

# The problematising the Technological: the object as event?

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## *Abstract*

The paper asks how certain zones of technical practice or technologies come to matter as 'the Technological', a way of construing political change in terms of technical innovation and invention. The social construction of technology (SCOT) established that things mediate social relations, and that social practices are constantly needed to maintain the workability of technologies. It also linked the production, representation and use of contemporary technologies to scientific knowledge. However, it did all this at a certain cost. To understand something as socially constructed implies that it can be positioned on a pre-given social grid. Making this understanding stick risks affronting others with the claim that their position is not singular, only ordinary. It also runs the risk of not having purchase on those aspects of technological relationality that overflow the framing context of the social (Callon, Barry et al. 2002). Building on the ground prepared by SCOT and relying on the work of (Stengers 2000) and (Simondon 1964; Simondon 1989), the paper discusses how technologies could be understood as relational events within the contemporary political space. Developing an account of technologies centered on relationality, this paper outlines an epistemology and ontology of the anomalies of technological events, and suggests how excess could explain the Technological.

## *Introduction*

We deal merely critically with the conception if we consider it only in reference to our cognitive faculties and consequently to the subjective conditions of thinking it, without undertaking to decide anything about its object. (Kant and Meredith 1978, 48)  
... to describe this space where the emerging identities created by techno-sciences' overflows could be discussed and could be mobilized in order to compose, to constitute, the collective (Callon, Barry et al. 2002, 287)

Social constructionist accounts of technology sought to establish better relations with technology. They rendered technologies visible as social achievements, but somewhat at the cost of losing sight of the singularity of what could be called 'the Technological'. The Technological is a pattern of shifting, mutating intensity, roving somewhat unpredictably across different zones, sometimes at the heart of urban life in gadgets and gizmos, sometimes extra-territorially, or deep in human bodies. It figures in certain excesses or overflows associated with contemporary technologies, in events where unpredicted identities, formations, significations and practices proliferate. In these situations, human and non-human actors are irreducible to a single location, identity, structure or essence. They exist relationally and exchange properties in bursts of invention. On these occasions, the Technological re-defines too the political existence of technologies. It changes the ways they are articulated, problematized and mobilized. By downplaying the

Technological, social constructionist accounts of technology made it harder to see how certain domains of technical practice become significant within the political.

This paper poses the problem of how technical practices become Technological. Any human practice can be understood as technical without too much effort, since everything has a materiality that can be artficed or worked on. However, only occasionally do practices become technological. These occasions involve changes in relations, and it these changes in relationality that need to be understood without attributing some kind of substance, or agency to things. . The argument addresses two different senses of relation. It begins with a sketch of the obstacles to better relations with technology that SCOT encountered. It then discusses SCOT efforts to make sense of technology as social relations. Two alternative approaches are introduced. The first, drawing on the work of the philosopher of science Isabelle Stengers, re-poses the problem of relation to technology as primarily a political problem. Her event-based understanding of modern sciences leads into the second alternative based on a discussion of Gilbert Simondon's concept of transduction. This concept counters some of the habits of thinking about technology present in SCOT. In particular, it provides ways of understanding the Technological as an articulation of diverse realities. In

### ***The sociotechnical encountered in SCOT***

While there are many different versions of the social construction of technology, and important differences in sociological, ontological and political orientation between them, the central idea of SCOT has been that technologies are social relations in another form: 'technology is society made durable' (Latour 1991). This general tendency to understand technologies as 'society made durable' can be found at work almost everywhere in SCOT, but especially in the network-centered versions of it.

There are good reasons for the emphasis on social relations underpinning technology. Growing out of the sociology of scientific knowledge, SCOT sought to overcome two major obstacles to an adequate relation to technology. It responded both to the critical tradition of European philosophical thought with its view of technology as alienated human nature (beginning with Marx (Markus 1986)), and to the technological determinisms endemic in popular culture, government policy and academic disciplines across human, social, natural

and applied sciences. In resistance to critical theories of modern technology and science developed in the first half of the twentieth century, social constructionist accounts of technology showed how grand narratives of a technological epoch or alienated reason tended to lose the plot. The diagnoses of technology as instrumental reason, or as enframing, failed to register the contingencies of technology and how it was socially constituted and maintained. Critical theory made it difficult to see how technology could be different or how a different relation to technology could emerge. Prominent philosophical targets here include (Heidegger and Lovitt 1977; Marcuse 1991; Adorno and Horkheimer 1999) as well as more recent incarnations such as (Virilio 1991), whose big-'T' notions of technology impose an almost incapacitating weight of responsibility on critical thought. In short, SCOT had the virtue of making it possible to think about technology a bit more light-heartedly. The humor and playfulness that runs through some of the most well-known SCOT writings (Latour 1993; Latour 1996; Haraway 1997; Latour 1999) (Latour 2002) attests to its refusal to figure technology as absolute other.

