérez Sedeño, and several researchers who have done work abroad in the field of STS, carry out research which intersects with the dimensions of gender, science and technology, particularly addressing the biopolitics of bodies, biomedicine and biotechnology. Its dedication to gender equality encompasses a transversal perspective leading to research into the causes and forms of disequilibrium, including the systems of science and technology (*Instituto de Filosofía* 2011).

In Barcelona the route taken was different. At the *Departamento de Psicología Social* of the UAB some authors showed a particular interest, both theoretical and applied in the field of STS. Thus Miguel Domènech i Armegi and Francisco Tirado Serrano, members of GESCIT, recognized ANT as a resource not only to deal with already described problems in the sociology of knowledge nor only to apply its concepts to the study of techno-science but to generate new questions, locate unexplored domains and at the same time come up with concepts to help think about them. They carried out this work in an intellectual context in which the predomination of the symbolic as an explanatory element defined the identity of the Department and the vanguard of research in Spain. This was the context in which the first book dedicated to ANT was published in Spain, *Sociología Simétrica: Ensayos sobre ciencia, tecnología y sociedad* (Domènech and Tirado 1998). It consisted of a compilation of Spanish translations of key articles considered foundational for ANT by Callon, Law and Latour among others. The idea behind the book was to analyze and disseminate the history and development of ANT without losing sight of its weaknesses and limitations and without forget-

¹¹ See: <http://identidadcolectiva.es/papeles/>

ting to ask questions designed to improve it. This was to find a particularly noteworthy reception in the field of Social Psychology, overcoming the limitations of social constructionism and the discursive perspective.

Thus began the publication of a series of studies which, taken together, tried to go a little beyond the approaches inherited from the founders and which were already in circulation. Since 1997 GESCIT has produced several chapters and articles on the critical analysis of institutions and their relationship to dimensions such as virtualization and technological change, and emerging forms of the social. Among the ideas so circulated was that of *extitución*, a concept developed by Michel Serres and used to explain the transformation dynamics of the traditional dynamics of power; a move from the institution, an organization focused on the interior, towards hybrid, porous and malleable entities dedicated to the management of exteriorities (Tirado and Domènech 1998, 2001, 2006; Tirado and Mora 2004; Tirado and López 2004; Domènech and Tirado 1997, 2002). This concept is noteworthy to the degree that it can be considered one of the first local intersections between philosophy and social science in the field of STS in Spain. There then came a series of studies which sought to make both empirical and theoretical contributions. These would come to light some years later related to matters such as biopolitics (Callén and Tirado 2006; Tirado and Callén 2008), the interaction between technological development and social healthcare (López 2009; Sánchez-Criado and López 2009; Callén *et al.*, 2009; López, Tirado and Domènech 2003; Vitores 2002) public spaces (Íñiguez 2006); social movements (Rodríguez-Giralt 2009; Rodríguez-Giralt and Causa 2002; Aceros *et al.* 2005; Domènech *et al.* 2002) and knowledge generating practices (Losego, Domènech and Tirado 2000; Domènech *et al.* 2000), among others. The Department has a journal *Athenea Digital*¹², where a series of articles with an ANT research basis can be found, as well as links to other that are critical in nature.

Between the middle and end of the 1990s, ANT came to be recognized in Spain as a theoretical and research perspective immersed in different currents of critical thought that had already fixed certain channels for themselves. The anchoring of ANT thus occurred in conjunction with its distribution and so fixing a productive route, which has followed particular paths but not specific ones, nor with established patterns. This, if anything, is what might characterize ANT in Spain: mobility and juxtaposition, the linking of interests to describe certain phenomena through the connotation of its effective breadth, its range and its concrete levels of influence. It is perhaps this aspect that characterizes what might have happened in these years, the recognition of ANT with its theoretical and empirical vocation separate from STS in general. In fact, ANT in Spain has transcended its applications in techno-science to deal with questions arising in the classic traditions of sociological, psycho-social and anthropological research¹³.

¹² See: <http://psicologiasocial.uab.es/athenea/>

¹³ The development of ANT in areas other than the sociological and psychosocial fields has not been explored. For some sightings of ANT in the field of anthropology in Spain see González-Ruibal (2007). For architecture could be consulted Muniesa *et al.* (2005).

3.3. The First Decade of the New Century: Plexuses

As occurred in other areas, the intention is not to make ANT into a theory, in the sense that there is no desire to stabilize it into an unquestionable set of assumptions of concepts with a pure and unique definition; the intention is, rather, to maintain it as more of a flow of thought (Law 1999). Though it is true that thought has never ceased to move, it has done so more rapidly from the 1990s and on into the first decade of the 21st century. As a sign of this movement it may be worth looking at the work being carried out by some young researchers today. These constitute a kind of "second generation" of Spanish researchers in the field of STS: in several centres, ANT has been adopted as a working perspective, articulating itself as platforms that offer opportunities for dialogue, communication and exchange and mutual influence. In the first decade of the century, new associations and connections have been generated which it may be beneficial to mention.

The ATIC has sought to be trans-disciplinary in nature and has as its objective the study of the role of technoscience in the organization of contemporary social action (ATIC 2011) with a special focus on the daily lives of groups and people. Daniel López and Israel Rodríguez-Giralt have contributed to its formation having previously been members of GESCIT. López has specialized in techno-medical development related to dependency, principally Telecare and in his work has made use of ANT concepts. He is currently working on research projects on the controversies surrounding the Spanish law for the empowerment and care of dependents. Rodríguez-Giralt does research into the heterogeneous mediated processes, which give shape to social movements. Both lines of research have connected with each other in work on public life, spatial and urban development (see Rodríguez-Giralt, López and García 2009; López 2005; López and Doménech 2008; López and Doménech 2009; Callén *et al.* 2009). Tomás Sánchez-Criado, a researcher at the UAM and related to the GESCIT, also participates in the ATIC, as well as an Iber-american network of anthropological studies, AIBR, *Antropólogos Iberoamericanos en Red*¹⁴. He currently carries out ethnographic research on the practices of implementation and use of home Telecare devices through which certain articulations of subjects, social contacts and care spaces emerge (see López and Sánchez-Criado 2009; Sánchez-Criado and López 2009). Also in the UAM, Rubén Gómez Soriano works on questions related to the role of the great apes, specifically, the bonobos, in the Western imagination, connecting ANT to the ethology of Despret, Haraway's early writings and some primatological reflections. Among these nuclei many other researchers have generated research processes in the material semiotic line

¹⁴ There was a special edition of the journal AIBR in 2005, produced with the intention of reflecting on constructivisms in the social sciences and the study of technoscience. It can be consulted at <http://www.aibr.org/antropologia/44nov>. This edition had some articles from the world of ANT and was the seed for the collection "Tecnogénesis" (<http://www.aibr.org/antropologia/aibr/tecnogenesis>). This was published in two volumes and in it various authors reflect on human ecologies as heterogeneous media shared with entities of diverse ontology.

and generating research fields providing mutual feedback on concepts, epistemologies and theories (see Callén *et al.* 2011)¹⁵.

At the UCM, *Departamento de Sociología V*, Carmen Romero has worked, together with Fernando García Selgas on the entanglements that make up the articulation of identities and how this relates to systems of sexual exclusion and differentiation, basing himself on queer theory, post-colonial studies and the notion of the Cyborg. ANT here exists in hybrid form in relation to other theoretical approaches. It maintains relations with the previously mentioned approaches.

The *Universidad de Salamanca* has developed a postgraduate study program on STS in which researchers from the *Instituto de Filosofía* of the CSIC, such as Marta I. González¹⁶ participate. No information is available about specific ANT research from this centre. At the *Universidad de La Laguna*, there continues to be some interest in STS, with some element of involvement of ANT. José Manuel de Cózar Escalante has carried out research on nanotechnology from this position. On the mainland of Spain, CSIC, for its part, is currently developing an annual seminar titled "Cartographies of the body. Biopolitics of science and technology", at which work done from a feminist perspective on the role played by bodies in scientific and technological practices is discussed (CSIC 2010).

