A Plea for Pleats

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Introduction

There are many folds in Deleuze's *Le Pli* (Deleuze 1988). In this short book, he reads Leibnitz as a quintessential Baroque philosopher – exploring his work through its resonances in contemporary music, architecture, art, mathematics and sculpture. This is not a philosophy of Enlightenment, with bright lights transfixing a personified Nature – all order is accompanied by confusion, light by shade and joy by rage in this best of all possible worlds. I offer hear a reading of *Le Pli* as a model for a critical reading of scientific texts – centered on an exploration of the relationship between the individual and the collective. In particular, I draw attention to ways in which political, philosophical and scientific discourses are imbricated one in the other – and to how Deleuze's fold gives us ways to work analytically with this imbrication without getting lost in vapid assertions that it's all One.

This essay is written in counterpoint to some tendencies in science studies to eschew both the philosophical and the political within the science being studied. Most works in social constructivism and some in ANT – my two reference traditions - have shown that the scientist or technologist is a political actor and yet have not read closely the science being produced: it seems that it is enough to show the rational actor gaining funds for her lab while black-boxing the science. Similarly – though especially for social constructivism - there has been a tendency to avoid philosophizing and valuing: our task, it seems, as social students of science is to represent *their* categories, not to develop our own. However, I don't know how you can do politics today without doing science. The sciences gain their political power precisely through their claims to keeping politics outside of the door of the laboratory (Shapin, Schaffer et al. 1989) – and yet they cannot theoretically and do not practically achieve this. And I don't know how you can do interesting politics about science without engaging it philosophically. Gone are the halcyon days when we could just refer to the *interest* of specific theories – though clearly modern day eugenics and euphenics are amenable to interest theory. The task now is to explore the entitities – scallops, electrons, dark matter – we people the world with in order to recognize the limits to our own ways of knowing (a political imperative if we are not to continue the current age of imperialism). In order to move in this direction, I believe that there is room in the field of science studies for new kinds of reading of science which are philosophically and politically rich – and that Deleuze offers us some analytic purchase on the shape of that reading.

Much of Deleuze's work consists of readings – of Proust (Deleuze 1996), Foucault (Deleuze 1986) and Leibnitz for example - each being inflected by his own philosophical quests. His is an expository reading which permits a movement between multiple registers, akin to those of Lévi-Strauss' mythologies (Lévi-Strauss 1971): it is this practice which I concentrate on. I do not therefore distinguish between Deleuze and Leibnitz, apart from a critical sentiment, the very last in the book, in which he gives a counterpoint to Baroque certainty:

We are still Leibnitzean, even though harmonies are not what express our world or our text. We are discovering new ways of folding and new envelopes, but we are still Leibnitzean because we are always folding, unfolding, folding again (Deleuze 1988). In *Le Pli*, Deleuze imagines a beautiful machine, which he this final move somewhat disarticulates. This machine treats in part the question of the relationship between the

individual and the collective; and it is this relationship which will ground my development of the fold in science studies.

What is a Fold?

To understand the fold, we start with the monad. Although monads are infinitesimally small, they are not easy things to write about. However, we need a little monadology in order to begin to make sense of Deleuze's work. For a first approximation, we can say that monads are the stuff of life, and are its smallest unit. They have a dual structure: an upper chamber and a lower chamber; and they are completely sealed from the world. The upper chamber is filled with light, the lower is dark, obscure. As a living entity, I have a monad, which is the expression of my being in the world. That being itself is constituted by the events/arenas in which I can see clearly, and those which for me are dark or in shade. Only God can comprehend the world at one moment. Now my body is made up of organs, such as a liver and heart. These organs themselves have monads, enabling them to perform there livery or hearty functions as best they can. And each separate part of the liver as monads and so on all the way down. There is no bottom line here – each 'world' contains sub-worlds which contain others. (One can see immediately here the connection with the infinitesimal calculus). Now, strangely, these monads which act in the world have no direct communication with others – the appearance of communication is a reflection of a pre-existing divine harmony. God has chosen one world (and therefore the best of all possible), in which that harmony guarantees the complex phenomena we experience. Evil is possible in this best of worlds because an evil monad is one filled only with rage against the Lord: this constricts its rage of clarity to a point, freeing up energy and space for virtuous monads. All light entrains shadow. Each monad contains a reflection of the entire world within it. The light part is that which it can see and act on clearly (not much for a liver monad, much more for me) and the dark part is its area of confusion, distortion, shadow.

