The Two Cultures Become Multiple? Sciences, Humanities and Everyday Experimentation

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This discussion rose from a quick exchange at the 'Two Cultures' conference at the University of New South Wales in 2006. Sciences-humanities relations were the issue. What remained of the 'two cultures' divide, if anything? How were the humanities and social sciences responding to the "hard" sciences? How possible at this moment was it to work across the two cultures? In the concluding discussion, Andrew made an off the cuff remark that "we are all scientists now". Someone else suggested we could all go into the laboratories. Adrian was not so sure, and thought that now, more than ever, we needed to pay close attention to the specificities of the different kinds of thinking and activity involved in science, and in the humanities, and even perhaps social science's engagement with the "other" sciences. What follows is an attempt to work through these problems - if only briefly, and if only to raise more questions. It turns out that we were probably talking about quite different things, which, although not exactly in agreement, are quite complementary. Adrian discusses the contemporary circumstances of the engagement between the two cultures - which in sum he sees at last beginning, but only beginning, to become an actual engagement, rather than a critique, or perhaps worse, badly posed poaching of terms and concepts from science. Andrew responds to this by suggesting that everyday life perhaps has been much more engaged with science for much longer than the academic world of the humanities. Both of us found the work of Isabelle Stengers useful in thinking these questions through.

Adrian: Sciences-humanities relations as sfields of experimental activity

What does engagement with sciences practically mean for humanities and social science-based research? Paul Rabinow sums up the present situation in relation to the life sciences: '[t]he relationship of those authorized to produce
truths [scientists] about living beings and those authorized to judge [humanities scholars?] the modes of production and dissemination of those truths and their related practices is one of either blithe reciprocal ignorance or truce-like state of enforced mutual toleration, or sporadic antagonism’ (Rabinow 2003, 115). Is this right? Of course, it leaves out certain things, not least of all Rabinow's own work, which neither ignores, neutrally tolerates or attacks science. It elides too the powerful steering force that biomedical and biotechnological industries exert as they move ahead of sciences, preceding and leading them in various ways that scientists do not always want or like (again, something Rabinow is aware of). Most of all, however, Rabinow's statement refers to an older position that increasingly seems untenable. It refers to arms-length relations between humanities/social sciences and the sciences. It covers only the first of three different stances towards Science and the sciences that thread through contemporary humanities/social sciences scholarship: critique, extraction and engagement.

Each stance sets up a different transmission path between scientific and non-scientific thought. Critique, extraction and engagement uneasily co-exist in humanities work. Under critique, we could lump the bulk of the older school critical theory critique of scientific rationality (Adorno and Horkheimer, 1999, Habermas, 1970, but also Agamben 2004, much analytic philosophy of science Popper, 1972 Feyerabend, 1981 etc, or analytically-influenced history of science (Kuhn, 1996 etc). Critical theory took on high-profile scientific disciplines such as physics, chemistry and biology (Merchant 1989). In addition, much of the social constructionist work on the making of scientific knowledges and objects of science still falls under critique. Here, case studies, laboratory ethnographies and histories of particular sciences or scientific theories abound (e.g. Latour 1988; Shapin and Schaffer 1989; Traweek 1992; Pickering 1995). Both critical theory and the social constructionist canons challenge the authority of the sciences as true knowledge. They reveal something about the conditions of knowing, and particularly about the socially stabilized fabric of science. Scientific knowledges conceal a higher or deeper truth of science (society, power, the West, the Same). After the so-called 'Science Wars' of the late 1990s, the process of generating critical understandings of science did not have a clear way forward. The terms of critique and the critical stance towards science as power seem familiar and well-understood.