In key respects, however, the SCOT project remains critical in the epistemological or Kantian sense of this term. That is, it renders intelligible the conditions under which technologies become an object of perception, judgment and action. As a 'critique' of technology (in Kant's sense of considering objects only 'in reference to our cognitive faculties' (Kant and Meredith 1978)), SCOT showed how, in various registers, technological objects and practices become intelligible in relation to particular subject positions, knowledges and practices. It grounded technology in a set of social relations that could be rationally understood, and explicated. It found that there was no specificity to technical objects, systems or practices that could not be analyzed sociologically, sometimes even going so far as to say that engineers, technicians and innovators should be understood as doing sociology (Callon 1987). Depending on the bent and provenance of the version of SCOT, these forms of intelligibility could be structural, pragmatic, semiotic or cognitive. It rarely asked whether a critical position provides the best ground on which to think through technological relationality.

What I am calling the Technological, the advent of technology as a way of articulating collective belongings, has long framed SCOT accounts. Alongside its resistance to the generalized negativity concerning technology that characterized critical and humanist

theories of modernity, SCOT has been allergic to any form of 'techno-hype' or 'bad advertising' concerning technology. Providing alternatives to forms of technological determinism has long been a central plank of the SCOT platform of better social relations with technologies. But the cost has been an immunity to the idea that the hype might be constitutively part of technology as we know it, that hype can get under the skin, so to speak, of technologies, whatever their materiality or sociality. The term 'hype' is pejorative, yet it does connote an excess of feeling or affect, an over-attachment to an image or figure, usually circulating through mass media or publicity mechanisms. To formulate an account of the Technological then is to ask whether there could be an affirmative take on this overflow, an approach that encompasses both a differentiated spectrum of feeling in relation to technology and a more constructive role for feeling in general.

Feeling, within social constructionist accounts, plays very much an ancillary role, attendant upon other relations within the systems in which the hybrid socio-technical thing exists. Attention to feeling or affect of technology might necessitate changes in the understanding of the relations that technologies render stable or durable. If feeling or affect has been left out of much SCOT exploration, partly this is because the studies have tended to be micro-level (for instance, (MacKenzie 1990; Traweek 1992; Latour 1996; Helmreich 2000)). In contrast to the macro-level concerns of critical theories and philosophies of technology, actual SCOT studies have stayed within localized sites, seeking to trace the social with an ever more fine-grained focus. But feeling or affect overflows particular localities. Feeling has also eluded SCOT because feeling or affect is hard to think about without resorting to psychosocial understandings of the subject and experience, precisely the kinds of understandings that social constructionist accounts more generally do not want to take as pre-given. Feeling also has a much lower epistemological profile than rationality, especially within the scientific and technological 'centers of calculation' (Latour 1987) on which social constructionists accounts are usually focused. This is not to say that all SCOT research has neglected to study the feeling in relation to technology (on this score, see for instance (Haraway 1997), and also (Turtle 1984; Turtle 1995); also, outside the academic literature: (Kidder 1982; Ullman 1997)).

### ***Relationality as overflow***

The reality of relations -relationality - has always shadowed SCOT's understanding of sociality, yet the various approaches that broadly come under the rubric of social construction of technology construe it differently. Within SCOT, it comprises two different axes. Haraway's notion of 'articulation', with its 'clusters of processes, objects, figures and marks' that include the 'modest witness' (Haraway 1997, 63) differs in important respects from Law's 'modes of ordering' as the 'recurring patterns embodied within, witnessed by, generated in and reproduced as part of the ordering of human and non-human relations' (Law 1994, 83). The former is directly concerned with the relation between the knower (the 'modest witness') and technoscience, the latter addresses different styles of relation within a technoscientific domain and how they constitute, enrol or 'agentify' different actors. Woolgar's 'moral order of representation' as 'the existing complex of relationships between entities' (Woolgar 1991, 65) diverges markedly from Latour's 'relativist sociology' with its 'fluctuating referents' and 'supple frames of reference' connected together by catwalks running between actors (Latour 1996, 169, 179). Both, however, figure relationality in terms of the network of associations that tie different actors together. Or again, ethnomethodologically inspired accounts of technical practice such as Star's and Ruhleder's, arguing that 'analytically, infrastructure appears only as a relational property, not as a thing stripped of use' (Star and Ruhleder 1996, 113) or Suchman's accounts of situated practice as continual contingency and co-production (Suchman 1987) (Suchman and Trigg 1992) lie at quite a distance from the 'circle of culture' approach developed in cultural studies of technology such as (Du Gay and Hall 1997). Broadly, however, the whole spectrum understands technologies as crystallised or congealed social relations which need to be de-sedimented in order to facilitate social, cultural, and political change.

What in this relationality remains to be thought? Why attempt to foreground relationality again? What traction does it have that SCOT's account of technologies as social relations in detour lacks? Even as they seek to dissolve the obstacles set up by both critical and determinist interpretations, a lingering necessity weighs down social constructionist accounts of technology. By mapping technologies onto societies, SCOT approaches levels differences between technologies, political positions, and cultural formations in ways that may not necessarily sensitively respond to the technological imbroglios in which our collectives and our knowledge practices are increasingly enmeshed. These imbroglios

concern how technological practices open up the political space of 'the Technological'.