Since the year 2000, on the basis of the interests of various researchers, ANT has been employed as a specific perspective of analysis to deal with fields that go beyond the purely scientific but which, nevertheless, transect it. These researchers have generated organizations to propagate their research, obtain funding and contribute to the training of people interested in this field. GESCIT, *Sociología V* at the UCM, ATIC, CEIC and *Instituto de Filosofía* of CSIC, are examples of the work being done in which multiple lines of research are developed by researchers in different spaces in movement, exchanging intentions and projects.

3.4. At the Margin

A map is flat. Nothing that it presents shows the movements that occur in the space it tries to represent. Its purpose is different: to provide bearings and mark routes on a terrain which one is about to set out, but which has not been seen across. Thus, instead of providing a conclusion, some reflections will be set out, in order to mark out a certain perspective on the development of ANT in Spain. They arise from talks between people attending the *Primer Encuentro Estatal ANT* (2010, June 18, UOC, Barcelona), and they may well reflect the marginal and creative momentum that was experienced among several researchers.

The meeting was planned around two main themes: the implications of the use of ANT in social sciences and the conceptual lines of thought for and against this perspective. These resulted in two panel discussions and a series of presentations

¹⁵ There is a web log generated by these academics in which they maintain public dialogues and publish recent information related to ANT: <http://network2matter.wordpress.com>.

¹⁶ She has recently written a theoretical article on ANT with Javier Echeverría (see Echeverría and González 2009).

on various ongoing research projects. It would be too difficult to offer a synthesis¹⁷ of all the topics discussed, so that we present here the main axes that have articulated these debates. Their presentation may serve to capture the constructive nature with which it is sought to adopt this perspective in Spain.

a) Do all the discrete categories have agency?

Is ANT understood as a sort of animism? A monolithic discourse on culture? Certainly, the notion of agency in a context in which the distinction between human action and material participation is seen as diffuse material is relevant in the situating of a field of reflection. Thus, the reification of the notion of *actant* as the entity that homologates any kind of participation and ANT as a new mechanismism is a topic to consider and resolve. In terms of a solution the notion of symmetry as a flat epistemology and not as a simile of equality, has been proposed, arguing the lack of a need to specifically localize agencies. This amounts to re-considering the perspective of joined together groups acting – carrying out actions, generating differences – without irreparably requiring their “locatability” (they are scattered across at different points, but connected), their being identified by the effects they produce and the routes plotted on their course.

Among collective spaces, the human one, with its configuration and production as a stable entity is an obligatory way point on the way to assigning an adequate semiotic place to the notion of *actant*. The articulation of the human would not be a process but rather an effect thereof. The *actant* as a subject space in a statement is not assigned to any material, however, not all *actants* have the same semantic mobility; action would not be an ontological problem, but rather semiotic. Remembering Latour: an actor is which is acted as such.

The notion of agency gravitates as a form of understanding the possibility of causing differences in socio-material entanglements. The recourse to the category of *actant* does not appear to satisfy the demands of the relations that it analyzes. One way of establishing certain densities in the theory could be the distinction in French semiotics between the categories of *actant*, *actor* and *figuración* (Greimas and Courtés 1979). According to this semiotic differentiation, these three categories correspond to three different levels of stability in a network which, in a symmetrical description, could account for participations of different degrees of complexity or intensity, which would not involve losing sight of the relational character of its existence. The interplay between action and agency does not depend on ontological constitution but rather on an analytic exercise in which the entities appear on the basis of the traces that are possible to reconstitute. There is, thus, the opportunity to translate the proposals on the need to identify *actants* to one that considers the entanglements or wefts that articulate them. Any ontological unit, in this sense, would be susceptible to analysis from the multiple connections that

¹⁷ A special edition of the journal *Athenea Digital* was published with the presentations made at the *Encuentro* and in it more can be found about questions mentioned in this section (Callén *et al.* 2011).

keep it active and that give it shape. The notion of entanglement could even replace that of the network to the degree that it would refer to the establishment of vague connections and would refer to the *process* of spinning and weaving in some way, and with some kind of material reality¹⁸. It would be possible in this way, for example, to change the objectification of "expert" for "expert entanglements", with the analytical implications of this concept.

b) How to frame power?

Is power somehow involved in its conceptual weave or is it something that must be accounted for? For some, technical artefacts are items from which power can already be conceptualized and have agency in its strategies. Revealing the participation of these latter and citizen agencies in controversies can be a way of approaching the problem but always taking into account precisely what is hidden in these relationships. As with governmentality in the Foucauldian perspective, politics would consist of that which does not seem political and an act of power is to take notice of this. In a "cosmopolitic" entity of different natures, human and non-human at the same level interact in a sort of ideal of democracy, being explained in the same universe of interaction.

Nevertheless, life wants to be captured and one of the most useful concepts in this regard is that of biopolitics. Based on the "calculated ambiguity" of Rudolph Kjellen it is possible to establish a certain assembly of ANT approaches. Thus, "Biopolitics can be read without betraying the spirit or intent of this Swedish author, in a way that would understand the biopolitical as a policy not of life nor about life, but rather pursuing life" (Tirado 2010, 11). ANT has properties that allow for the following of traces fixed and left by power in the persecution of the living.

4. Final Legenda

In Spain, since the beginning of the 1990s, a joint movement has arisen devoted to recognition, production and hybridization in the social sciences, with one of its apexes being STS. These acquires specificity in ANT which, in certain groups, became a tool for translating the research activity carried out up to that moment, in relational and material terms. Without losing site of the foundations of this perspective, the impetus for these researchers has been to contribute with concepts and ideas, subverting the directional relations that can occur when importing theories and generating internal lines of influence in an academic area made from specific contributions, partial connections and loosely coupled links.

In this text an attempt has been made to trace out some of these lines of development marking the evolution this perspective has undergone in Spain. In this entanglement, ANT has become a field which, though not much visible and remote

¹⁸ While a network always refers to the possibility to be entangled.

from disciplinary questions and attempts at institutionalization, has achieved certain recognition in academic spheres of critical thought. Its particular way of opening up the black box of scientific truth has allowed it to establish a terrain in which its interest lives beyond the intellectual, with a certain degree of passion. Marginality and emotion seem to be good companions. Like a wandering animal, ANT marks and creates its own territory.

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Book reviews

Dario Minervini

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Dario Minervini
**Politica e Rifiuti. Conessioni
 socio-tecniche nella governance
 dell'ambiente**
*(Politics and Waste. Socio-technical
 Connections in Environmental Governance)*
 2010, Liguori Editore, 176 pp.

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Being a music lover (and partly a musician), I have always thought that Italian singers and bands suffer from two major problems: a kind of 'subsidiary dependency' on Anglo-American music, together with the need to pay homage to the Italian melodic tradition. If this book were a piece of music, it would escape both. If this book were a piece of music, it would be the first release of a young musician. I want to stress the importance of the word 'musician' here. A musician is a person who is able to convey a concept, to communicate an idea, whatever music genre s/he plays; otherwise, s/he is just a player.

This same ability is clearly recognizable in this book: this is not just an ANT-oriented account of the process leading to the construction of the "Fenice" waste incineration plant in Melfi, in the province of Potenza (Italy). This is a book about the possibility of looking at politics, organization and decision making as the products of the relationships that bind together humans, technologies and natural elements.

What I am trying to say is that on many occasions we listen to a song, a piece of music, that immediately re-

minds us of a particular band or music genre. And that's all. But if this book were a piece of music, it would not simply sound like ANT. It would push a little bit forward the borders of a 'genre' that, although sometimes theoretically celebrated and with a lot of followers in the field of STS, still has some difficulties in finding its audience in the field of political sciences and, more in general, politics. Which is quite strange, given that ANT, as Minervini aptly states referring to Latour (1999), is actually a political theory.