Beginning with twentieth century philosophy of science (Whitehead, Cavaillé, Bachelard, Canguilhem, Serres, Foucault, Deleuze), extraction develops different relations with science. Currently epitomised in Deleuzean-influenced work, it lifts scientific concepts from the sediment of actual sciences and moves them into philosophical or theoretical
registers (Delanda 2002). This approach tends to favour more calculative and computational sciences such as mathematics, physics or even certain strands of biology, rather than the field sciences (such as ecology, climatology, or epidemiology). The latter, unfortunately, demonstrate increasingly messy forms of participation in the social (policy, regulation, activism), thereby reducing the purity of what can be extracted from them (for instance, in the form of ontologies or epistemologies). A good example of extraction might be Alain Badiou’s recourse to mathematical set theory in order to think the multiple with unity (Badiou, Brassier and Toscano 2004). This specialised mode of relation to the sciences animates much recent theory-building activity (Braidotti 2002). It erases or undercuts any radical separation between the sciences and other ways of knowing by moving concepts between them, although almost always in one direction – from science to theory. Extraction, although it has some representatives in literary or historical work, is predominantly a theoretical enterprise. It looks for resources in the sciences, ways of thinking or concepts that can refresh critical thought. The politics of extraction-based theory are more complicated. On the one hand, scientific concepts and figures such as ‘multiplicity’ (Deleuze), ‘undecidability’ (Derrida) or ‘norm’ (Canguilhem) have been incredibly influential in cultural or social theory. On the other hand, the specificity of scientific knowledges, institutions, practices and apparatuses, and the intimate coupling of sciences and technologies, have to be cast off in the interests of theorisation. Extraction takes certain risks in its handling of scientific materials. It must, since all extractive processes leave tailings, separate what is conceptual in a science from what is a-conceptual. An ontological dualism between science as thinking and science as extended practice can reassert itself at a methodological level. Furthermore, extraction encounters great obstacles when confronted with sciences that have not yet stabilized into paradigms or theories, in other words, with ‘sciences in the making’ (Latour 1987).

By contrast, ‘I am heartened,’ Donna Haraway writes, ‘by recent ideas in ecological developmental biology’ (Haraway 2003). This is an interestingly specific affirmation of a science. Engagement, finally, encompasses whole sectors of contemporary social scientific activity. Although it inherits the results of critique and extraction, engagement tends to shy away from both. It deflects critique or extraction towards conversation, dialogue, or collaboration (Rabinow, Stengers, Latour, Haraway, and Rapp). It has developed most intensely around ethnographic work on life and health sciences in domains of reproduction, disease and illness (e.g.Rheinberger 1997). It engages with sciences-in-the making and it has had to formulate questions about how to live in or with science collectively. Isabelle Stengers’ work, especially in her Cosmopolitiques series, lays some of the philosophical groundwork for this shift:
According to the thesis that runs through this book, we 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 (technē). 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 (Stengers 2000, 163)

Stengers’ thesis has several virtues. It is lightly reliant on grand theories of history, time, modernity or subjectivity, it is highly nuanced in its engagements with actual sciences, and it is politically energised by a commitment to different futures with and in science. At the core of her long-standing engagement with the specificities of physical, earth and biological sciences stands an event-based understanding of collective life as an integration of praxis and techne.

**Andrew: We are all called to Science**

While agreeing with Adrian as concerns the humanities, I wanted to suggest that the academy perhaps lags behind everyday life when it comes to engaging science.

It will surprise no one to say that the complex ecologies of practice (Stengers, 2002:262) involved in science have intensified during recent times, and that this has changed everyday life. This has led us, as humanities academics, or just as those living in these times, to be confronted by science as never before - and perhaps to understand science differently as well. As Isabelle Stengers has noted throughout her recent work (2000), it is now possible to understand that the complex ecologies involved in science are not only those of hypothesis, modelling, experiment, certain modes of logic and so on but ecologies of affects, institutions, politics and, crucially, exchanges within everyday life. Moreover, science is not "Science" but a diverse series of ecologies of practice. While acknowledging both Adrian and Stengers’ care for the specificity of these ecologies, I want to point to the new ecologies developing within the diverse engagements of everyday life with science. In short, it seems that as science's ecologies of practice have increasingly
moved into general culture, we all now feel "called to science", or at least feel we must make some kind of response to the call of science, as much as to "culture" or even "faith". Indeed, the three are increasingly confused with each other. For example, although seen quite rightly as fundamentalist faith's attack on science, Intelligent Design can also be seen as the result of an acknowledgment by fundamentalists, however reluctant or even cynical, that they too need to respond to the call to science (or at least appear to respond).

Here I will briefly address this call to science as found in an everyday life thoroughly permeated by science practices. I will suggest in passing that this is a two way street, that science is also called to everyday life, not only in terms of the "impact" of science on culture, but in terms of changes to science itself. I will briefly assert that in many ways, the humanities and even "social sciences" (a term rich in problems in itself) in some ways lag behind everyday life in the complexity of their engagement with science. Finally, as an aside, I will use words such as "science" and the "humanities", "culture" and "everyday life" as a kind of shorthand. I hope it will become obvious that these are all just covering terms for what are much more specific and diverse micro-ecologies of practice - many of these not really described with any accuracy by any of these terms. This is in many ways my point, one which suggests that "non-science" engagements with science might be more than a recreational flirting with exotic concepts.

