Sociotechnical Environments

Actors, Technologies, Geographies and New Kinds of Action

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Abstract: This section draws from the opening plenary session of the 6th STS Italia Conference "Sociotechnical Environments" (Trento, 24-26 November 2016). The section was dedicated to the topic "Sociotechnical Environments: actors, technologies, geographies and new kinds of action". It is composed by three contributions which articulate different relationships among actors, technologies and sociotechnical environments. Felix Ekardt presents an analysis of the scope of technologies with reference to societal problems, analysing the case of climate change. The idea of sufficiency as leading human behaviour for a sustainable normality drives the author's analysis of the node technology-environments-action. The second contribution by Luigi Pellizzoni is an epistemological travel around possibilities and conditions of an alternative science. Drawing from philosophical and STS literature the author inquires the (not) surprising convergences between critical STS literature and neo-liberal approaches, pointing to the concepts of materiality and materialism, In the third piece of the section Christine Fassert focuses on the node of actors-technologies-geographies through the case of Fukushima contaminated territories. She presents technologies of zoning in their ambivalence towards residents' life and multifaceted consequences of scientific controversies in territorialised risks.

Keywords: Sociotechnical environments; climate change; alternative science; contaminated territories; STS Italia Conference.

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Is Another Science Possible? And Can STS Say Anything About It?

Luigi Pellizzoni

Is another science possible?

Naïve question, possibly. And yet, addressing the issue of sociotechnical environments, new kinds of action and key challenges for STS, I'll venture to say something on that.

Naïve question: science is what it is. If there is one thing that objectivist outlooks share with constructionist and co-productionist ones, it is the assumption that science has its own paths. Not that knowledge acquisition and technology development necessarily follow a predetermined trajectory. Rather, whether the chosen rationale is of ascertaining "givens" on which to intervene or eliciting a "response" from an agential materiality, the result of the process is just that one. As it takes place it rules out any other previous possibility, simultaneously opening a new space of possibilities which would have never been precisely the same if things went differently. Whatever the intricacies of the way research develops and technologies take shape – intricacies which STS has documented admirably – what happens, happens. This conveys a sense of necessity, no matter how much one tells oneself that inevitability appears only in retrospect.

There is another, more specific, reason why there is something compelling about the unfolding of science and technology, which SSK and co-productionist outlooks did not wash away but, if anything, strengthened by showing the embroilment of factors that characterize this unfolding. The reason is what Vicky Kirby depicts as "the extraordinary challenges and perceived success of so much scientific and technological research" (2008, 7). Aircrafts and rockets fly. Computers elaborate information with astonishing quickness. Drugs and surgery techniques become increasingly precise. The success of science and technology exerts an undeniable fascination. It expresses a solidity that overwhelms any fundamental "questioning". This constitutes a challenge for whoever aims to reflect on alternatives to the existent. Browsing STS literature, one realizes that technoscience's overall success, in spite of or even thanks to evidence of failures, is mostly taken as a starting point, very seldom as an object of inquiry.

What does it mean, then, "another" science? And, first of all, why should we think of, or search for, another science? Yes, we know that the case for the unquestionable benefits of innovation, a narrative that from the West has spread in the globalized world, can be and is contested. Yet, contestation usually addresses issues of research choices (such as the

10/90 problem)[3] or of distribution of burdens and advantages, losses and profits, costs and gains of science and technology. Complaints nowadays rarely address their fundamental rationale and attitude towards the world, as it happened with such thinkers as Weber, Adorno or the much maligned Heidegger, whose critical writings have often been regarded as expressions of anti-scientism and technophobia rather than calls for another science and another technology. Even Actor-network theory perspectives make no exception in this regard. Once we realize we have "never been modern" (Latour 1993) and that this mistake enabled an unbridled intermingling with materiality, the ensuing case for a greater intimacy with and concern for the nonhuman world does not necessarily entail any actual change in the basic attitude, opening rather the way to, or legitimizing, technological interventions ever more powerful and invasive precisely as they get more intimate and concerned with matter. The question, in other words, is not intimacy and concern as such, but the spirit of such intimacy and the ultimate goals of such concern. Admittedly, however, this question resonates in recent approaches to the government of science and technology, such as "responsible research and innovation" (or "anticipatory governance"), according to which social actors and innovators should be made "mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products" (von Schomberg 2013, 63); according to which, in other words, technology has to be inclusively shaped before technological "lock-in" sets in, having regard to both "how" and "why" issues. At least on paper, this sounds as good news, no matter if the basic aim underlying this framework is not redirecting science and technology but addressing people's "resistance" to innovation.