A moment here on what is going on ontologically. In general analytic philosophy does not trade in metaphor and allegory (Deleuze reads Leibnitz as writing allegory) and so it can appear unusual to explore seriously a position which is fairly demonstrably not the case – or at the very least which is unprovable. The trick to making this interesting – as with imaginary numbers – is to take the impossible to be true and see what can be usefully done with it. What emerges – around issues of the collective and the individual, sameness and difference – is just such an outcome.

So on to the fold. The world has two levels or moments:

> … the one by which it is enveloped by or folded into monads, and the other by which it is engaged in or unfolded into matter[1] (Deleuze 1988)

There is no absolute separation between the organic and the inorganic (139), the inside and the outside – this is a dynamic philosophy of folding and unfolding. And, crucially, it's turtles all the way down – there is no point at which you can say you have found pure matter or pure spirit: each is always, infinitely folded into the other:

> The soul and the body are always really distinct, but they are inseparable as a result of the coming and going between the two stages: my unique monad has a body; the parts of my body has masses of monads; each of these monads has a body … (Deleuze 1988)

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[1] My citations are to the French edition and translations are my own.

There really are in the principle of the fold no kinds of things, species – everything is radically singular, incorporating its own sets of monads with their own unfoldings into the world.

The best analogy for the fold in the world of science studies is the actor-network position whereby the act of intermediation is central – unsurprisingly given the centrality of Leibnitz to Michel Serres (Serres 1968) and Bruno Latour (and of Whitehead to Stengers (Stengers 2002)). There is by this view no nature apart from science – both are constructed simultaneously in this act of coming and going between the one and the other. They are outcomes of a dynamic process – not preexisting realities. The fold is the guarantor of irreducibility; the act of folding is the dynamic we analysts need to understand.

Many binaries dissolve as soon as one uses the language of the fold – as with Latour's observation in *Science in Action*, entities like Nature and Science can only be seen as changeable outcomes of specific historical processes (Latour 1987). Three sets of binaries and their dissolution - foregrounds and backgrounds, insides and outsides and identity and multiplicity – will allow us to trace the historiographical force of Deleuze's vision for our understanding of the sciences.

Foregrounds and Backgrounds

When you ask an academic how much work they got done on a given day, they'll generally respond in terms of their 'real' work – time spent researching or writing. The rest falls away into the background. (The reductio ad adsurdum is Dick Boland's imaginary executive jacket, tailored to catch the actual moment of knowledge production and completely blind to the distributed nature of that work). Similarly, when academics talk about papers that they write, there is little recognition of the collective nature of writing: the role of peer reviewers and editors in honing, shaping, altering ones productions.

When we talk about remembering an event, we tend to foreground our mental processes and let slip into the nebulous background the social and physical inscriptions of our highly distributed memory processes (Halbwachs 1968; Hutchins 1995). Remembering is inexorably material and social.

When we foreground the technical artifact (the impact) of computers on society then we lose the computer itself as an expression of the principle of division of labor (Yates 1989; Bowker 1994). The first object-oriented program (Simula) was designed to mimic organizations (Khoshafian 1993)) now organizations attempt to mimic object orientation (Vann 2001).

There is no biodiversity problem today. At the microscopic level viruses, parasites, bacteria proliferate even in the most poison sludges we have been able to concoct (Staley and Reysenbach 2002). There is a problem indexed by what is foregrounded in our own vision of nature – the big, the beautiful and the economically salient. If we let the microscopic background into our reckoning of nature we would have a radically vision of natural processes – parasitism of all sorts would be a dominant mode of relationship, not an annoying backdrop to the pageant of life (Serres 1980; Margulis 1992; Zimmer 2000) the tree of life would be a complex rhizome, with genes jumping across genera and species (Helmreich forthcoming).

In each of these instances, the act of foregrounding is one of creating a divide between an ideal, self-contained unit and a set of background activities from a different realm – in turn the thinking academic, the remembering brain, the ideal machine, the separate species (of which we humans constitute the nec plus ultra). In a world of folds, foregrounds and backgrounds are not particularly useful mesoconstructs – they propose a form of separation which is precisely belied by the dance of fold.