Adrian: *Is humanities work on the sciences basically confined to ‘reading up’?*

It might be important to acknowledge the practical possibility of engagements accessible to humanities researchers. Unlike artists, humanities researchers seldom engage directly with scientists. In reality, most humanities engagement with sciences is not in laboratories, or in conferences, but textual. We read popular science books written by scientists or science journalists (e.g. (Buchanan 2000), magazines and periodicals, (*New Scientist, Scientific American, The Economist, sometimes Nature or Science*)), see television and film news and documentaries, hear radio interviews or podcasts, and browse websites such as BBC or ScienceNews. (Occasionally, almost exceptionally, we read primary scientific literature, but that is messy.) In these media, the figure of the scientist often occupies a specific position. The scientists either write directly (e.g. Hawking, Penrose, Feynman, Watson and Crick, Jacob, etc) or a journalist conveys the voice of the scientist speaking as expert to non-scientists.
How, then, to read such works? They pose a reading problem for non-scientists interested in engagement. The problem is that by virtue of their mere existence, these works set science apart, as something different, yet as something whose significance is grasped by scientists. Stengers writes:

> The 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)

A protocol for engagement with scientists, Stengers suggests, would be open to the singular differences of the sciences. However, much of the science media is devoted principally to propagating significations of that difference. To take a single example, the best-selling popular science book, *Mind Wide Open: Why You are What You Think* (Johnson 2004), counsels a turn to ‘recreational neuroscience’ as a path to self-understanding. The book offers one version of what an engagement with science might mean:

> Knowing something about the brain’s mechanics - and particularly your brain’s mechanics - widens your self-awareness as powerfully as any therapy or meditation or drug. Brain science has become an avenue for introspection, a way of bridging the physiological reality of your brain with the mental life you already inhabit. (Johnson 2004, 17)

The difficulty in ‘brain science becoming an avenue for introspection’ is that an fMRI of Johnson writing something (170) is a different way of knowing self than the modes of self-awareness cultivated in Tibetan Buddhism or psychotherapy. Stenger’s injunction to carefully sort out singular difference from privileged knowledge of signification, however, would need to be applied at several points in the passage. Each of the two sentences oscillates between singular differences (contemporary brain science - itself a dynamic field, or knowledge of ‘your brain’s mechanics’) and
signification of socially stabilized norms (powerful self-awareness, introspection). The question is, from Stengers’ perspective: who is saying this? Is this a claim of the scientists, signifying their own singularity? Does the ‘bridging’ that Johnson promises reinforce an already ‘privileged knowledge’ of what that singularity signifies.

**Andrew: Complicating the contamination of ecologies of practice**

Adrian has argued for the specificity of science ecologies and practices, and for the existing distinction of science from the humanities and social sciences, even as there is increasing engagement between them. However, in alluding to the problems of the signification of science he has perhaps suggested that things are more complex in everyday life. He has also pointed to the need, within the humanities and social sciences, for more than critique and extraction in relation to science, arguing for the engagement between distinct academic areas - and distinct ecologies of practice. He is right to do so, but I want to complement the questions he raises by raising questions about different specificities - those found in the broad series of micro-ecologies coming into existence between science and the everyday (rather than the humanities and social sciences as academic disciplines). I will start with a brief example drawn from a novel written by Richard Powers, one of the contemporary novelists most engaged with science. This book thinks through many of the issues Adrian discusses above, at the same time considering them in a very everyday context.