Thus, contrary to the common refrain that ANT does not take 'power' seriously into account, here the description (Akrich, 1987) of the ways in which specific environmental issues enter the political debate highlights how political decision-making is fragmented into an action-net (Czarniawska, 2004) involving what I would label 'negotiations-in-practice'. In the Italian literature there is a well-known antecedent of this way of 'playing' ANT, *Tradurre le riforme in pratica* ("Translating reforms into practice"), a book edited by Silvia Gherardi and Andrea Lippi in 2000 (the first ANT-oriented book written in Italian). And the approach of Minervini is clearly informed by having listened to (and having taken seriously) the tunes and the whispers of that text, as well as the ANT 'standards' (Callon, Latour, Law...).

The roots of Minervini's work, by the way, are not in STS. The author clearly comes from the area of policy analysis, particularly from the French line of research (Mény and Thoenig, 1989). This means that policies are seen as the non-linear outcome of decisional processes influenced by public

and institutional actors. In this view, action is always 'strategic', but strategy does not necessarily imply rational choice, if not a posteriori (Crozier and Friedberg, 1977).

Similarities and differences between the French school of strategic/bureaucratic analysis and ANT are well depicted in the first chapters of the book. Although both approaches share a common interest in the study of processes of association, cooperation and betrayal (without imposing any particular structure on actors' relations), they differ in their conception of symmetric action. Minervini refers in particular to Friedberg (1993), when (commenting on Callon's work on the Saint Jacques' mussels) he states that the principle of generalized symmetry does not give enough emphasis to the intentionality of human actors: objects (technologies, texts, laws, and so on) are relevant to social action and power relations as long as they are in the hands of intentional actors. The difference between humans and non-humans is thus grounded in the instrumentality of the latter and in the intentionality of the former.

How to reconcile the two approaches?

From a theoretical perspective, the author argues that the main point is that both approaches converge on a processual theory of action/power: ANT takes into consideration how processes of association translate into 'collectives'; strategic analysis looks at stabilisation, at the ways in which power 'takes place' in processes of association and negotiation. "For this same reason – argues Minervini (p. 33) – in strategic analysis the category of power

acquires a clear and visible dimension, contrary to ANT, where power is always in the making, has its effects, but it refers to a coalition of actors/actants in relation to specific, and constantly changing, spatio-temporal configurations".

I must say that this argument is not very convincing. From my point of view, the principle of generalized symmetry is not a minor point and an instrumental approach to objects and technologies immediately reminds me of a sort of predetermined structure regarding relations and associations. However, it is quite common, in my experience, listening to a music piece and not appreciating all the 'solos', which, in this case, is actually a really minor one.

The main solo is in the research account, where the author describes and interprets the making of an environmental policy, adopting both the ANT model proposed by Callon in 1986 (regarding the moments of a translation process) and the one suggested by Latour in 1991 (regarding the study of programs of actions). Here the author gives voice (by making reference to documents and interviews with different groups of actors) and visibility (through the use of numerous schemata) to the logics, the rhetoric, the strategies, and to the very idea of 'politics' and 'environment' as emerging from and within relations.

It would be meaningless to summarize the whole story in a few words. Thus, I prefer to skip directly to some of the final chords offered by Minervini:

- a participatory process does not automatically imply a democratic atti-

tude in decision making: ‘open-ended’ cannot be confused with ‘democratic’;

- the power to define policies is the result of a relational process, not the origin of the policy at stake: looking at power in objectivist terms, as a resource individual actors can mobilize for their own interests, does not account for who, how and when actors acquire the capacity to mobilize resources, and what constitutes a resource in the actors’ perspective;

- sometimes, ANT looks for missing masses, but in this case social actors are missing: why didn’t the trade unions take part in the whole negotiation process?

If this book were a piece of music, as it often happens nowadays, it could be of interest for different audiences. ANT listeners would probably be its ‘natural’ public, but political scientists and environmental sociologists could maybe enjoy it even more, because of the ‘fresh sound’ this book brings into established canons. And social scientists (in general) could find new sounds and dissonances in it that could help them better frame the relationships between humans, technologies and nature.

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João Arriscado Nunes, Ricardo Roque

Objectos Impuros. Experiências em Estudos sobre a Ciência

(Impure Objects. Science Studies Experiences)

2008, Edições Afrontamento, 328 pp.

Laura Centemeri

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Science Studies are today in Portugal a very dynamic field of investigation. Edited by two Portuguese scholars that actively participated in the emergence and development of this research field, the contributions collected in the volume aim at showing how the theoretical and empirical investigation on science practice, objects and institutions in the Portuguese society (a “semi-peripheral society” is the definition given by the authors) “interferes”, through original paths, with the broader international debate.

The interest in studying science and its impact on society is far from being a novelty in Portugal. In fact, the promotion of science and the dissemination of scientific knowledge, as part of a broader process of citizenship-building, have been a crucial component of the movement of opposition to the Estado Novo, the Portuguese authori-

tarian regime that for almost half a century (until 1974) controlled the Country. Starting from the 1970's Portugal has seen as well the emergence of a rich debate on epistemological issues, namely through the works of Boaventura de Sousa Santos and Hermínio Martins.

Rooted in this tradition, the field of Science Studies in Portugal is nevertheless an undoubtedly "young" field. It started to emerge in the 1990's through the creation, by the initiative of Maria Eduarda Gonçalves (currently professor of Law and Public Policy at ISCTE), of a community of researchers, otherwise dispersed in different research institutions (especially ISCTE and ICS in Lisbon, CES in Coimbra). Joint projects of investigation brought to collective publications, edited by Gonçalves, like *Ciência e Democracia* (1996) and *Cultura Científica e Participação Pública* (2000).

This specific history implies that the field of Science Studies in Portugal didn't emerge in opposition to a conventional sociology of science that never really came into existence. As a consequence, some of the main theoretical issues that oriented and structured the epistemological debate at the international level were never at the core of the Portuguese debate. The importance of collaborative projects in structuring the field accounts for its being strongly multi-disciplinary (not only sociologists are involved but historians and anthropologists as well) and for the variety of theoretical approaches that orient the investigation. These different theoretical and epistemological approaches are not the case for structured cleavages. As noted by

Nunes and Roque in their Introduction, the collaborative dimension of the research projects through which the field was built always prevails over these differences. An additional explanation to this lack of clear cleavages is as well the strong "practical" orientation of these projects, which were designed in order to actively participate in the shaping of a Portuguese scientific culture.

In fact, the emergence of the field of Science Studies in Portugal run parallel to the constitution of a national system of scientific production, via the creation of the Ministry of Science and Technology and a large investment in research, supported by European Programs – Portugal having entered in 1986 the European Union. This specific condition brought to a situation in which Portuguese researchers in the field of Science Studies have been able to actually follow the creation of the institutional and human infrastructure of science authority, studying obstacles, controversies and conflicts emerging in the process.

Through collecting contributions based on case-studies, written by young Portuguese researchers, this volume shows, first of all, the variety and dynamism of Science Studies research in Portugal, in terms of objects and approaches. However, the choice of the editors to have a first section of the book with contributions from prominent scholars (Bruno Latour, Annemarie Mol, Alan Irwin among others) is meant to demonstrate how the work of these young Portuguese researchers is oriented by issues currently core in the debate at the international level, like political ontology and

performativity.

The contributions of the second section of the book well illustrate the main themes structuring the research on science, technology and society in Portugal. They can be regrouped in three areas. First, ethnographic studies concerned with science “in the making”. Second, historical trajectories of scientific and technological innovations, oriented towards the understanding of the processes that shape the modern institutions of science and the state. Third, the study of socio-technical controversies, with an emphasis on the confrontation, in the public space, between different forms of knowledge and their expression in social conflicts, especially in the field of environmental and public health problems. They all share an approach to the study of how social and material entities are associated in complex and multiple ways that grants a privilege to what Nunes and Roque define in terms of a “sociology of impurity”, that is, the contamination of different tools and epistemic approaches.