Numerous symptoms attest to the remarkably dense enmeshing of technology and the political today. State spending on military technology, the sales of the latest audiovisual gadgets, regulatory struggles over GMOs and GM foods, the proliferation of State and private networks of surveillance devices such as CCTV cameras and biometric ID, the consternation over assisted reproductive technologies like IVF or PGD, febrile financial market speculations on biotechnology, legal struggles over MP3s, the failure of cryogenics, the figure of the hacker in Hollywood cinema and television, these are just some of the multiplying examples in which technologies figures as part of a political space. More generally, utopian longings persistently attach themselves to new technologies even after the dot com crash or the end of the Cold War 'big-iron' epoch of military technology. The term 'the Technological' designates the fact that technology somehow sustains itself as a, if not *the*, vector of change. If we relinquish, as SCOT has done, grand narratives of technology, how do we account for this? (Barry 2001) writes: 'a technological society should not be considered as a stage in the evolution of society, nor a particular mode of government, but rather as a particular form of orientation to the political present. Central to this orientation is the equation of invention in general with technical innovation' (201). At least intermittently, the Technological comes to embody *the* political (in the singular, as distinct from politics and its institutions - parliaments, assemblies, congresses, senates, executive, judiciary, etc. (Patton 2000)), in forms that need to be described and analyzed rather than just responded to. Beyond any capture by the State of social relations, beyond legitimating forms of national or international sovereignty within political institutions, technology's embodiment of the political involves changes in the forms of belonging-together that constitute social life. In seeking to move past the obstacles that a critical standpoint and a reluctance to countenance affectivity pose, the challenge is to both preserve what SCOT has made knowable about the workings of the technical, and to change the project of relating to technologies into something more attuned to the dissonances and syncopations of the Technological. Radicalizing the social construction of technology entails developing ways of analyzing the Technological construction of the social.

### ***The singularity of the Technological***

In combination, the work of Isabelle Stengers and the work of Gilbert Simondon suggest a way of approaching this contemporary nexus between the Technological and the political. Stengers' work poses the problem of how to think about the singularity of modern science without attributing to it the privileged position that it sometimes claims. It offers some leads in developing a relation to technology that resists exaggerating the Technological yet grapples with some of the excesses and overflows associated with technologies. Simondon's work on collective life as relationality, and in particular, his concept of transduction as structuring event suggests how, at least speculatively, we can think about these overflows as arising from the articulation of divergent orders together, and how feeling or affectivity is deeply implicated in this relationality.

Stengers' work on modern science is kaleidoscopic. In a series of writings, she has posed one question in different versions: how do we undo the privilege and the constructed effect of our own technological-scientific superiority whilst respecting or responding to the singularity of science? How do we invent antidotes to the persistent belief that our own ways of knowing and doing are more powerful and better than those of the past, or those of non-European-American cultures? (Stengers 2000, 164-5) There is little trace of cultural relativism to be found in her work. Throughout the studies of classical mechanics, chemistry, hypnosis, the earth sciences, ethnopsychiatry, classical dynamics, ecology, Darwinism, drugs, clocks, thermodynamics, and so forth (Stengers and Andler 1987; Stengers 1993; Stengers 1997; Stengers 1997; Stengers 1997; Stengers 2000), she has repeatedly taken on 'hard cases' in the history of science because 'the history of the sciences constitutes the test par excellence for historical practices' (Stengers 2000, 65).

Stengers' approach to the question of how to frame modern science is especially germane to this discussion because she locates the invention of the sciences within the space of the political:

[W]e are under the influence of the invention of a different way of doing politics, one that integrates what the city separated: human affairs (*praxis*) and the management-production of things (*techné*). The event, which we have inherited, is that of the invention of a new practice of measuring things by humans, centered on the difference between "fact" and "fiction", [it] has created "another way" of doing politics (163)

This statement is quite complicated. Why approach science from the standpoint of doing politics rather than making knowledge? This is firstly an ethico-epistemological move, a

move that in her later work, Stengers calls 'cosmopolitical' (Stengers 1997) because it locates the political within science not outside it. Doing politics implies a concern for rendering accounts of the legitimacy of power and knowledge to others. To say that science does politics implies that it affects how collective life works. It does this by giving an account of its own practices, rendering accounts being the basis of legitimate power. By switching focus from society to politics as a constitutive dimension of science, by referring to science as one amongst 'the various means through which a human society *constitutes* itself' (Stengers 2000, 61), Stengers seeks to defuse the direct confrontations between scientists and other experts exemplified by the science wars of the 1990s (Gross and Levitt 1998; Sokal and Bricmont 1998).

When some scientists, for instance, became indignant that their activities were being reduced to an object of sociology, they wanted to affirm a difference that matters to them between scientific knowledges and other kinds of knowledge claim. The sociological judgment, one often found within sociologies of scientific knowledge and SCOT would basically be: 'no you're not!' As a knowledge practice, sociology implies describing actors engaged in social actions (although some versions of social construction definitely go beyond this: (Latour 1994; Law and Mol 2002)). Sociologies of science often describe scientists as actors like any other actors (engineers, cooks, sailors, alchemists, weavers). The first lesson to be drawn from Stengers' account of the invention of modern science might be the need for approaches to technologies that take into account their own position, and that of the interlocutors with whom the dialogue is occurring. Stengers is proposing a different kind of knowledge practice with respect to science. It is meant to intervene in the ways in which contemporary collectives perform politically: '[t]he decisive point here is no longer to deny the differences scientists claim for themselves, but to avoid any way of describing them which implies that scientists have a privileged knowledge of what this difference that singularizes them *signifies*' (Stengers 2000, 67). In contrast to much of the social constructionist work, this suggests the need to affirm the singularity of science, to accept the possibility that sciences have specific modes of risk and responsibility associated with them, and to avoid accepting at face value any exclusive or general interpretation (positivist, realist, reductionist, constructionist, relativist, deconstructionist) of science.