In Powers’ novel, *The Echo Maker* (2006), a young mid-west American, seeing what he thinks is a visionary figure on the road, rolls his truck and ends up with brain damage. He develops Capgras syndrome. This involves the delusion that those close to him, in this case his sister and even his faithful dog, are in fact imposters, even though they look exactly like themselves. Desperate, the sister calls a well-known neuroscientist from New York, who is also a very successful popular science writer. He comes to visit what is in fact the rough area in which the neuroscientist himself grew up, at first for selfish reasons - this seems like the basis for a new book. So in some ways the fact that the book - best termed a drama of neuroscience in everyday life - could be written is in itself interesting. The story is made the more complex by the setting. Human thinking processes are compared with those of migrating cranes, who use this particular town as a staging post in their migration each year. This yearly crane migration through the town is threatened by the competition for increasingly scarce land and water resources. An environmentalist - who enters into a relationship with the crash victim’s sister - tries to defend both the cranes and the crash victim (it is he, for example,
who researches the drugs the neurologists propose to give the brother). A number of ecologies of practice come together - science, everyday life, popular science, fame and publishing, mid-west obscurity, family, environmentalism, property development and the economy of a small town, the crane - in the context of a small town environment in which none of these can avoid each other.

In the face of the strange and rare condition of Capgras, one which is literally a matter of discriminating between the actual and the pseudo, between "fact" and "fiction", all those involved are, with some urgency, called to science. I do not mean that they are called only to science - the case is quite the opposite. They are called precisely to work the gaps between science and the everyday - and the question of an engagement is an urgent one, far beyond the reflex actions of critique and extraction (which are as present in everyday life as in the humanities). The sister is called to science to deal with her brother's belief that she is an imposter, and to help her brother (she reads everything she can about the condition, popular science and eventually some "real" science papers, and she also, with the neuroscientist, performs a series of "experiments" to try and explore or treat her brother's condition). The crash victim himself is called to science when he cannot even remember what happened, let alone decide on whether to go with the drugs and other treatments he is offered. As his condition worsens, he too begins to experiment and at the same time to think he is part of something like an experiment. He hypothesises that there is a vast conspiracy directed towards him, which of course there is, though not exactly as he imagines it. The environmentalist, trying to save his beloved cranes, also helps the sister. They take up forensics at the crash scene to try and determine what happened.

This call to science, as it bleeds into everyday life, also works the other way. The pure nature of science is doubted - its ability to be quarantined in the midst of the complications of everyday life (in the case of the brother) or ecological and political contexts (in the case of the cranes). The famous popular science writer/neuroscientist experiences a crisis of faith in his position as neutral observer, wondering exactly how much his research or writing could ever really be separated from the impact they have on the lives of those whose odd neurological conditions have made him famous. In all this the novel in many ways reflects contemporary neuroscience's challenges not only to fundamental everyday concepts and practices, but, via its intervention in everyday life, and the feedback of everyday life into the science, to the brain sciences themselves (including not only neuroscience, but cognitive science). It is perhaps no surprise that there are so many writers of popular science who deal in the new research into the brain. Or that this science risks approaching everyday areas such as violence, happiness or meditative states. As Deleuze and Guattari put it, precisely
when discussing the brain, it seems that 'science would relinquish all the rational unity to which it aspires for a little piece of chaos that it could explore' (1994:206).

Of course, although the novel suggests that to some extent we are all suffering various forms of delusion, not all of us suffer from Capgras. However, even to make sense, *The Echo Maker* depends on the reader's familiarity with a more widespread "suffering" produced by the call to science within everyday life. This has many aspects, which I shall all too briefly list below. One of these is undoubtedly that which Adrian points to above: the interpretation, assessment and engagement with scientific data - such as that coming from neuroscience - in relation to our own life. This has become so prevalent that the cover of a recent issue of *Time* magazine (January 29, 2007), always a good guide to popular culture, promises to provide us with "The Brain: A User's Guide". There are many other examples. In Adrian's reading of Stengers' there is undoubtedly a troubling "mobilization" science that is very often involved.

**Adrian: Should humanities mobilize science?**

The difficulty, the 'decisive point' Stengers calls it, is to differentiate singularity and signification. (Not coincidentally, versions of this difficulty have abounded around the politics of difference.) The difficulty is exacerbated by *mobilizations* of science that seek to give greater impetus to signification:

Mobilized scientists will be happy and proud to see themselves called on as experts by a power that recognises them as the sole legitimate representatives of a problem. (Stengers 2000, 129)

One does not have to go far in science-related media to find mobilized scientists (e.g. the famous neuroscientist in *Echomaker*). They come from the high-profile disciplines such as physics, brain science, biology and genomic sciences. In the wake of the obstacles and disruptions encountered by various scientific and technological projects (the Supercollider in the US, GM crops in the UK and Europe), vocally mobilized scientists have come forward. Only in certain specific problem domains does their representative authority come into question.
The mobilization of science has many dimensions, and draws on many different forces. Broadly speaking, the mobilization of science entails ways of making science homogeneously available and accessible (116). Some of these ways are well-known. Much has been written about the scaling-up of scientific enterprises to a global scale, and the appearance of new hybrid public-commercial actors in science (scientist-entrepreneurs such as Craig Ventner) who combine scientific projects with industrial enterprise.