In the subsection “Ethnographies”, Gonçalo Praça shows how the technical production of meteorological knowledge is based on two black-boxes: global models of weather forecasting, and the local experience of scientists working at the Portuguese Meteorological Institute, an experience made of a combination of subjective knowledge, texts, technologies, institutional rules. Tiago Moreira investigates the socio-technical organization of neurosurgery rehabilitation, through an ethnographic work in a neurosurgery clinic in Portugal. In order to reacquire a notion of “self in action”, pa-

tients are helped by technologies and forms of knowledge that exist in the clinic. These technologies and forms of knowledge act as “prostheses” so that patient personal agency is distributed in what can be defined as a “surgical collective”. The way in which these precarious and contingent collective orders function accounts for the rehabilitation path which is observed, in terms of successful recovery or not.

In the subsection “Histories”, João Vasconcelos investigates from an anthropological point of view the emergence of an empiricist discourse in Europe in the period 1850-1920, taking “spiritism” as its object of analysis. The author shows how spiritism challenges the separation between science and religion, thus breaking a fundamental principle of modern sciences. This fact accounts for the epistemic and normative marginalism to which spiritism has been condemned since then. Rui Branco studies the relationship between the construction of the state and the scientific-technical production of cartography in Portugal, using an approach of historical sociology and the analysis of material (and micro) processes of construction of science and the state. Ricardo Roque analyzes the trajectory of the only partially successful “scientific translation” of wild bananas seeds into recognized medical treatment against smallpox in India, at the beginning of the 20th century, crossing the biography of the physician Joaquim Vás, the history of the creation of Health Services, the conflict between medical powers.

In the subsection “Controversies”, Sofia Bento studies the case of the Alqueva dam and the controversy con-

cerning the existence of significant archaeological find in the area to be undated. The mobilization asking for the preservation of this archaeological heritage was not successful, a failure that Bento investigates with a focus on the role of media in the construction of scientific and technical objects. In the final chapter, Marisa Matias examines the controversy about the use of a cement factory in Souselas (a small town close to Coimbra) to incinerate industrial wastes. Matias discusses the dynamics through which the problem arises together with the objects of scientific controversy. She investigates as well how environmental policies and citizens' mobilisation enter the frame. The author suggests that this kind of studies can help in understanding the processes that confer existence (or non-existence) to public problems and collective actors. Far from being just a sample of Science Studies research in Portugal, the volume edited by Nunes and Roque is an important exercise in self-reflexivity that points out the originality of the Portuguese contribution to the study of science and technology in society, thus tracing a clear path for future developments.

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Reiner Keller
**Wissenssoziologische
 Diskursanalyse. Grundlegung
 eines Forschungsprogramms**
*(The Sociology of Knowledge Approach to
 Discourse Analysis. Groundwork for a
 Research Programme)*
 2011, VS Verlag, 360 pp.

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Reiner Keller's work constitutes one of those "exceptions" that prove that the academic scene is not yet as global as we tend to think. Keller has developed a research programme for the sociological analysis of discourses and their effects. Thanks to its concreteness and practical applicability in empirical research, the method has been harnessed by German scholars in a wide range of disciplines – not only in sociology but also in history, pedagogics and educational science, linguistics, political science, studies of religion, criminology... That Keller's manual has reached a third edition in barely six years can be taken as an indicator of its success. Oddly enough, no English translation is available yet, and while he is widely cited in Germany, international publications referring to Keller's work are still rare.

Keller's research programme for discourse analysis – he prefers to call it a programme since it includes both a theoretical framework and methodological tools – is grounded in the sociology of knowledge but incorporates insights from Foucault's work. The proposed research programme originated in his own discourse research on waste politics in Germany and France

in the early 1990s (mentioned in Keller 2010). There are some affinities with Maarten Hajer's work on story-lines in the acid rain controversy (Hajer 1995). Both scholars were interested in the circulation of knowledge and discourses concerning environmental conflicts. This affinity doesn't come as a surprise, since the two collaborated at the University of München. Nonetheless, Keller went much further than Hajer in developing a complete theoretical framework – social theory is presumably his actual area of interest – and published it in the manual under review.

In the brief introductory chapter of the manual, the author elicits that the research programme tries to reconcile two traditions that have drifted apart over the last decades: the sociology of knowledge on the one hand, and Foucauldian discourse analysis on the other hand. For the former tradition Keller takes the work of Peter Berger and Thomas Luckmann (1966) as reference point, while for the latter he departs from Foucault's *Archeology of Knowledge* (1969). Berger and Luckmann undertook an in-depth inquiry into the social legitimisation, social institutionalisation, and subjective internalisation of “whatever passes for ‘knowledge’ in society”. This sociology of knowledge has in Germany evolved into an important interpretative current in the social sciences, known as *Hermeneutische Wissenssoziologie* (hermeneutic sociology of knowledge). Keller believes that this tradition has much to offer for the analysis of discourses, but he contends that it has been focusing too much on the micro level of “language-in-use”. On the con-

trary, the foucauldian tradition of discourse analysis, he maintains, is situated at an all too abstract level of macro analysis, focusing on grand discourses, and is not really suited to empirical research. Keller's programme tries to find a middle way, by up-scaling the hermeneutic sociology of knowledge beyond the language-in-use level, while maintaining the social constructedness of discursive actors, institutions, and discursive practices.

The rest of the manual is organized in four large chapters. The first two describe the history of – respectively – the sociology of knowledge, and discourse analysis. The third chapter, covering one third of the manual, describes Keller's research programme for *Wissenssoziologische Diskursanalyse* (WDA) – or somehow oddly translated in English: the Sociology of Knowledge Approach to Discourse (SKAD). The last chapter of the manual discusses the role that the SKAD research programme can play with respect to wider social questions about risk, social responsibility, science and technology in society, politics of identity, or “life politics” in general.

So, what does the SKAD programme look like? SKAD understands discourses as “structured and structuring structures” that both reproduce and are reproduced by social practices. Discourses socially constitute knowledge systems, orderings of reality, institutional and material devices (Dispositif), and power effects in the network of social actors. Keller emphasises that the nature of discourses is concrete and material, both in construction as in effects. Therefore, he distinguishes three principal dimen-

sions of analysis: (i) the discourse content itself, (ii) the internal structuring of the discourse, (iii) the materiality of the discourse.

The first dimension contains those utterances and pronouncements that constitute instances of the discourse. The researcher might try to distinguish public discourses from specialist discourses, look for discourse formations, as well as minimal and maximal contrasts in the discourses.

The second dimension is the one that structures the internal meaning of the discourses. In order to lay bare the internal structuring, Keller mostly relies on concepts inherited from the hermeneutic sociology of knowledge. He proposes to look for the following elements in the discourse: the meaning-making schemes (*Deutungsmuster*), classifications, the structuring of external phenomena, narrative structures, models of action, and models for the involved actors.

Discourse has also a material dimension – on which Keller insists very much. In fact, the third dimension is constituted of: the actors that reproduce the discourse, the actors that are subjects of the discourse, the addressees of the discourse, the receivers of the discourse, the platform from which the discourse is disseminated, the material devices (*Dispositif*) that incorporate and/or reproduce the discourse, the practices that reproduce the discourse, and the practices that are provoked by it.

Therefore, SKAD is a research programme for the sociological analysis of discourses that maintains the middle ground between the socio-linguistic micro level of analysis and the fou-

cauldian macro level. Nonetheless, the research programme heavily rests upon the foundations of the sociology of knowledge, by assuming the social construction of knowledge orderings, their social legitimisation and institutionalisation. From Foucault's work Keller has retained the key idea that discourses have power effects and the recognition that discourses are materialised in devices.

His programme and concepts, however, are more static than dynamic. They cannot explain how discourses emerge, take over others, or become hegemonic. Nor do they throw light on the dynamics through which hegemonic discourse are challenged. Understandably, Keller admits that his programme does not pretend to be complete.

Moreover, I believe that the research programme is designed for the sociological analysis of political discourses, whereas it has little to say about the data collection. Keller refers to standard data collection methods such as interviews, ethnography, etc., but at various points he also invokes the Grounded Theory Method and the work of Anselm Strauss (Keller 2005, 2010). That he invokes the Grounded Theory Method seems odd since Keller's programme includes various pre-conceived theoretical dimensions, concepts and categories – yet this inevitably conflicts with the central idea in the Grounded Theory Method that the researcher should collect empirical data without any theory in mind.