So, the theme of a different science can be not only inappropriate but also untimely. And yet, we find ourselves increasingly immersed in pervasive sociotechnical environments on which we depend for any aspect of our life. We are hit almost daily by worrisome announcements about climate change or energy and water scarcity. We are struck by claims concerning forthcoming technoscientific revolutions capable of fulfilling any possible need (clean energy, healthy food for everyone, personalized answers to diseases or "enhancement" desires, and so on), while dazed by opposed evidence of a decline in the rate of return on investments that the blossoming of ICTs and biotech, a massive reduction in wages and social expenditures, and the spiralling expansion of finance and debt have to some extent been able to conceal but not to reverse. We are confronted with equally dazing calls for "downshifting", "voluntary simplicity"

[3] The so-called "10/90 problem" concerns the fact that only 10% of health research worldwide is directed towards problems accounting for over 90% of the global burden of disease. In other words, the bulk of research is targeted to the health problems of affluent populations, instead of the more urgent ones of the poorest people in poor nations. On this issue see for example Woodhouse and Sarewitz (2007).

and "communal life", often proclaimed by people who travel around the world to diffuse the new gospel among admiring audiences that, in their turn, live in comfortably warm and well-equipped houses, at close distance from hospitals provided with high-tech facilities. We are confused by ag-biotech industry contentions that what they do is just what humans did for thousands of years, only more competently and precisely, or indeed what nature always did, additional confusion coming from champions of traditions who find nonetheless in genetic interventions a precious support for revamping forgotten plant varieties. We are disconcerted by expert claims of safety, reliability and trustworthiness when compared with (post-accident or side effects manifestation) statements from the same experts about how prediction is limited, scientific knowledge is progressive and hypothetical and the "costs of technology development" are worthy of shouldering – whoever has to shoulder them.

Fascinated and confused, attracted and worried or infuriated by this and much else, Walter Benjamin's image of modernity as an accelerating train on the verge of derailing comes to mind: "Marx said that revolutions are the locomotive of world history. But perhaps things are very different. It may be that revolutions are the act by which the human race travelling in the train applies the emergency brake" (2003, 402). It may even be that the image of a train running faster and faster is not the right one; that a more correct description of the technoscientific present is an engine running idle at growing speed and at constant risk of falling apart. Be that as it may, the question about the possibility of something else, a thoroughly different scientific and technical approach to the world, naïve or rhetoric that it may look, takes a sense of urgency which sounds also as a call to STS engagement.

To address such call, however, STS meets at least two difficulties. The first one has to do precisely with science's success. If science "works" (whatever the defects in its working), why not just trying to make it work "better" (addressing such defects)? And could another science work (better)? Coping with these questions raises a problem that Ian Hacking (2000) has effectively described. The notion of science's success, he notes, verges on tautology. Even the discovery of "fundamental constants of nature", like the velocity of light, is not immune from tautology. Any difference in observation, to count as a difference, is to be achieved within the same conceptual-experimental framework (same assumptions, equipment and tacit knowledge to use such equipment). Yet, if the framework is the same, no difference can emerge; or, if it emerges, it will likely be interpreted as a measurement error. Similarly, it makes little sense to say that an alternative science, to exist, should lead to as good results (for example in terms of yield of foodstuff) as the actual one. If this means that one has to pull off exactly the same specific material results of actual science, "then the alternative is not going to be an alternative" (Hacking 2000, S64).

The challenge, therefore, is to understand how an alternative science and technology can be first of all imagined. The problem bears similarity, but does not totally overlap, with an issue that Alfred Nordmann (2014) has raised in regard to the rationale of anticipation. There is an inherent contradiction, he remarks, in foresight exercises about technology. These seek to go beyond the depiction of "trivial" futures, that is, beyond a mere extrapolation from emergent trends, in order to grasp the possible shape of actual novelty: "black swans", "singularities" or at least "game changers" bound to make the world of tomorrow substantially different from the present. Yet, such "non-trivial" futures cannot be really anticipated, because a radically different world will be "inhabited not only by different technologies but inhabited by different people" (Nordmann 2014, 89). Here the problem is the gap between – borrowing from Niklas Luhmann (1976) – present-futures and future-presents, that is, between a future whose seeds can be discerned now and the future as it will actualize itself as a result of as yet indiscernible forces. The question of "non-triviality" of anticipation bears obvious relevance to the issue of an alternative science. The latter, however, has not just to do with the limits of discernibility and governability of change, but rather with whether and how a radically different path of, and approach to, change can be devised. Figuratively, we should conceive the gap as located not ahead of us but aside. The leap to be imagined is not forward but lateral.