It is less commonly recognised how mobilization begins to affect the very fabric of certain sciences. The epitome of a science made to be mobilized, a science in which mobilization has threaded into the very weave of practice might be ‘complexity science.’ Few scientific projects of the last decades can have generated as much lateral theoretical expansion as complexity science. The popular literature, media and artefacts of complexity is massive (Prigogine and Stengers 1983; Prigogine and Stengers 1984; Kauffman 1995; Cilliers 1998; Wolfram 2002; Gribbin 2004). The models, figures, and techniques of complexity have propagated rapidly into other sciences, natural and social. Attractors, bifurcations, tipping points, non-linearity, sensitivity to initial conditions, self-organization, autocatalysis, and above all emergence have re-energised certain stagnant pools of basic science. Interestingly, the movement of the techniques (primarily simulation-based) and figures of complexity outside natural sciences have been almost as visible, even leading to new hybrid knowledge-projects such as ‘social physics’ (Barabási 2002). The techniques of complexity have authorised physicists and biologists to write extensively on economics, media, communication, and human social behaviour (Kauffman 1995). They heavily draw on certain strands of the critique of science discussed above to differentiate complexity science, and to legitimate its expansion. For instance, a critique of Cartesian mechanistic determinism often serves as an introduction to non-linear dynamics.

All of this, if it is symptomatic, really complicates the engagement for the humanities. After science and scientists leave the laboratories, and the walls of the laboratories start moving, on what ground does the engagement occur? Where and with whom do we engage when the scientist has mobilized herself and her knowledge-practice to this extent?
**Andrew: What does it mean to be "called to science"?**

Let me expand just a little on what I mean by being "called to science" in everyday life?

First, I do mean that we are, in Adrian's terms, when discussing the humanities, increasingly called to critique science. However, in everyday life there is an urgency with which we are also called simply to evaluate "science" - to make, if you like, judgments that are not only directed against "science" but are just as often at least pseudo-scientific in that we are called to evaluate "data". The line between pseudo and "real" science here is often clear, but it is just as often - perhaps increasingly - thin or blurred. In addition, we are often - and often knowingly - part of an ongoing experiment producing the data. The most obvious example is global warming, but other examples might be various diets, other factors in nutrition and health, mobile phone use and the brain - that's before you get to our participation in vast psychological, economic or social experiments.

Second, in Adrian's terms, the call to science also involves an extraction of terms and processes from science within everyday life. This is probably the most troublesome area in some ways. As Adrian points out with regard to the humanities, so it is that in everyday life the adaptation of terms from science, along with often undigested theories deployed outside their particular scientific contexts, can produce strange results. Examples might be the fallout of cultural engagement with "false memory syndrome", the proliferation of badly used psychological models and statistics (often encouraged by "scientists" it has to be said) in education and performance management, or the series of technical metaphors that are mobilized within self-development and relationships. However, as everyday life becomes arguably more sophisticated in its engagement at least with some scientific ecologies of practice, not all the results are negative, and this changes science. We might not even feel like arguing too much with the emerging "science of happiness" as it comes into everyday life (if it actually does increase the quotient of happiness). Although undoubtedly its "signification" is problematic, and I personally am not interested in the Cognitive Behavioural Therapy model it adopts as much as challenges, the science of happiness is interesting in the terms of this discussion in that it proposes a much more positive (as much perhaps in Foucault's terms as anything) role for science within everyday life and vice versa. As Seligman and Csikszentmihalyi write -

... psychologists have scant knowledge of what makes life worth living. They have come to understand quite a bit
about how people survive and endure under conditions of adversity... However, psychologists know very little about how normal people flourish under more benign conditions. (2000:5)

In short, it is no longer only, for science, a question of the remote, the pathological, the odd, the decontextualised, that which is precisely not "everyday". It is rather a question of "benign" conditions, which we can also read as "everyday" conditions.