In conclusion, the manual offers two valuable components. First, Keller rigorously sketches the double theoretical grounds in which his research pro-

gramme is rooted: the sociology of knowledge, and foucauldian discourse analysis. Second, he delivers a number of very user friendly tools and concepts for the analysis of empirical data. The success of his research programme in German academia can be taken as a guarantee for its applicability in a whole spectrum of issues, varying from global environmental controversies, over science and technology in society, to social identity politics.

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Philip Vannini
**Material Culture and Technology
 in Everyday Life. Ethnographical
 Approaches**
 2009, Peter Lang, 254 pp.

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The book edited by Philip Vannini – one of the more eclectic and prolific emergent scholars in the intersection between culture and technology – is a very useful step to fill a gap in the ongoing process of interconnection between different perspectives on the social studies of technology. This gap consists in the partial lack of dialogue between, on the one side, the science & technology studies and, on the other side, the material culture studies and, more in general, the context of cultural studies intended in their broader sense. Indeed, while these two areas of contemporary social sciences have hardly found explicit convergences, at a closer look they reveal a common feeling on the fact that social relations, technologies and objects are strictly interwoven with each other and, also, that at their junction it is possible to find a crucial dimension for the development of contemporary world. However, in spite of this, it is pretty hard to find scholars that are effectively committed to develop these connections and links. Philip Vannini and some of his colleagues certainly are among these few scholars.

As the editor recognizes in his introduction, the boundaries between these fields – STS and material culture – have remained solid more as the result of accidental scientific practices,

rather than as a consequence of motivations and planning. While we can partially agree with this idea, we could also add other kinds of considerations to this “casual” explanation. The main one is that these two different traditions have sometimes developed as “congregations” with specific “buzzwords” and vocabularies, which have been at the same time good catalysts for grouping scholars and researches, but also obstacles and impediments for the involvement of neophytes and scholars belonging to different debates. Thus, seen from this more intricate perspective, a metaphor for this book could be found not in a bridge connecting two hills separated by nature or casualty, but rather in a bridge between two cities that have developed with different infrastructures, policies and mayors – meaning different languages, perspectives, and major scholars – but that today find themselves on the same side of the barricades: the side that believes in the need to develop an understanding of the role of materiality and artefacts in society. It is to be said that the book is not the first attempt to build this bridge and probably it is neither the more analytically coherent and theoretically sophisticated one. Anyway, I guess that, at this date, it is perhaps the most variegated and inclusive one, and also the one with the clearer tendency to favour the dialogue between different domains and to enable readers to understand some of the coordinates of this dialogue.

As we have said, the book is based on the idea of making two different domains dialogue. The first one is the field of material culture studies, which

is a loose and mostly interdisciplinary sector at the overlapping of anthropology, archaeology and, at a lesser extent, sociology. Explicitly rooted in the heritage of the archaeological attention to ancient objects, material culture studies have decisively developed toward the understanding of the role of objects in the contemporary society, and the book “The social life of things”, edited by Arijun Appadurai in 1986, can be considered a founding text. Other references of this perspective can be found in the works carried out by archeo-anthropologist Chris Tilley and by the socio-anthropologist of consumption Daniel Miller. The second realm the book intends to involve is the social study of technology, which includes scholars who are already known to “Tecnoscienza” readers, such as Wiebe Bijker, Bruno Latour, Trevor Pinch, Donald MacKenzie and so on. As we know, this field presents different articulations of the relation between technology and society, but it can be generally unified by highlighting the relevance accorded to the role of technologies as material artefacts in the social context. The strategy to mix together these different scientific universes is based on the common emphasis given to two specific dimensions. The first one is a common preference for ethnographical methods, intended in their heterogeneous and open sense. The second one is the common attention to the realm of everyday life, which is not regarded as a taken-for-granted domain, but as a dimension of the social world constantly under question.

More concretely, the book is divided into three parts, which present re-

spectively theoretical, methodological and empirical chapters. Part one is devoted to the different theoretical perspectives involved in the two different fields. Vannini and Ian Woodward take it upon themselves to outline the area of material culture from a more anthropological perspective, while Trevor Pinch and Grant Kien are in charge of making sense of the STS side, undertaking the task, respectively, of tracing the legacy of the “Social Construction of Technology” (SCOT) approach and of the Actor-Network Theory (ANT) perspective.

The second part of the book has a more methodological vocation, presenting different ways to articulate ethnography in relation to the material world. These chapters engage not only in common forms of ethnography, but also in more heterodox ones, such as the practice of autoethnography (by C. Noy) and video ethnography (by D. Tutt and J. Hindmarsh), also dedicating a specific chapter to the use of “Grounded Theory” (by A. Hanemaayer). Part three of the book is characterised by the presentation of specific ethnographies of material culture belonging to the everyday world. We can take two of these chapters to exemplify the way to analyse the material technologies of everyday life. The chapter of Chris Tilley considers the practice of gardening and its meaning in contemporary England, discussing eleven reasons why people garden and what that means in their lives. In this case, the analysis of gardens as material culture represents an example of a perspective mainly rooted in the anthropological tradition and in the current trend of the more contemporary mate-

rial culture studies. The second example is the chapter by Bryce Merrill, which considers the practice of home music recordings from a perspective directly based on the SCOT approach. Probably, the different standpoints of these two chapters highlight the fact that while the book represents a good step toward an integration of different perspectives on artefacts and technologies, there is still much work to do in order to fully integrate these standpoints. This last consideration probably helps highlight the major limit of the book, which can be regarded more as a first attempt to combine the work of different scholars, rather than the result of an actual and broader process of integration.

Anyway, even if not always compact and coherent in developing its analysis, this collection has the unquestioned merit of bringing novelty and excitement to the current development of the studies on artefacts and technologies. For STS scholars unused to be involved in social anthropology of things and consumption, the book will open a door to an entire world that is not adequately known in the STS context, and will do that from a useful and understandable perspective. Moreover, methodological and ethnographical chapters definitely offer valuable insights into the ethnographic research in everyday life things and objects.

Roberto Verganti
**Design Driven Innovation.
 Changing the Rules of
 Competition by Radically Innovat-
 ing What Things Mean**
 2009, Harvard Business Press, 272 pp.
 (*Design Driven Innovation. Cambiare le
 regole della competizione innovando
 radicalmente il significato dei prodotti e dei
 servizi. 2009, ETAS, 282 pp.*)

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This is not a book for you. Unless you are a manager or, better, a top executive. Otherwise, if you are, as I suppose, a scholar in STS or interested in STS, this is not a book addressed to you. As Roberto Verganti, professor of Innovation Management at the Politecnico di Milano and author of the book, explicitly says, “this is a book on management” (p. vii), a book “about the management of innovation and design” (p. 219) where “the process through which executives leverage external and internal resources and creativity to develop breakthrough innovations” (p. 219) is examined.

And yet, this is a book you should read if you are interested in artefacts, design, technology. Anyhow, if you decide to read it you should try not to give too much relevance to the managerial rhetoric that peppers many parts of the book – all the references to “profit margins”, “competitive advantage”, “inspiring leaders”, “your company”, “your customers”, “your competitors”, etc. – which hampers a real engagement with the contents, at least for me, not being a manager either.

You should read it because *Design Driven Innovation* is not just a book about innovation management. By introducing the issue of meaning – and of the management of meaning in relation to artefacts – Verganti deals with issues that are very close to those tackled by STS, – as he himself notices by citing Callon, Bijker, Latour and Law. Indeed, by focusing on meaning, Verganti investigates the sociocultural dimension of artefacts and its relevance for innovation.

You should read it because, by disentangling the sociocultural dimension of innovations, Verganti takes into consideration the mediating role of artefacts and all those other actors – “interpreters” for Verganti – that constitute the network through which innovations take place.

You should read it because by focusing on how innovations rearticulate the relations in which they take part – one of STS concerns – Verganti gives the possibility to talk, within innovation studies, about artefacts as “matter of concern” and not as “matter of fact” (Latour 2008), and about design as an articulation of issues and not as problem-solving.