The second difficulty in addressing the issue of alternative science concerns STS's conceptual equipment. Much research and technology development is still carried out according to a traditional objectivist framework, to analyse and criticise which STS has equipped itself, along the years, with increasingly effective instruments. The cutting-edge of STS outlooks can be considered the new materialist, or "ontological", approaches that, in different versions, have gained growing momentum in recent years (Woolgar and Lezaun 2013). Key to this strand is an account of materiality as agential and in constant flux and transformation, of subjectivity as "decentred" and equally "becoming", and of human agency as on a par with (or even lesser than) nonhuman one. This outlook is well synthesised by Annemarie Mol and John Law (2006, 19) when they claim that "knowing, the words of knowing, and texts do not describe a pre-existing world [but] are part of a practice of handling, intervening in, the world and thereby of enacting one of its versions – up to bringing it into being".

This standpoint works fine when the task is to challenge traditional approaches to science and technology, as grounded on binary thinking (nature/culture, mind/body, subject/object, organic/inorganic, animate–/inanimate, reality/representation, matter/information, etc.). What happens, however, with cutting-edge research which, from physics to life sciences, from biomedicine to cybernetics, increasingly adopts non-binary

thinking? Should one buy into such science just because of this[4], neglecting in particular that an account of reality as disordered, emergent, constantly changing is key to post-Fordist capitalism and neoliberal governmental approaches? What happens if Friedrich Hayek's plea for market competition as the only efficient mechanism of value allocation, faced with the complexity of the socio-material world, meets Crawford Holling's ecology of disorder, with its celebration of instability and resilience as the only antidote to sclerosis and decline (Walker and Cooper 2011)? And if, whatever the researchers' intentions, science's increasing focus on the extremes rather than the norm meets capitalism's growing demand for flexibility and speed of change (Cooper 2008)? What happens if one finds that hardly distinguishable celebrations of technological transformations of an insubstantial humanity in the context of a dynamic, ever-changing, self-organizing materiality underpin both radical critiques of capitalism such as Rosi Braidotti's (2013) case for the post-human, and resolute restatements of the necessity of capitalism, as Roco and Bainbridge's (2002) case for technology convergence? What happens if the Anthropocene is increasingly taken, rather than a call to a profound change in our approach to the world, as a justification for "post-environmentalist" agendas aimed at an accelerated decoupling of social systems from biophysical systems (Asafu-Adjaye et al. 2015), the ultimate goal of which is "doing without nature", and if non-dualist ontologies underpin "post-natural" accounts of sustainability (Arias-Maldonado 2013) where human exceptionalism re-emerges in terms of agency over an indefinitely pliable materiality?

The convergence of cutting-edge STS with cutting-edge capitalist narratives and neoliberal regulations can be read in different ways. One, inspired to the idea of a "counter-revolutionary" use of notions and claims born with opposite intentions (Virno 1996; Boltanski and Chiapello 2005), maintains that theories of disequilibrium and adaptation have offered since the 1970s a framework for redirecting socio-ecological instability towards a new regime of accumulation (Walker and Cooper 2011; Nelson 2014). From this perspective, current ontologies of becoming are functional to legitimizing (even inspiring, perhaps) the most recent phase of capitalism, as this thrives ever more on unpredictability, turbulence and flux. Another reading, less unidirectional because drawing from Foucault's idea of "problematization"[5], acknowledges that a deep, broad so-

[4] New materialisms, actually, often build on new technoscientific outlooks on matter and agency, while these often find inspiration in philosophical and social science accounts of reality and (post-)humanity, in a game of cross-influences on which I have elaborated elsewhere (Pellizzoni 2014).