Thirdly, the call to science is also engagement within science at the level of everyday life (a more intense engagement perhaps than that lamented by Adrian within the humanities and social sciences). We constantly (often very willingly) make ourselves both scientists and objects for the sciences - physical and social - at the level of population (Foucault, Agamben, Virno) and increasingly as individuals. This engagement occurs within a biopolitical context that outside the academy has indeed become as much a matter of urgent engagement as critique (Rose, 2006). Think here of the sciences of reproduction for one thing (for example see Waldby and Mitchell, 2006 on "tissue economies"). Science is now deeply immersed in everyday life, not only via the institutions which fund it, or industry, but in the way that this engagement is also a matter of contamination, of the fragmentation of both scientific and everyday ecologies as these form their own weird hybrid mutations. This is a matter of new modes, in everyday life, of hypothesis, experiment and theories perhaps (the Big Brother television "experiments" and the mediated engagement surrounding them, as social experiments), but also of new forms of contamination of processes (a more traditionally scientific example here is perhaps that of meditation and brainscans, in which meditation arguably causes science to rethink the brain, and changes scientists, as much as becoming just more fodder for neuroscience. Another obvious example is the widespread use of pharmaceuticals such as anti-depressants directed at the brain, with most of these new drugs seeming to be only dimly understood, even by science). This mutual contamination leads to new forms of communication, ecological mutations (see Harries-Jones [1995] here on the centrality of both ecology and communication to Gregory Bateson's thoughts on these issues). Despite these mutations and contaminations, there is undoubtedly still, in Isabelle Stengers' terms, as described by Adrian, a "mobilization" of science. However, the ecological contaminations between science and everyday life also provide "lines of flight" out of these mobilizations, "counter-mobilizations", even perhaps simple demands upon the mobilizations performed by scientists ("ethics" committees and so on, to take one example, or the media performance often demanded of science researchers by funding bodies, to take another, or, finally, the everyday demand that things simply work, that they allow one to live a
better life).

One mechanism for this ecological contamination, or for counter-mobilizations and lines of flight, might be *models*. Models are particularly important as an ecological catalyst wherever science is found (thus the argument over the models surrounding global warming, for example over Michael Mann et al's famously contested "hockey stick", in which science and politics were very deeply engaged). As Mary Morgan and Margaret Morrison (1999:10) have pointed out, traditional science models mediate between theories and experiments, axioms, logical forms and their specific semantics, while remaining at least somewhat autonomous of all of these. This autonomy allows models to act as 'mediators' (8) between theories and experiments, different logics and so on. In short, models allow communication between different domains or practices. For Morgan and Morrison this also makes models 'instruments' - 'there is a significant connection between the autonomy of models and their ability to function as instruments' (10). I would suggest that models also allow other forms of communication or mediation - in many cases between theory, data and everyday life. The case of global warming and the debates about models, theories, data and so on not only provide an example of the mediation by models, but of the way in which this mediation educates everyday life into science, and vice versa. Al Gore's *An Inconvenient Truth* (2006) provides a startling series of mobilizations, counter-mobilizations and even perhaps lines of flight in this respect.

In sum, if the call to science emerges out of an enhanced engagement between science and everyday life, this is more than an engagement between discrete ecologies. It involves ecological contamination and mutation. It gives rise to new and divergent ecologies (even at the level of the individual) of experiment, data collection, work with this data, statistical evaluation, the development of new procedures, modelling, theorisation, new testing, axioms, new forms of logic with their own semantics. This is what I mean when I suggest that we live in a time when we are all called to become scientists. I think that today - despite the highly specialised nature of much of science, which seems to forbid the participation of ordinary people in their ordinary life - there are many occasions upon which we are nevertheless all called to become scientists. Not necessarily good scientists, although we may be. Not necessarily according to good scientific principles, although who knows what these might be become when science is practiced both en masse, and with such diversity and ambiguity (science itself is full of bad ecologies [Guattari, 2000:27]). And I am not saying that we are all now nuclear physicists. Nevertheless, we all think through modes of thought and practice derived from particular sciences, at least some of the time, even if often in combination with other modes of thought and practice.
We do so for better or worse, and often literally with the result that we become richer or poorer. In short, there are now a complex series of ecologies of practice running between science and everyday life. To perhaps extend Adrian's points from above, it is also in these new ecologies of practice that we need to think through the relations between singularity and signification, whether these new engagements will give rise to more interesting forms of living, or whether they will be subjected to the overdetermination of Science (capital "S"), state or corporations. Thinking through this relation between singularity and signification is indeed urgent if, in Isabelle Stengers' terms, the practices of everyday life are increasingly invaded by science's mobilizations.