Besides, you should read it because, should Verganti’s version of “design driven innovation” (DDI) become popular among managers, entrepreneurs and policy makers – as it seems possible considering that the book has been praised by people such as Luca Cordero di Montezemolo – it could allow STS scholars to make STS’s issues understandable for an audience who, at least in Italy, has never been too sensitive to them.

Thus, you should read it, yes, but without swallowing it – and not just

because it is peppered with a managerial rhetoric not always easy to digest.

The book summarizes ten years of studies on innovation (see bibliography) giving them a managerial allure. These studies have been carried out by Verganti himself and other scholars from management and design studies, and are mainly about northern Italy furnishings and housewares companies, even if the book presents many examples and cases from various companies from different parts of the world.

These studies have been inspired by Verganti's specific perspective on DDI. The concept of DDI was introduced by Giorgio De Michelis (2001) in 1997 in order to account for a third kind of innovation that does not fall under the traditional two considered within innovation literature – “technology push” and “market pull”. For De Michelis such a third kind of innovation, which is typical of Italian industrial districts, is characterized by the creation of a new user profile and, at the same time, of the product or service able to meet the expectations, desires, needs, of this new user. De Michelis also notices that such kind of innovation makes it possible to create not only a product or service, but also a corporate vision related to the brand.

Drawing on Klaus Krippendorff's dictum – “design is making sense of things” – on which the “product semantics” approach (Krippendorff 2006) of design studies is based, Verganti reformulates the concept of DDI. By doing so, he broadens, clarifies and specifies it, showing that DDI is not just a blend of the two traditional kinds of innovation in connection with a brand vision, as others, following De

Michelis, assume (see Celaschi and Deserti 2007), but a different kind of innovation that interacts with the other two. In this way Verganti is also able to actually integrate DDI with the other two kinds of innovation, connecting his model to Giovanni Dosi's one (1982) (Dell'Era, Marchesi and Verganti 2008; Verganti 2008).

Verganti's version of DDI is outlined in the first part of the book – “The strategy of Design Driven Innovation”. In order to illustrate it, I can mention one of Verganti's preferred examples (see also Verganti 2003): the *Metamorfosi* light system by Artemide, an Italian lamp manufacturer. *Metamorfosi* is not a lamp like *Tizio* or *Tolomeo*, also produced by Artemide. It is a three-spotlight system producing colored ambient light that can be changed through a remote according to the situation and the user's moods. For Verganti this is a radical innovation “in what people mean by a lamp” (p.27): “it shifts people's attention from the object of the light (...)” and “from white to colored light (...) to psychological well-being”, bypassing the need to illuminate through a focused light as well as to have a nice artefact in the living room or in the studio. Indeed, *Metamorfosi*, with all its technical elements visible through the transparent bowl that constitute its shell, has to be placed on the floor, not necessarily in view.

Thus, for Verganti, innovation is related to people's need in two ways (see also Dell'Era, Marchesi and Verganti 2010):

- through function, i.e. technological innovation – the three-spotlight system of the Artemide lamp – which allows the performance, and

- through messages, i.e. language, which convey a meaning – well-being instead of illumination.

Performance-technology and meaning-language are schematized as the two axes of a matrix where it is possible to distinguish incremental technological improvement from radical technological improvement as well as “adaptation to the evolution of socio-cultural models” from “generation of new meanings” (p. 45). Radical improvement accounts for “technology push” innovation, “generation of new meanings” for DDI, incremental improvement and adaptation for “market pull innovation”. For Verganti the latter is equivalent to user-centred innovation. Indeed *Design Driven Innovation* can also be read as a critique of user-centered design and all the related methods – usability tests as well as focus groups. For Verganti, user-centered design tends to conform to present user needs, whereas radical innovation creates new users, which cannot be tested before the innovation has spread. As Verganti notices: “people seemed to have been waiting for the Swatch, although they did not think to look for it” (p. 73), “[p]eople did not ask for that meaning, but they loved it once they saw [Nintendo Wii’s features]” (p. 5), which allowed a shift from a “passive immersion in a virtual world” to an “active physical entertainment, in the real world, through socialization”.

The second part of the book – “The Process of Design-Driven Innovation” – “shows how companies can realize successful radical innovations of meaning: how they can make unsolicited proposals that turn out to be what people love” (p. 15). It basically focus-

es on how a company can take part in the “design discourse”, i.e. the discourse produced by interpreters of the cultural production and of technology such as, among others, artists, media, cultural organizations, technology suppliers, retail and delivery firms, but also sociologists, anthropologists, semioticians as well as designers who have a specific role as “brokers of language”. In order to develop a radical innovation, a company should listen to, and interpret, the design discourse, which means to develop its own vision by selecting the right information and, finally, influencing it in order to influence in turn the more general public.

The last part of the book – “Building Design Driven Capabilities” – tells how Design-Driven labs can be built and used and what “the vital role of the top executives” (p. 202) is. Thus the latter emerge as the actual protagonists of DDI since their job is to spin the design discourse in their favor.

Verganti’s interest in meaning leads him to take into consideration mediation: the mediation deployed by innovative artefacts, the various mediations deployed by all actors – “interpreters” in Verganti’s words – constituting the networks of innovation and, most importantly for Verganti, the super-mediation carried out by managers. Even if Verganti does not explicitly mention mediation as a foundational concept of his approach, it emerges from the cases and examples he introduces. And it emerges in its radical, Latourian, version: mediation as an instance that does not connect two pre-existing terms, but two instances emerging through the mediating third (Hennion 1993).

Meaning is, indeed, seen as a result of a mediation that rearticulates the network in which the innovation takes part, as the *Metamorfosi's* case shows. This is exactly the way in which Madeleine Akrich (1990) conceived the signification of an artefact.

And yet, Verganti formalizes meaning in another way: as opposed to function, performance, technology. But as Akrich (1990) stated, "What we call function of technical objects is not opposed to signification. Such opposition belongs to a perspective related to technical or, on the contrary, to cultural determinism. From our point of view 'function' is just part of the *program of action* outlined by the *script* of a technical device", as the *Metamorfosi* case shows: the "technical" devices have a central role in the re-articulation of the illumination and hence in its meaning.

Through his formalization, Verganti recovers the quite known – at least since Barthes (1964) – opposition between function and signification, selling it as a new way to look at design. Unfortunately that dichotomy – which recalls other, more general dualisms of the western thought – continues to pester the reflection carried out by the semiotics of objects, notwithstanding the parallel efforts of the Greimassian semiotics of objects (Floch 1995; Mangano 2009) and of Actor-Network Theory in overcoming it – a thing Verganti does not really acknowledge since he considers STS only as a contribution to the technological side of his theory.

Even if Verganti knows that such a dichotomy does not hold (p. 33), probably for the sake of an elegant and alluring formalization that complies

with other theories of innovation, probably for the catchiness of a schematization so entrenched in the always popular western dualisms, he uses it and, through it, introduces other theories of signification that cast a shadow of incoherence on his discourse.

Following Akrich (1990), who recognizes that signification emerges from the passage between "the world inscribed in the object and the world described by its displacement", Verganti could have kept his schematization using a general and relational dichotomy such as "inside/outside", acknowledging, as he implicitly does, that meaning permeates the whole process of innovation, as this journal has showed (see Parolin 2010).

Probably other STS -minded readers, not so interested in signification as I am, would have focused on other discrepancies with the STS approach, such as the fact that Verganti mainly presents success stories or the fact that he considers users very marginally.

STS tend to be symmetrical and consider innovation failures as much interesting as successes, if not more. It is understandable that in a book that tries to sell a certain approach to innovation to managers, success stories have more relevance than failures. But certainly it would have been interesting to examine not just successful DDIs, such as the Swatch's one, but also the failure of Smart, which, at the beginning, was managed by the same manager of Swatch under the same brand; or not just the process of Barilla's project *Beyond primo piatto*, but also the process that brought to the Alixir line, soon disappeared from our supermarkets.