## ***An event- approach***

Stengers makes a second move which impinges more closely on the political space of technology. Science is political to the extent that it problematises accepted differences between facts and fictions (or between reason and opinion). It differs from politics, and scarcely appears as political because of the role played by practices and things. Science has created 'another way' of doing politics that links humans and things, and connects *praxis* and *poiesis*, rather than separates them as most classical and modern understandings of the political do. In saying that science needs to be understood as constitutively political, Stengers presents it as an invention that affects how our collectives elaborate their belonging-together; '[t]his is the very meaning of the event that constitutes the experimental invention: *the invention of the power to confer on things the power of conferring on the experimenter the power to speak in their name*' (89). Science can speak differently on the basis of this transfer of power.

As in (Shapin and Schaffer 1989) (cf. (Haraway 1997)), the relation between facts, witnesses, and things lies at the heart of this event. In certain respects, Stenger's account of the political linkages between things and humans is thinner than that found in Haraway's cyborgs (Haraway 1997) or Latour's mediators (Latour 1993). Although her account relies on the concept of mediators, she does not insist, for instance, so forcefully on the hybridization of bodies and things as some SCOT or related accounts would (for instance, (Clark 1997; Clark 2003)). The distinctiveness of her account lies elsewhere. It frames the singularity of the invention of specific modern sciences as an event. Like Latour, who writes that '[w]e collectively elaborate an emerging and historical *event*' (Latour 1994, 50), Stengers treats modern sciences in their singularity as events which make a difference between before and after. Why treat the invention of a science as an event? Theories of the event have abounded in recent philosophical theory, especially in work influenced by Foucault's and Deleuze's thought (see (Foucault and Rabinow 1984; Thrift 1996; Grosz 1999; Braidotti 2002; Massumi 2002; Rabinow 2003)), as well as in deconstructively-oriented work ((Stiegler 1998) (Tschumi 2000)). For many of these accounts, concepts of event help think about the contingency of new formations or assemblages without 'front-loading' a particular ontological commitment. As Rabinow puts it, 'from time to time, and always in time, new forms emerge that catalyze

previously existing actors, things, temporalities, or spatialities into a new mode of existence, a new assemblage, one that makes things work in a different manner and produces and instantiates new capacities. A form/event makes many other things more or less suddenly conceivable' (Rabinow 1999, 180). Stengers draws on and refines some of these philosophical materials. For her, the prime motivation to regard the invention of a science such as a geology, thermodynamics, ecology or a-life as an event is to respect the singularity of modern science as a contingent constellation of practice, things, risks, and responsibilities . On this basis, it becomes possible to understand the ongoing re-invention of science in other terrains, with other objects and in changed political conditions.

There are some vertiginous complexities in event-based thinking. In his recent reflections on 'modern equipment', Paul Rabinow draws heavily on Foucault's later work (Foucault 1985; Foucault 1991) to introduce event-based approaches into contemporary anthropology:

Events problematize classifications, practices, things. The problematization of classifications, practices, things is an event. A sensibility of constant change, and a certain pleasure and obligation to grasp it and participate in the transformations, constitute one mode of relating to things. This sensibility takes the mode of a keen awareness that the taken-for-granted can change, that new entities appear, that our practices of making are closely linked to those entities, that we name them, that we group them, that we experiment with them, that we discover different contours when deploying questions and techniques. (Rabinow 2003, 67)

Like Rabinow, Stengers is interested in approaching sciences and technologies as events. Rather than trying to say what a scientific claim or technological object is, 'eventalizing' thought tries to understand the problematization of a given situation, at the same time 'refusing to reduce a situation to what the passing of time gives up power to say about it today' (Stengers 2000, 42). So for instance, when a domain of materials, practices and significations becomes politically or collectively charged, it puts into question or problematizes an existing set of boundaries or limits within the social. If an event is something that makes a difference between before and after, according to this approach, it is because it puts something into question, renders it problematic or makes it possible to feel, perceive, act or know differently.

As a mode of relating to change, and to the mutability of the taken-for-granted, the event-based understanding of science allows engagement with differentiations occurring

within modern sciences (for instance, the shifts between the theoretico-experimental assemblages of Galilean mechanics and the 'historical objects' of the earth, field and life sciences), accounts for situations where the object answers back (for instance, in the highly-charged field of primatology). The virtue of event-based problematizations consists in their respect for contingency without basing contingency on some specific ontological foundation (such as language, discourse, the body, or materiality). It retains openness to the potential for constant re-inventions, such as those characterising modern science, for instance, as it moves increasingly into experiments based on simulations, (for instance in a-life research; (Stengers 1997; Helmreich 2000; Kember 2003)). They suggest lightweight, just-in-time epistemologies that accept the impossibility of stable solutions to the problems of thinking about relations to others, to technologies and to self.