Identity and Multiplicity

There is an ontological problem with the concept of 'identity' to the extent that it is often a timeless claim. Objects in general are not identical with themselves over time – indeed the practice of mereology (the relationship between parts and wholes) is partly predicated on this non-equivalence (Martin 1988). I am other at different moments. I am physically multiplicity through the constant shedding and accretion of cells, flora, fauna, sugars, toxins salts in my body. I am psychically multiple. There is no single thread of consciousness that travels from my cradle to my grave. At different times I have access to radically different selves. There is on my bicycle rides a self without much memory (I think…) except perhaps of the day before, along the same route. Or in a lecture course when I am enveloped only by previous lectures and the on hand and how to string together some variegated riffs on the other. This is a staccato from of discontinuity. There is a spatial form when I go to another place. England clenches my stomach with its damp, mildly depressed culture – I tap into that dimension of my being while I am there and not a whit of it when I am not. Rather I know about it when I am not there – but from through outside – I see it through a glass darkly.

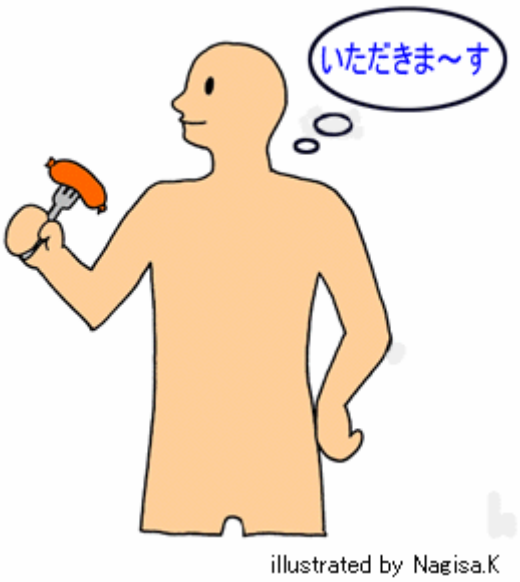
Then there's the discontinuous self over more extended periods of time (Linde 1993). I remember now (from the outside) when my trajectory was toward living on a permaculture commune. The points along the way (stations of the cross) for that self included a tram in blue hazed mountains in Victoria, uncomfortable politics and a hot lead press in the outback and so forth: points which have no particular significance in the most recent several trajectories I have conjured for myself. I am processually multiple. As I accrete more possible presents, futures and pasts – in Proust's terms as time tends to the infinitely slow as we age – I am now more multiply other in the present than I was a decade ago….

People are multiple, then. Historical objects are no less so. There is, as Paul Veyne so beautiful demonstrates, no transhistorical object such as 'democracy', the 'liberal subject' or the 'state' which are more or less realized in different contexts over time (Veyne 1971). There are two specific historiographical problems with such formulae at 'the rise of the state', 'the formation of the liberal subject' for our purposes. First, they generally operate willy-nilly on the assumption that at the present time these entities have achieved their fullest realization. We so often write history as if we were poised at the end of history – from the early historicism of the 18th century culminating in Marx's proclaimed end to the more empty exercise by Fukuyama (Fukuyama 1992)more recently. This is doubly true of many scientists' conceptions of their own objects – "They used to think but now we know" in Howie Becker's phrase (personal communication). The effect then is to simultaneously remove the present from history (and multiplicity) on the one hand and to tie the past down to a single thread on the other. Much recent work

on the Middle Ages in the Annalist tradition (Schmitt 1999) has shown how we can only understand ways of thinking and being in those times with a radical historicization and multiplication of terms like God, purgatory, the State and empire. Secondly, in posing emergent identity they deny real discontinuity. Discovering one's own or others' discontinuities is a really difficult exercise – one which Foucault carried out with great aplomb.

Nature is similarly multiple. The 'ecosystem' concept, for example is a useful approximation but it is one which assumes the identity of flora and fauna and place over relatively stable periods – especially in 'mature' systems. Recent calls to bury the concept point to the fact that flora and fauna are persistently moving in and out of ecosystem boundaries. Trying to tie the concept down too far can have deleterious consequences. As Westin points out for the African elephant, the creation of national parks to preserve their natural habitat has meant the enclosure of wetlands that the elephants need very occasionally – when there has been a particularly extended period of drought (Westin personal communication; cf (Gunderson and Holling 2002). Rick Jonasse makes this point beautifully for environmental planning in British Columbia, where caribou were tracked over one season and these tracks were used to set their boundaries for the subsequent two hundred (Jonasse 2001). Even abstracting away climate change and other forms of variability this is absurd. But it does follow naturally from a science and a social science which attempt to remove the present from the flow of history and create an eternal present (Bowker 2006).

Insides and Outsides



Inside all of the intestinal tract where food goes through without rupturing mucous membrane is "outside" the body border.