As for the second point, Verganti pays overwhelming attention to managers and their super-mediations, compared with the almost non-existent attention given to the users. However, the latter do not just constitute the market through the expression of their present needs and desires. Users sometimes innovate too, through more distributed processes than the manager-centered ones privileged by Verganti.

Thus, Verganti's version of DDI can interestingly bridge innovation studies and STS, but, in order for the bridge to be solid, we still have much work to do.

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Vadim, Volkov, Oleg Xarxordin
[Kharkhordin]
Теория практик - Teorija praktik
[Theory of Practice]
2008, EUSP Press, 298 pp.

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Teorija praktik is a book addressed to the Russian public, which gives an overview of the pragmatic turn taking place in contemporary social sciences. Pragmatic Turn is also the name of a series of books published by the newly founded European University at Saint

Petersburg, where this book was published. In Russian culture, attempts to provide overviews of “western” approaches and theories are an established tradition, sometimes achieving great results. In this case, the authors have chosen to focus on a line of research rooted in the French and German tradition, with few references to symbolic interactionism and ethnomethodology, as well as to workplace studies and learning theories dealing with the concept of community of practice. STS approach is not appreciated for its heterogeneous contribution to this pragmatic turn, with the sole exception of Bruno Latour, who is given credit for his key role in this field. Even if the book does not explicitly adopt a specific approach, it eventually follows a twofold order in the analysis of the theoretical reference framework. First, it traces a sort of genealogy of the main concepts related to practices in contemporary philosophy, with particular reference to Heidegger’s, Wittgenstein’s and Deleuze’s works. Secondly, it analyses the use and different ways of understanding practices, with regard to their origin, their causes and their effects, with an extensive analysis of the works of (among others) Marcel Mauss, Michel Foucault, Pierre Bourdieu, Michel de Certeau, Luc Boltanski and Laurent Thévenot.

The increasing importance of studying practices in social sciences first emerged in the Seventies (following the studies of Clifford Geertz and Pierre Bourdieu), as a both semiological and cultural reaction to structuralism. Starting from that, the authors trace a genealogy of this perspective. Marcel Mauss’ research on gift, focus-

ing on background practices, and Max Weber’s analysis of traditional agency and power of conventions, are juxtaposed with a more established line of research, drawing on the philosophical speculation on this topic, which is here described in a history-of-ideas style. The authors are very detailed in pointing out Ludwig Wittgenstein’s contribution and explaining it to the Russian readership, with particular regard to the different role that ‘discourse’ and ‘word’ (both expressed in Russian by the same word: slovo) play in different situations, and how different linguistic games, or forms of life, can produce different conditions of significance in everyday language. Another important aspect considered is the relationship between rules, habits, and ways of using rules, a perspective that makes it possible to finally overcome any approach considering the regulatory aspect as a cogent factor. A similar importance is attributed to Michael Polanyi’s studies on personal and tacit knowledge, and to his relativization of the commitment to rules.

The authors recommend that practices should be studied following Wittgenstein’s invitation: “Don’t think, but look”. However, they don’t discuss this aspect in further detail, and do not make any reference to the abundance of fieldwork studies on this issue, just limiting their discourse to the need to observe visible practices and examine contrasts and discussions. Following a Russian tradition, they consider literature as an important source for social sciences, at the conceptual level too. As an example of a correct perspective in studying practices, they consider Andrej Platonov’s *evnux duši* and Daniil

Xarms [Kharms]'s idea that knowledge is "seeing" (vidit') much more than znat' (knowing) or uznat' (learning). Evnux duši (The Eunuch of the Soul) is a character from Čevengur, a cult novel written in 1928-1929, but published only in 1988, who observes the overall transformation of society in revolutionary times, without adopting conceptual frames. Daniil Xarms was a prominent surrealist and a children's book writer, founder of the OBeRIu movement and very close to the trans-sense (zaum) perspective expressed by the great poet Velimir Xlebnikov [Khlebnikov] in the avant-garde art movement. Both of them were among the most popular samizdat (clandestine) authors in Soviet times. Surprisingly, the authors don't mention Mixail Baxtin's [Bakhtin] methodological concept of outsideness [vnenaxodimost'], while emphasising the same need to abandon chronotopic constraints in order to develop ponimanie, the understanding of processes.

The book examines the issue of practices in contemporary social sciences, following four axes: the causes and origin of practices, the role of things in practices, the role of discourses in practices and the centrality of practices in articulating relationships between power and everyday life. Referring to Norbert Elias's classical research on the western process of civilization, the authors stress two points, the "morality" and the regulatory performance of dominant practices and their embeddedness in bodies, conversations, emotions and spaces. They dwell on Pierre Bourdieu's extensive elaboration of the concept of practice, regarded as a result of an agent's posi-

tion in a field and of a habitus, which would make it possible to predict the practices of a certain agent. Here they agree with the criticisms recently made by Sloterdijk (2010), pointing out a contradiction between the "conditioned spontaneity" of predispositions and their "authenticity", both supported in Bourdieu's works, and conversely emphasize their unpredictability.

They also make a very interesting criticism of Bourdieu's concept of *illusio*, a pillar of the Bourdieusian theoretical framework, which is based on the assumption that "to play a game, one must believe in it". The authors argue that the well-known phenomenon of the absolute lack of belief in their system on the part of the Soviet citizens, back in the early Seventies, did not result in a refusal to play that huge game. So, practices are not generated by strategies, but result from processes, and their study has made it possible to bridge conceptual divides such as private/public, micro/macro, and so on. Surprisingly, the authors do not make any reference to the seminal work of Lev Vygotskij and Aleksandr Lurija, and in particular to their concept of *kollektivnaja dejatel'nost'* (collective activity, or practice), so influential in western practice studies (Cole 1998). They prefer to turn only to "Westerners", who explain the process of assimilation of new habits into a pre-existing, taken for granted, body of practices by virtue of their moral superiority (Wittgenstein) or due to a conflict between opposing forces (Deleuze, Fleck).

This attitude clearly emerges in their analysis of the role of things in practices. Latour's analysis of the pos-

sibility to develop analogous practices in different contexts and environments thanks to a network and inscription devices, and his idea that the same network develops agency as an infrastructure, as well as his theory on the assemblage of heterogeneous elements, regardless of their humanity or non-humanity, are presented to the Russian readership quite appropriately (considering that Latour is little translated into Russian, contrary to other authors quoted in this book). Vygotskij and his ideas about “acting with tools” are instead ignored, despite their reintroduction in contemporary western debate as “activity system” by Yrjö Engström and Michael Cole.

Analysing the role of discourse in practices, the authors present the most interesting part of their work, comparing the various perspectives of Michel Foucault, Michel De Certeau, Luc Boltanski and Laurent Thévenot. In particular, they underline how Foucault studied “serious” discourses (such as medicine), while Boltanski and Thévenot developed a sociology of criticism focusing on an analysis of regimes of accountability or justification, studying the kinds of regulatory forms used in everyday reasoning in relation to behaviours and practices, and analysing the impact of these types of discursive commitments (engagement) and constraints (régimes of coordination). Similarly, the authors examine Foucault’s idea of power as a “strategy without a strategist”, a configuration of forces operating in everyday life through practices transforming the Self into a Subject, and compare it with De Certeau’s perspective, based on the double register of strategic practices –

the dominant ones, generating order, spatiality, effect of power, hierarchy, production of identity – and tactical practices, i.e. the “weak ones”, mimetic and conformist, aimed at avoiding stigmatisation, generating mobility, despatialisation, networking of small groups, manipulation of identities, slang and multiplicity.