### ***How do events change relationality?***

What in the event-based approach to science transforms what we understand as 'technology'? One definite implication is that we should not assume that the Technological is a universal category of material objects associated with specially enhanced human capacities for technical action (as various 'technological histories of humanity' would have it (Diamond Jared 1997)). Can we treat the Technological as political in the same sense that Stengers treats science as political? Just as Stengers' approach treats science as a shifting problematization of collective belonging-together in relation to knowing, can we understand technology as a problematization of belonging-together in terms of doing?

An event-based approach would prompt us to ask: what unevenness, what transformations in the taken-for-granted, what namings, groupings and experiments (in the broadest sense), what difference between before and after does a specific technology make to the Technological? According to what co-ordinates, through what modalities and mediation does a domain of practice become technological? An event poses a problem. The emergence of contested practices, discourses, and tactics indicates an event. Stengers writes that 'the scope of the event is part of its effects, of the problem posed in the future it creates. Its measure is the object of multiple interpretations, but it can be measured by the very multiplicity of these interpretations' (Stengers 2000,67). Events are 'elaborated', as Latour puts it, in different ways. Those who are interested or involved attach significations, adopt tactics, invent ways of using it or resisting it. All of this

becomes part of the comet's tail of an event. But the event itself, contrary to any version of determinism, does not dictate its reception, signification, narration or consequences. These remain indeterminate and untailed. The risk that the social construction of technology runs of levelling the terrain of the technosocial on the foundations of 'society', and of glossing over the differences between technologies might also be averted here. Stengers' work suggests an ethico-epistemological precept to use in approaching technologies. This precept is meant to help avoid any further attribution of substance or essence to the technological.

How does it pose the problem of technological relationality - in both the sense of relation to technology, and technologies as relations - differently to SCOT? According to SCOT, the relations that make societies of any significant scale or duration require 'materials' to gain purchase (MacKenzie 1996, 13-14). When SCOT discussions turned to baboon societies or early tool-making practices, (Strum and Latour 1987) (Latour and Lemonier 1994), the technical mediation of all human relationality was being rehearsed. A secondary layer of SCOT argumentation was oriented towards scientific knowledge as a way of distinguishing modern technology from other technical practices. It argued that modern technology is a particularly intense zone of relationality because it rendered durable certain strands of social order via a recursive scaling up of scientific networks from centres of calculation outwards (Law 1994). These networks were themselves already technical in the sense that their capacity to produce knowledge depended on legions on non-human actors in relation. Occasionally, however, those networks of relations managed to expand out of the centres of calculation such as laboratories and to reliably enrol other realities. They become, imperfectly, technologies in wide circulation. In their analyses of technological imperfectibility, (Collins and Pinch 1998) describe, for instance, contests and debates moving 'seamlessly between science and technology' (92). How does the substantive link between science and technology, a link that has been axiomatic to social studies of science and technology, fare when it is subject to the approach advocated by Stengers?

If 'fact' vs. 'fiction' is the distinction that matters for science, 'it works' and 'it doesn't work' might be the distinction that matters in the scaling-up of ecologies of practice. These distinctions are not symmetrical. Workability or operationality increasingly coalesces with particular knowledge claims, as many contemporary ethico-political

disputes around the regulation of biotechnological and biomedical innovations attest. In each case, the dispute become political because a technical practice or innovation is at odds with some legal, ethical-political, scientific, moral, religious or cultural forms of reflexivity. SCOT accounts have often focused on disputes where scientific knowledge claims and technological operationality come into conflict (e.g. (Collins and Pinch 1998) on the Challenger disaster), and this makes sense given SCOT's kinship to the sociology of knowledge. However, the 'working' vs 'not working' distinction is pluri-faceted and variable. Whereas the fact vs fiction distinction is always addressed to competent witnesses (scientists and experts) whose authority to speak derives from the power conferred on them by experimental practice, the viability of a technical performance is directed to essentially heterogenous collectives and related to disparate constraints (Stengers 1997, 36). Scientific authority may be one of the voices to be heard in the Technological, but equally so, economic reasoning on different geographical scales as well as the figuring of technologies with identities, within subcultures and through cross-cutting social, political and cultural concerns plays a part.

The consequence of the asymmetry between the fact/fiction and works/fails distinction is overflow or technological excess. The sociologist Scott Lash gestures towards this excess when he writes:

[T]he more we monitor or self-monitor, the more we subsume cognitively, the more gets out of control, the more risk, uncertainty we bring about. The more we monitor the object, the more the object escapes our grasp. ... This moment of contingency, this where the object, or the self, escapes the cognitive categories of the subject, is indeed aesthetic. (Lash 2002, 50)

Lash's approach is focused on the irreducibly cultural energies which run through contemporary technologies. Especially in the last words of this passage, Lash points to a dynamic that centrifugally escapes the dispute-based locus of most SCOT work. (Haraway's work and some work influenced by her would be an important exception.) The micro-level studies of disputes or contests carried out in SCOT work are not wrong or irrelevant by any means. Rather, contextual boundaries built into the SCOT approach have made it harder to see the 'moment of contingency' where things overflow cognitive categories attuned to social relation made durable. Precisely what is not durable, the unstable, has been hard to register. Even the difference between 'it works' and 'it doesn't work', around which so many disputes revolve, is highly contestable, since it is easy to ask 'works for whom?'