[5] By "problematization" Foucault (e.g. 2001) means a way of conceiving and circumscribing the range of what can be regarded as a problem or a possible answer to such problem that characterizes a historical period, being shared by even opposite epistemic, ethic and political perspectives.

cio-cultural change has begun in the 1970s undergoing a crucial intensification in recent years, but that such process has involved in a tangle of reciprocal influences all social spheres: scientific and economic, political and technological, philosophical and artistic (Pellizzoni 2015).

Whatever the interpretation, the convergence between critical outlooks on, and dominant approaches to, the government of science and technology represents a problem for the endeavour we are discussing, to the extent that it leads cutting-edge STS to linger on criticizing technoscientific conceptions and practices of lessening relevance while adhering too much to emergent ones to be ready to acknowledge that what is assumed to (and could earlier) work as transformative in an emancipatory sense is now often made subservient to exploitative designs.

Does this leave STS helpless faced with the compelling "facticity" of current science and technology? I would not say so. STS has on its side at least three important features that can work as antidotes to the overwhelming power of such facticity: self-reflexivity, theoretical and methodological pluralism, and a capacity to build bridges between the natural sciences and the social sciences and humanities. Indeed, the point is not disavowing any of STS's conceptual equipment and research orientations, but taking care to avoid reproducing what Foucault calls the "analytics of truth", that is the aspiration, profoundly inbuilt in the Western tradition, to get closer and closer to the actual nature of things, to reality "as it is" (no matter, in this sense, if conceived as substantial and stable or differential and endlessly becoming). As I have argued elsewhere (Pellizzoni 2015), it is crucial that – borrowing from Adorno – the non-identity between things and concepts, reality and our apprehension of the world, is always acknowledged and respected.

This basic orientation, I think, is premised on addressing the question of an alternative science. Habermas (1983) once claimed, criticizing Adorno, that "for the sake of removing socially unnecessary repression we cannot do without the exploitation of external nature necessary for life. The concept of a categorically different science and technology is as empty as the idea of reconciliation [with nature] is groundless" (Habermas 1983, 108). In this perspective the exploitation of nature constitutes a universal, culturally invariant imperative for social reproduction. As hinted, the overcoming of dualist thinking does not rule out but rather discloses the possibility of an intensified exploitation. Opposed to this stands Adorno's case (but the same could be said for Heidegger and other supposed technophobes), which is not for a farewell to reason and enlightenment, but for the possibility of a different reason and a different enlightenment – hence, first of all, a different science. D. Bruce Martin, quoting Evelyn Fox Keller (1985), finds an example of this different science in the work of geneticist Barbara McClintock, as based on a respect for difference that impinges upon methodology, concepts and theory development, whereby "the unique or exceptional is not seen simply as an example that proves or disproves a general law, but as an opportunity to

make those exceptions or differences meaningful 'in and of themselves'" (Martin 2006, 148). However, we have to add, a different science entails not only different theories, concepts and methods, but also, and first of all, different goals and criteria of success – capable of avoiding that the usual rationale is reproduced in disguised forms[6].

How to conceive of these different goals and criteria, building on the available array of conceptual and methodological resources? This, to me, is a (perhaps the) core challenge for STS.

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Living in/with Contaminated Territories: an STS Perspective

Christine Fassert

Territorialisation of a *Risk Society*

The "Risk society" described by Ulrich Beck (1986) now 30 years ago has become, for a part of humanity, an enduring and daily experience, which invades all parts of our daily life. Beck referred mainly to the extension of risks that do not stop at national borders, but I refer here to a more territorialised aspect of risks, i.e. to the development and "management" of contaminated territories. The causes of contamination may vary. They may be the result of poor management of industrial waste, as it is the case, for example, in the Marseille region in France. They may also be the consequence of accidents. A series of industrial disasters has led to

[6] This risk includes non-modern accounts of the embroilment of humans and materiality, if these are regarded as the solution to the problem. Think, for example, of indigenous American outlooks on the gathering together of the human and the non-human, the material and the spiritual. These are the addressees of many hopes as they are seen to underpin new "ontological struggles" against dams, oil drills, mining, deforestation, genetically modified crops – ontological in that they denaturalize Western binaries in favour of perspectives holding that "all beings exist always in relation and never as 'objects' or individuals" (Escobar 2010, 39). One should consider, however, that these "indigenous ontologies" are recent, indeed ongoing, elaborations of traditional cultures (Gudynas 2011), influenced by modern frameworks and understandings. Their "otherness" is therefore spurious: one might just find in them a distorted mirror of Western modernity.