However, the most surprising aspect of this book is its confidence in sticking to a divide between Russian and “western” (in this case) theory of practices, which seems to be taken for granted. This is a great sign of continuity with the Soviet tradition. In the past, in every Institute (Graham 1975) there was a sektor, or department, devoted to the study of “bourgeois” areas of research, which were obligatorily subject to criticism, with a number of scholars conveying the contents of western debates into the Soviet world (Mongili 1998). By doing so, they regarded “western” or “bourgeois” science (during the Soviet period) as a phenomenon apart from the Soviet (now Russian) culture. They often achieved a very high level of analysis, as we can see if we compare Steven Shapin’s (1995) review of SSK with a Soviet analogous work (Kelle *et al.*, 1988). However, the price for this kind of approach was not only the denial of any direct influence of Soviet thinkers (such as Vygotskij) on the western debate, but also of some original intellectual perspectives on practices, such as Baxtin’s. The only justification the authors have for this attitude is a meaningful discussion on the replacement of the Russian word for practice, *dejatel’nost’*, with the more westernizing *praktika*.

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Sophie Houdart
**La cour des miracles. Ethnologie
 d'un laboratoire Japonais**
*[The Court of Miracles: Ethnology
 of a Japanese Laboratory]*
 2007, CNRS Éditions, 335 pp.

Assunta Viteritti
 (Università di Roma)

In this very absorbing book, Sophie Houdart flits ably from one role to another, becoming in turn an ethnologist, an anthropologist and a sociologist of science. Laboratory life – that of humans both divided and united by culture (national, scientific, professional) and that of other species, in this case the drosophila fly – is enriched through a totally cultural vision of scientific knowledge (Pickering 1992; McCarthy Doyle 1996; Goodwin 1994).

The author tells the fascinating story of how a Japanese research laboratory describes and characterizes the homosexual gene of the drosophila fly in the 1990s. In fact, man is believed to be the ultimate branch on the tree of life. The research hypothesis is that the “forebears” of our sexual behaviour patterns can be found in animals, bacteria or flies. In its behaviour and in its genetic mutations, the fruit fly manifests many intermediate stages between hetero- and homosexuality. Above all, it focuses on the laboratory manager, Yamamoto, who evolves from being a lover of insects (*mushi mushi maniac*) according to the “naturalistic” culture prevalent in Japan, and becomes a laboratory scientist in line with the more “rational” western vision, without ever losing his cultural identity.

The book opens with the film: *Sexual behaviour – Mechanisms and evolution* – which Yamamoto made to allow us to observe both the heterosexual and fluctuating behaviour of the fly. Does nature communicate through the images or is this the story as told by Yamamoto? He tells us about his drosophila fly and we can see it, we watch with him more than 30 scenes narrated by the author: all appears simple, evident. In the visual tale, the story seems like a rosary of natural facts. The actors in the film are the flies, which demonstrate both hetero and homosexual behaviour. Then come the genes which embody these characteristics, then the areas of the flies' brains where these genes act. Then come Yamamoto and his story, the researchers who work with him, the other laboratories, his centre collaborates with. The film, like the book, shows how nature and culture are questioned. The "natural" history of the drosophila becomes the "cultural" history of Yamamoto, his laboratory, his successes and his problems. The author moves ably from one type of culture in practice to another: natural and mutant drosophila flies; types of genes (canoe, tamou, satori, fruitless, etc.); types of laboratory location – Japan, Hawaii, France; types of research practices – more interdependent, more individualistic, more rational, more natural, more polyphonic, etc. In each difference, in each stage of the story, we see how the natural is transformed, and how each distance or nearness between the elements represents a cultural experience.

Houdart's book presents the tradition of laboratory life competently and innovatively, ably adding the cultural

ingredient in its various forms and shades. The book is a play on mirrors, all the characters being observed through the eyes of the other characters: only through comparison and analysis of the reciprocal differences can the characteristics of the various actors emerge. The author goes on to highlight the cultural changes deriving from the fact that in the research field of ethnologists, anthropologists and sociologists of science, we find ourselves in the presence of non-humans – not only in the form of technologies and artifacts (according to the consolidated ANT tradition) but also in the material form of other species, such as scarab beetles and flies, and even cells, molecules and genes which behave like active entities, repopulating the fields of inquiry in social sciences (Houdart and Thiery 2011).

Sophie Houdart begins by telling her personal story, that of a young PhD student in social sciences who arrives in Japan to study in a laboratory which had become a talking-point in the West. The author gives a detailed, very personal account of how she introduced herself into the laboratory environment, how she integrated with daily life in order to relate the group's working modalities, silences, personal pathways, their difficulties with the English language. The author speaks of the professional pathway of the laboratory manager, Yamamoto, a typically Japanese story, yet exemplary in its singularity. As related to the ethnologist, the anthropologist, the sociologist of science with the certain measure of rhetoric which one might expect and forgive in a scientist, Yamamoto is first and foremost Japanese and then a re-

searcher, first a lover of insects and then a scientist. The text guides the reader through the adventurous metamorphosis of this naïf ethnologist who loves the mountains and insects, transforming him into an almost Western scientist capable of producing knowledge for articles in important international science magazines.

She then tells of how Yamamoto put together his team, how he set up other laboratories, how he gradually began to interact with Western colleagues, how he maintained the modalities of “naturalistic” knowledge which derived from his culture of origin. All this took place within the socialization to western scientific culture with which he needed to measure himself in order to export the Japanese cultural systems which through him had evolved into something new.

The insects from his mountain childhood lead him towards science. His love of nature, intrinsic to Japanese culture directs his footsteps towards rational science: from the mountain butterfly to the laboratory drosophila, from natural to artificial adaptation. Yamamoto’s trip to Chicago does the rest, making it necessary for him to acquire a posture, a conduct, a psychic experience, a sense of perseverance, a disciplining of mind and body, as Foucault (1975) would say, thus transforming him from collector into electrophysiologist. In this transformation, Yamamoto also becomes one who has to master other people, genes, flies, colleagues, as well as mastering himself.

The book is divided into three parts. The first narrates the cultural transformations of the actors in the

field: how the foreign ethnologist from a European culture arrives as a guest in Yamamoto’s laboratory, how Yamamoto himself evolves from being a lover of insects to scientist (after his long experience in the USA), and speaks of the differences between the Japanese laboratory and the second Hawaiian laboratory set up by Yamamoto, highlighting the cultural differences between the two working teams. The chapters in Part two introduce the anchoring to nature through the drosophila fly and its transformations in the multiple court of natural mutants: the court of miracles. In this part of the book, other cultural diversities enter the picture. Through a particular modality of comparison, adopting differences rather than similarities, the author tells of the modes of action exerted by humans on the drosophila. Two laboratories, one in France in which Yamamoto develops his project on the drosophila and the Japanese laboratory are compared. The two research experiences, the two teams, act differently when observing the drosophila’s behavior, the diverse types of mutant flies (either more or less heterosexual or more or less homosexual). Also in this case nature is tested by cultures and diversities, with the polyphonics and multiple existences in the behavior patterns of humans and flies under examination: the ethnologist widens his field of observation populated by various subjects and watches the researcher who watches the drosophila, then watches the drosophila itself through the researchers experiments and reports. What is questioned here is the relationship between local and universal, between specific research practices

and how these are represented reciprocally as a part of more universal scientific practices: local is different in the more general sense. In the third part, we are told that scientific practice is above all social practice. Houdart describes how Yamamoto exhibits his charisma, his way of orchestrating the events, his authority over the group and at the same time how order is established within the laboratory, how objects are distributed in practical terms and how the human actors dominate the others (the flies and genes) in the process. Yamamoto has produced his own practical pedagogy (Kaiser 2005).

In conclusion, it may be said that Houdart's work is not a comparison, not a multi-situated ethnography, not a case study but rather all of these in part. It can certainly be said that it is rich in bibliography, rich in literary composition, wide-reaching in its narration of the research field and competent in its use of scientific terminology, accurate in its use of the many citations – from literature, philosophy, science – which open the chapters. It is a very French book in the certain sarcasm and recurring elegance which sustain the narrative. It is a book which certainly continues along a pathway rich in possibilities in terms of the cultural studies of practices and knowledge, and which young academics (of social sciences, but also biologists, physicists, chemists, etc.) from the U.K., Italy, France, Japan, the U.S.A., Spain, etc., ought to read to obtain a close-up of the lives of others (both human and non-), which are also theirs, and ours.

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