[the animated GIF is at the source site: http://physiol.umin.jp/hrm/chp1_e/1-101_e.html]

I was somewhat shaken when I read the observation that the intestinal tract is an outside within – material passed through it, to be selectively accreted by the body – with most never coming into what is considered real contact with it. Our bodies become different places if we start to look at the outside within. As Arthur Bentley wrote about this in his beautifully titled "The Human Skin, Philosophy's Last Line of Defense": ""Inner" and "outer" are ever present distinctions, however camouflaged, in philosophical procedure as well as in conventional speech-forms… " (Bentley 1941). His argument was that if we take skin as the separator between myself and my environment physiologically or my self and other souls psychologically then we are making a strong ontological commitment which cannot be justified either scientifically or philosophically. Michel Serres' 'Cinq Sens' resonates with this position – he places the soul not in a Cartesian temple in the body but distributed throughout our senses – where the outside gets folded into our bodies (Serres 1985). As Deleuze adumbrates in *Le Pli*, this is also the nature of the Leibnitzean soul: it contains the world within it; and its individuality is comprised in what it can perceive clearly outside of that world within.

Insides and outsides extend to our artifacts, our history as well as ever external nature. In *The Great Wall of China, from History to Myth*, Arthur Waldron explores the myth of the fence as a barrier which keeps the barbarian hoards ravaging an unprotected countryside (Waldron 1989). First, he notes, the barrier itself acted also as an entranceway. Several times central powers lost wars to the nomads beyond, who then became the central powers, who then … . At any given temporal scale, movements of lesser or greater magnitude can be seen. Secondly, the wall was never a continuous stretch of patrollable boundary – it was shored up wherever the current threat was and elsewhere fell into desuetude. The apprehension of a single fence stretched across the landscape has always been a political statement in the present rather than an historical representation. Thirdly, the site of exclusion – the wall itself – was a rich and stable trading zone between the nomad barbarians beyond and the civilized within. It was a site of interpenetration of people, artifacts, food, disease.

As with the skin and the border, so with our understanding of nature. Most notably, when we put ourselves in one category and nature as that which is other we are missing the ways in which we incorporate multiple forms of life; ourselves as part of ecosystems rather than external forces acting on them and ecosystems as temporally and spatially highly variable.

Across these three sets of insides and outsides – self, society, nature - my historiographical interest is in alternatives to the creation of the inside as a place removed from time, flow, the world. We murder to dissect, we don't do a lot of good when we transect. When the body gets trapped behind the skin, the soul within the body or the State within the wall then they become transhistorical entities about which one can speak lasting truth. The scientific laboratory is archetypical (rather than sole exemplar) of this act of enclosure whereby the inside is sequestered (to use Leigh Star's phrase (talk at SCU, October 2006) from the vagaries of the outside. The nature of the fold is to perpetually bring the outside within (folding) and the inside without (unfolding) – the false dichotomy between the two is both politically and philosophically charged.

Politically because we have a tendency to smuggle our 'inside without' back into our world as transcendent truth about the nature of reality – as discussed in Latour (Latour 1993). Philosophically because it breaks up a world which by its very nature should be understood as one.

The Virtues of Categories and Problems with Origins

There is a whole set of similar binaries which structure our categorical systems through systematic exclusions. I have not mentioned here, for example, the relationship between visible and invisible work (Star 1991a; Star 1991c) or between ourselves and the Other. In these latter two cases, as in each of the binaries above, there is a natural analytic point to be made of the value of recognizing the multiple, the outside, the Other, the invisible and so forth. The underdog of the binary relationship should, so it is said, be cherished on its own grounds. Deleuze goes further by underscoring the value of a theoretical language to match these several ontological commitments.

It's hard to get away from categories, to imagine a language not predicated on some set of classification systems. Just like standards in our built infrastructure, classifications proliferate at every level of our interaction with the world. Which is what makes it interesting to explore the sets of commonalities there are across all of the classifications we use, and whether in Verran's terms there are techniques for avoiding hardening of the categories (Watson-Verran and Turnbull 1995). A historical view within Western society takes us from classifications by essence to classifications by origin – genetic classifications (Tort 1989). Today we classify species, soils, people, languages by where they come from – what they originally were. Tort's careful historical analysis demonstrates how principles of genetic classification traveled from discipline to discipline through a series of happenstance events – a mineralogist taking a course in biology, a linguist knowing someone interested in evolution and so forth.