It is true that such questions attain a kind of clarity in the aesthetic engagement with science. By this I mean not only in art, although as Adrian points out below, art can be interestingly experimental in its engagement with science. There is also a kind of aesthetic experimentation given to everyday life by science. By aesthetic here I mean the modes of living reflecting the rearrangement of our senses and perceptions, or the way things affect each other, at a basic level - the responsiveness, as Gregory Bateson puts it “to the pattern which connects” (1980: 8).

**Adrian: Is contemporary art the precursor for humanities/social sciences?**

Contemporary art thrives on engagement with science and technology. A quick glance through the catalogues of major art events such as *Ars Electronica* or through listings of recently funded projects of arts councils and arts funders in Europe, Australia or North America shows the prominence of art-science collaborations. Recent issues of art-technology-science periodicals such as *Leonardo* contain frequent reports of art-science collaborations.

Many art-science projects occur in the life sciences. The development of *bioart* as a distinct sub-field of contemporary art, with its own curators and showings, attests to the status of this work (Kac 2007). The willingness of life scientists to work with artists contrasts with the caution and reserve they often display towards social scientists. Does the recent intensification of art-life sciences collaborations suggest anything in relation to the ‘decisive point’ (how to singularize science without privileging the scientific viewpoint) we have been addressing? Are they new forms of mobilization of science? On the one hand, art has been doing many of the same things with science that humanities and social sciences have been doing. Artworks critique and promote awareness of sciences, extract materials, techniques or concepts, and engage with different sciences. On the other hand, the willingness of artists to work with the very
apparatus, techniques and materials of scientists, to enter into experimental situations, can be seen as going further in singularizing the differences of science than the humanities does or can. Apart from the laboratory case studies done in the social studies of science, non-scientist researchers hardly ever go into laboratories. Even bioethicists rarely go beyond the meeting room in the clinic. By contrast, much bioart bases itself on tissue culture techniques, and occasionally on standard techniques of molecular biology such as PCR. For instance, Brandon Ballengee’s attempt to breed an extinct frog back into existence in the work ‘Species Reclamation’ (Ballengee 2000) borrows field survey techniques from field sciences and breeding techniques from biological sciences. This kind of work means going into laboratories, sometimes for extended periods.

Does this resort to laboratory practices mean that artworks experiment in the same way as science does? According to Stengers’ account, science invents ‘a new practice of measuring things by humans, centred on differentiating between “fact” and “fiction”’ (Stengers 2000, 163). This differentiating practice stages experimental events. In relation to life sciences, every experiment takes a risk. It needs to ask a relevant question:

The intrinsic complexity of living systems – the fact that they are the product of multiple histories in relation to which all constraints (genetic, experimental, or otherwise) take on meaning – does not impose a dramatic limit on any possibility of experimentation. What it imposes is the necessity for an intelligent experimentation, which assumes the responsibility of asking relevant questions. Every question is a wager concerning what the interrogated object is sensitive to, and no method is neutral with respect to this problem. The problem of relevance does not lead to irrationalism, but to the ever-present risk of “silencing” the very thing one is interrogating (Stengers 1997, 17)

Many of these collaborations probably remain unilateral. They import image-making techniques from the studio into the laboratory, and from there move to corporate or institutional lobbies and atriums amidst potted palms. The results of art-science collaborations hang in the lobby of the Sanger Institute or the Wellcome Trust. Often they beautify science, and lend aesthetic service to technical knowledge. Sometimes they head in different directions. Many art-science
projects transport new materials, forms and figures from laboratories into galleries, for art and art-markets to work with in a modernist sensibility. These two unilateral possibilities (art supports science; art borrows from science) beg the question of experimentation. The question is what are the relevant questions to ask of the 'interrogated object' when it itself is part of a mobilized field of knowledge and action.

**Adrian & Andrew: Conclusion**

Wherever such questions head, they will have to take into account the fact that there are no longer only two cultures. There might now be many more, a large subset of which, though certainly not all, involve mutual contamination of science and everyday life. In all these respects, if the humanities and social sciences are going to engage more with science, then perhaps they might learn a thing or two from everyday life.

**References**


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