## ***Technological overflow***

A further move is needed in order to map how the Technological eventuates. Drawing on the work of the philosopher Gilbert Simondon, the cultural theorist Brian Massumi outlines a concept of relationality which is overflow-sensitive:

Call the openness of an interaction to being affected by something new in a way that qualitatively changes its dynamic nature *relationality*. Relationality is a global excess of belonging-together enabled by but not reducible to the bare fact of having objectively come-together. Relationality cannot be accounted for by the objective proper ties of the actual ingredients in play considered as discrete elements. It cannot even be reduced to the interactions that might logically be predicted according to those proper ties (Massumi 2002, 224).

To understand relationality as what exceeds the interactions in a given context, or to think of it as a 'global excess of belonging-together' seems to present great difficulties. What could this possibly mean? And in what sense, if any, does it augment the event-based problematization of technology that might be drawn from Stengers' work on the invention of experimental practice?

Through the concept of relationality, Massumi highlights the singularity of events. Singularity is crucial to Stengers' account of the invention of modern science as a change in political existence or collective belonging-together. Without a notion of singularity, she cannot assert the specificity of scientific knowledge whilst resisting the privileges that science sometimes takes on when mobilized within other debates and political manoeuvres. The singularity of the invention and re-inventions of experimental practice rests on the way in which the power to speak for things is conferred onto people. But this conferral is not fully determined or in any way guaranteed. Put simply, objects can bite back, sometimes literally, and this induces new shifts, new problematizations within scientific fields, and sometimes triggers the production of new fields of knowledge. The event of modern science as an invention consists in this generative openness to ongoing transformation.

What of this shifting, dynamic nature can be found in technologies? One way to understand this is to contrast it with the standard SCOT account of technological innovation. Innovations do not necessarily discover anything. Rather they make something up. They are a distributed fiction operating within constraints. The move from the

laboratory, design studio, research centre or workshop that a technology undergoes can be narrated as a series of negotiations with those constraints, which are usually very diverse. Of this series, Latour writes, for instance, '[t]he only thing a technological project cannot do is contextualize itself without placing itself in a broader context' (Latour 1996, 126-7). Actor-network theories within SCOT such as (Law and Hassard 1999) have tended to emphasise smooth translations: '[t]he observer of technologies has to be very careful not to differentiate too hastily between signs and things, between projects and objects, between fiction and reality, between a novel about feelings and what is inscribed in the nature of things. In fact, the engineers the observer is studying pass progressively from one of these sets to another' (Latour 1996, 24). Technological *projects* become technological *objects* when they succeed in contextualising themselves as immutable. At that point, they become less obviously technological. They begin to sink into a field of mundane practices. It becomes possible to assign to them the status of means, tools or instruments.

Relationality implies a different rather more heterogeneous emergence, one which is much more affectively variable and dynamic in its rhythms. Rather than the smooth translation or the continuous process implied by 'following the actors', there may be events that trouble existing systems of interpretation or categorisation. When certain technological practices or zones become hotspots, the notion of smooth translation and scaling-up seems inadequate. Or when discourses, figures, problems and practices multiply around contemporary 'nodal points' [TODO: Haraway page] (the stem cell, the foetus, the operating system, the cellular phone, the car, the anti-depressant medication, the digital camera, the GM seed), something quite different to 'contextualisation' seems to be taking place. One way of putting this would to say that the imagining of technologies encounters what technologies really are, but this hardly seems to capture the anomalous collective investment flowing through these nodal points.

In some respects, the explanatory inadequacy of context was already recognised in canonical SCOT studies of innovation. Michel Callon questioned 'the claim that it is possible to distinguish during the process of innovation phases or activities that are distinctly technical or scientific from others that are guided by an economic or commercial logic' (Callon 1987, 83-4). But the relationality under consideration here, the

overflows that call new forth new identities, new resonances and collective couplings, goes beyond the linking together of heterogeneous inanimate and animate elements that has been so powerfully analysed in SCOT's actor-network theories. Would it be possible to investigate technologies from the standpoint of incompatibilities, non-translatable differences, different scales or orders of reality in relation? What kinds of epistemologies and ontologies would such a relational account require and how would they explain the processes through which certain technologies turn out to be excessive, overflowing their contexts and becoming pivotal within the Technological?

### ***Relationality understood as transduction***

SCOT countenanced two different senses of relation: a social relation to technology and technologies as social relations. There is a way of combining these two dimensions, as well as engaging with the anomalous excess relationality. Simondon's concept of transduction (as elaborated in (Simondon 1958; Simondon 1964; Simondon 1989) suggests one theoretical approach to this problem of thinking relationality in a dual register. For the purposes of the present argument, Simondon's project of developing an ontology of relationality can be treated, as (Stengers 1997, 97-99) does, as a theory which helps shake some habitual patterns of thought.