However, this technical feature of the way we cut up the world is synchronized with our profound historicism. I could say our historicism stemming from great thinkers from two centuries past such as Hegel (Yerushalmi 1996) – but this assertion itself would but instantiate the problem. Thought only stems from thought if we accept a separable realm whose internal logic resists the outside world; it assumes that 'our' historicism is a consequence of theirs.

The historian's search for and obsession with origins has been challenged over the past forty years and for good reasons related to the themes of identity and multiplicity and insides and outsides. First, for the identity and multiplicity. The first 'x' – be it the first member of the bourgeoisie, the first modern state, the first trade union – assumes that things are identical with themselves over time. It is really not the same to be a member of the bourgeoisie in 12th century France (the earliest sighting I know of) than to be one today. If there are no transhistorical concepts, then the pursuit of origins is moot. Secondly, if at any one we recognize that historical objects interpenetrate (are folded into each other) then again it is only at a first level of approximation that we can talk of stand-alone origins.

This can sometimes be a useful level though. How else can we talk about the world? There have been numerous calls to change our own language to bring process rather than fixity into central place (Bohm 2002) or to do away cast categories adrift on a sea of local distinctions (http://www.shirky.com/writings/ontology_overrated.html). The

language of the fold gives us a way of understanding the world as inherently multiple and porous, without losing the value of categories.

Reading Biogeography

Ontological recommendations such as this often seem to make little practical difference. If I can internalize the Leibnitzean monad and use the concept to build up a world pretty much like the one which I knew beforehand in, say, mechanistic terms, then arguably the new ontology does not have much traction. Or to be more precise, what I write may not change at all, but its resonance for myself – and just possibly for my readers – may be quite different. If all the fold does is put scare quotes around insides, outsides, identity and categories without changing practice, then it is not so interesting. Through their very proliferation, scare quotes fade slowly into the background, leaving old habits of thought unchanged.

I will turn now, to some recent work in biogeography to see what a folded reading of science looks like. To preface though, I note that it has in general been difficult to get people in the field of science studies to actually read science and interpret it. The baleful calls to use only actors categories, to preserve anthropological strangeness and to worship at the Temple of Symmetry have rendered it very difficult for the science studier to actually approach the text. "Actors categories" are one way of parsing the world. However we fall into the Poverty of Empiricism trap (Jones 1972) if we assume that only what they see and say is going on. Indeed, actors do not in general recognize their own work and the entities therein as being folded into each other, into the sociopolitical realm and into a dynamic ontology. As Jensen and Bowker (forthcoming) point out, the field of science studies has been notorious in historical accounts of itself in its refusal to recognize the social, political and economic roots of its own practice. "Everyone else is constructed, I have captured an eternal truth", they seem to say. "Anthropological strangeness" is useful for picking up work practices that might otherwise be invisible – most famously the cascading inscriptions that lead to immutable mobiles – but practitioners of the same precisely bracket off the science they are writing about. The "principle of symmetry" – in any of its many forms – is an invocation for the science studies practitioner to remove themselves from direct engagement from the flow of history, and from the insides of sociotechnical exchange. In general, any attempt to create a neutral observer (the God trick, in Haraway's terms (Haraway 1997)) is one which at the same time creates a world outside of the observer. This should not be taken as an indictment of the whole field. Indeed, there are salutary examples – especially in the anthropology of science (Haraway 1989; Hayden 2003)- of rich readings of scientific texts. It's just that there are too few of them.

On to biogeography. There is no one discipline of biogeography, though the generic topic is the study of the distribution of life, past and present. This is an interesting field for our purposes because of the multiple ways in which the binaries discussed above play out. At the scale of biogeographical analysis, one needs to recognize the role of living beings in terraforming the globe (Margulis and Olendzenski 1992): we won't be breathing oxygen if it weren't for organic life. There is the complex issue of whether one is using species distribution as markers for geological change (the upthrust of the Rockies changed patterns of speciation – can one infer geology from

species or is it more possible to infer species from geology. There are a number of technical fixes to the inherent circularity – each philosophically rich.