The problem of feeling provides an entry point to the theory, and is especially relevant in addressing the question of how the Technological figures as affectivity. According to Simondon, we feel emotion to the extent that an incompatibility exists between who we are as individuated beings (subjects, selves, as socially constructed identities within social groups or structures such as gender, class, ethnicity and race) and what we are as relational entities within a field of potentials that are not yet structured. (Feeling attests to the 'global excess of belonging-together' that Massumi referred to.) Although societies are structured by representations, systems of different scale (governments, markets, law, religion) and identities, social structure does not exhaust the potentials of collective life. It does not even exhaust the potentials of perceiving-acting subjects or actors present within the social field.

Transduction is a way of thinking about how individuation depends on not-yet structured potentials or a 'pre-individual reserve' (Combes 1999, 8-9). Transduction is a process of

individuation. It leads to individuated beings, such as things, gadgets, organisms, machines, self and society, which could be the object of knowledge. It is an ontogenetic operation which provisionally resolves incompatibilities between different orders or different zones of a domain. The most limpid analyses of transduction in Simondon's work focus on a physical ontogenesis: e.g. the growth of a crystal in a super-saturated solution (Simondon 1964, 31). This growth structures the crystal and changes the solution. Transduction, however, also extends to perception, feeling, acting, knowing and thinking as ontogenetic operations. Indeed, to accompany in thought ('to think') the individuation of a thing is to undergo individuation or ontogenesis. Like SCOT, perhaps more radically, transduction posits things as relations. Going further, it explains thinking about relations as a relational event in which the object and subject of knowing are co-individuated or co-constituted. In other words, transduction provides a way of uniting the different senses of relationality that SCOT bifurcated - the thing as relationality, and knowing relation to the thing. According to Simondon, we cannot know a process of individuation as object, only individuate ourselves in relation to that process; that is, enter into the individuation (Simondon 1964, 34). There is no preconstructed observer of transduction.

### ***From technologies to actions***

On the basis of *Du mode d'existence des objets techniques* (Simondon 1989), Simondon became known as a philosopher of technology. His work can be read (Dumouchel 1995) (Hottois 1993) as a humanist plea for an end to alienation between humans and machine, and the inauguration of a technological culture in which humans are no longer either masters or slaves of machines, but equals whose role is to regulate technological ensembles. However this humanist reading of Simondon's work on technology is in tension with his work on physical, psychic and collective individuation (Simondon 1964; Simondon 1989). For our purposes, the most important of these tensions concerns how in certain cases, collectives can come into being around technical activity. In other words, how does the Technological - an orientation to the political space of belonging-together- attach itself to particular technical practices?

For Simondon even the collective itself is not given. It results from processes of individuation. It differs from a society or even a culture. Social structures are not intrinsic to collectives. Collectives can overflow or blur the boundaries between social groups or

even between cultures. Whenever a collective comes into being, it is because an incompatibility has been resolved between existing structures and the field of potentials that individuated beings carry with (or between) them. What SCOT has occasionally called 'the collective' (Latour 1993; Callon, Barry et al. 2002), is the outcome of an event in which some element of the pre-individual reserve associated with individuated beings in a domain is singularly structured. In this event, both the individuated beings (subjects, objects, assemblages) and the collective itself become something different.

SCOT analysed the specific power of modern technology as a re-crystallisation of social relations. In this way, it was able to detach itself from frozen figures of the Technological as other to culture or as agent of cultural change. The notion of transduction suggests a different entry-point upstream of social construction. It backs away from the social as an explanatory substratum of technologies and technical practices. Viewed transductively, both societies and technologies are the provisional results of the quasi-physical individuation of a collective out of an unstructured milieu of potentials.

Particular technologies or particular technical practices become important in the constitution of collective or in these structuring events to the extent that they act as repositories of pre-individual potentials. Whether a technical practice is critical to the collective or not, a structuring event is profoundly affective. Individuals within the collective experience an incompatibility between who they are (as socially constructed entities) and the pre-individual reserve they carry as relationally constituted beings (Combes 1999, 53). In a crucial sense, a collective constitutes itself to the extent that social subjects experience themselves as 'more than individual'. There is an inextricably psychic correlate of the advent of any collective, but perhaps also a technical-practical one. In belonging-together (that is, the political), psychic life plays a constitutive role. Simondon's understanding of invention is transductive and affective. That is, affect or emotivity is a relational event occurring between an individual's relation to world and others and relation to self. To the extent that collective life has a psychic dimension, affectivity embodies the differences or disparities from which individuation derives. In basing an account of collective individuation on affect rather than cognition (conscious or unconscious), Simondon even goes so far as to say that 'there is [a] collective to the extent that an emotion structures itself' (Simondon 1989, 211).

What we can make of this affect-centred account of collective life in relation to technical innovation or invention? Relations to others, to machines or technical ensembles, and relation to self are knotted together in Simondon's account through processes of individuation, or through what Massumi calls 'anomalous excess of belonging-together.' Rather than social relations detouring or crystallising in machines or technical practices, the ensemble of others, self and machines envisaged by this account imbues an impersonal zone with potentials streaming into singular structuring events. It happens that in certain situations, these structuring events effervesce in ensembles of machines, technical objects and networks of technical practices. What we feel is significant, momentous or transformative flows from the collective individuation unfolding through those ensembles.

## ***Implications***

The methodological precept from Stengers' work was all events are singular. So too for Simondon, every individuation or transductive reality is singular, not general. Certain contemporary technologies signpost where specific pre-individual reserves lie. The biosocial dimensions of many technical practices (in relation to food, drugs, reproduction, security, forensics, diagnostic and therapeutic biomedical practices) indicate that living organisms have become one key zone of collective individuation (Agamben 2004, 1998; Rabinow 1999). The concentration of technologies around the composition, recording and circulation of sounds and images comprises another zone of particularly intensive structuration of collective life.

In what ways does this focus on individuation differ from SCOT's emphasis on things as mediated social relations? Epistemologically, it undercuts the epistemological configuration of sociological subject and technological object characteristic of much SCOT work. Because individuations are singular, no general *a priori* categories permit them to be known. Radicalising 'follow the actors', the concept of transduction implies that to know a technical invention or practice is to individuate or re-invent oneself. Rather than trying to establish conceptual relations between terms that are real, this re-invention is predicated on the reality of the true relation.

Ontologically, transduction insists on the reality of the relation, not on the substantial

reality of terms which can be put into logical relation. This bears strong implications for the SCOT project of understanding technologies as networks of actors in relation. Actors are neither the locus of technical invention nor the constituents of collectives for Simondon. On the contrary, only to the extent that individuals, things, or systems are not yet actors, only to the extent they embody unresolved contradictions, incompatibilities and tensions can they participate in invention and can collectives eventuate. Like some SCOT accounts, the transductive approach does not posit any essential difference between nonhuman and human. Unlike these accounts, however, it does not struggle with the problem of whether agency can be attributed to a thing such as a machine or a bacterium. What counts as acting or agency changes from case to case. Agency as socially constituted function is different to a reserve of not-yet-individuated potential. This reserve is not located in the agent or actor. It occupies an associated milieu, which may be interior but may well be exterior.

Ethico-politically, the tenor of SCOT projects to establish better relations with technology was that subjects (sociologists) in society should bring to light and distentangle the social relations that have been pushed through technologies. Some expectations regarding existing political institutions and their interests underlie these projects. Relying on notions of 'the social' and 'society,' SCOT usually carries out its analysis within a framework of Western liberal democratic norms. These norms prescribe notions of representation, agency and power that struggle to accommodate the Technological in its contemporary bio-info-entertainment-military complications. One general problem has been that the living-nonliving difference could not be easily figured within the conceptual matrix of actor-relation-thing. Today perhaps that difference figures too heavily in the Technological in the form of biotechnologies and biomedicine to be ignored. Here the concepts of transduction and the relational reality stressed by Simondon offer leverage. In his account of technology, Simondon emphasises that humans can become responsible for correlations between technical machines, objects and ensembles only as living beings (Combes 1999, 98). In terms of the philosophy of individuation, life entails particular kinds of transductive reality. Unlike processes of physical individuation (the growth of crystal), vegetal and animal life has topological and temporal complexities. All the topological complexity of living things, including their developmental and reproductive specificities, can be formulated temporally, as the capacity to retroact to some degree on the

circumstances within which life occurs. The key point might be that life slows down physical processes of individuation, it suspends resolution of differences, and retains an openness to further individuations. People slow down, divert or orchestrate the resonances, and rhythms running through networks of technical practice. The implication is that we should explore social-technological imbrications with an eye on the relations what is not yet individuated, rather than on social actors in control of, confronted with, or subject to technological objects. To act technologically is to locate those points in networks of relations from which resonance or amplification of action might take place.

## ***Conclusion***

After the social construction of technology, the Technological cannot be constructed critically, as an object of possible experience. Stengers' and Simondon's work diverge from each other in key respects. Different ontological commitments and methods channel their arguments in different directions. Both, however, feed into an event-based account of the Technological. They would perhaps agree that technology itself is ubiquitous since every human domain has a technical dimension. Both attend to ways in which technologies are differentiated, made accountable, and how authority to speak in their name is generated and conferred. But for neither is society the foundation of technologies or the Technological. More or less implicitly, for both the ground of technology is political. It lies in the problematizations of collective belonging-together. The Technological can structure itself in different ways according to a multiplicity of interpretations and through a proliferation of practices.

Problematizing the various means through which the Technological constitutes itself means following the effects of contingent processes across different contexts, and mapping the overflows or anomalous excesses which, from time to time, according to a constantly variable rhythm, bring specific technologies to prominence as sites of collective investment, as objects weighted with meaning and affect. To follow a contingent process is to see how it is prolonged, how it is re-invented and how it is subject to a multiplicity of interpretations across different locations. Methodologically, problematization resonates with George Marcus' description of multi-sited ethnography:

Multi-sited research is designed around chain, paths, threads, conjunctions or juxtapositions of locations in which the ethnographer establishes some form of literal,

physical presence, with an explicit, posited logic of association or connection among sites that in fact defines the argument of the ethnography (Marcus 1995, 105).

'Literal, physical presence' has not been emphasised here, but both Stengers and Simondon have strong accounts of how the researcher can be present to the object of research. Notably, both posit the relation between researcher and technology as a real not logical or epistemological relation. Knowledge claims form part of the location or site in question.

But to say this provides no new foundation for the study of technologies. As event, the Technological is problematic. It admits of different formulations, resolutions, and solutions.

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