Let us look at some ways in which the kinds of arguments I have developed about the fold are playing out in this arena. In *Frontiers of Biogeography* there is a wonderful paper by Humphries and Ebach entitled 'Biogeography on a Dynamic Earth' (Ebach 2004). We begin with a rather opaque assertion near the beginning of the paper:

> The consequence of not making a distinction between cladograms and trees has many other implications…. . The old chestnuts of dispersal versus vicariance and the role of ancestors in determining centers of origin are good cases in point. Also, the postmodern versions of historical biogeography are creating a milieu of mixed messages that consider life to be separate from geophysical history. Old oppositions constantly resurface in different guises and so we argue for the theory, methods and implementation of historical biogeography from a pattern perspective that sees cladograms as different from phylogenetic trees; that ancestors and centers of origin cannot be ascertained; and that the distinction between dispersal and vicariance cannot be justified. (68)

Trees are the problematic branching structures which subtend many representations of the development of life on earth – the 'tree of life' representations many of us saw in school which started with single celled organisms and branched and branched until humans, horses and other contemporary species emerged is an example. A cladogram is a way of representing species change – it maps 'acquired characteristics' which are sufficiently stable to mark a branching point. A cladogram can be represented in tree form inter alia but the question of whether or not it actually depicts historical pathways rather than a map of acquired characteristics is at stake here. There have been furious arguments about whether the cladogram should be seen as an historical representation or a logical presentation, whose historicity is an open question. From the inside of the science (tree or cladogram) we get from Humphries and Ebach a denial of origins – the question of 'dispersal' (species leaving from a common center of origin) and vicariance (dispersed species getting cut off by climatic or tectonic events) is made moot.

Along the way precisely the same denial of origins that as we have seen is associated with structuralist history (Foucault, Serres) is now associated with the history of species. Without some way of folding our sociocultural present into our science and our history, we would have a resonance without a cause. With a fold, it would be surprising if there were no such resonances.

Dispersal from centers of origin is the general line of argument that species start somewhere and then spread out in linear fashion, fighting other species until they find a suitable niche they can settle in. The move has generally been painted as from centers in the tropics to ecosystems beyond – in some marine molluscs for example one finds the older species are further out from the tropics, suggesting dispersion. Vicariance biogeography argues that speciation occurs when major tectonic or climatic events cause the separation of similar taxa for long enough that they evolve into separate species. One can imagine this most clearly for parts of Arizona, where there are multiple species of hummingbirds in the high mountains. Before the area between the mountains was desert, these would have been able to interbreed – more recently they have been trapped in their island forests and have lost the ability to interbreed.

For Humphries and Ebach, phylogenetic (or vicariance) biogeography: "views the worlds as static, but cladistic biogeography … allows us to assess relationships of areas on a dynamic Earth" (68). What they mean by this is that the tectonic events and their climatic consequences are seen as external to and acting on life. For those in science studies, they want to use precisely the kind of arguments deployed against technological determinism – there is no 'impact' of the world on life because you cannot separate the two, just as you cannot separate technology and society. In order to move forward, they argue, we need to switch foreground and background, as well as the inside and the outside of life:

> For almost two centuries, biogeographers in the dispersalist tradition have considered life and Earth as separate entities. Dispersal from centers of origin and geophysical stasis, or at best, gradual change, was the enduring paradigm from the mid-nineteenth century until well into the twentieth century…" (69)

Or again: "What is common to both panbiogeography and cladistic biogeography is the notion that life and Earth have evolved together"(73). In this process, insides and outsides get defined in new ways – we no longer have the rock and the range as stable frontier akin to Bentley's skin:

> An 'area' in area cladistics is not the inorganic substrate of soil, rock, and sea, but rather the endemic biota. A case of two conflicting patterns may sometimes be resolved if the same area, over time is treated as two different areas. This is known as 'time slicing' (79)

The phrasing is clumsy but the analysis is clear. A Deleuzean/Leibnitzean reading of such texts brings to the fore the radical similarities of our natural entities – people, organisms, flora, fauna, planets are all built up of monads within monads… . The world is in us and we are in the world. Rather than be surprised at tripping over parallels between people, peoples and areas over the question of whether they are identical with themselves over time, we can invert the issue and take the parallels as evidence for a richly multiple ontology.

The biogeographical arguments here are very similar to the historiographical arguments above. Whence all this similarity? We have too often been caught in Bateson's dictum that 'information is a difference which makes a difference' (Bateson 1972). There is informational richness in similarity if we know how to read it – indeed I would formulate the fold as a similarity which makes a difference. There are a range of possible responses. There is the argument by ideal origins, which of course I reject. A pure form of this is that we are dealing with, for example, the history of the Hegelian subject – thought drives all practice and thus single sets of concerns appear quite naturally in all spheres of human activity. There is the somewhat more attractive but equally flawed argument by materiality. This can range from a base/superstructure model where there is determination in the last instance by the mode of production to the more pragmatist position that it's all work, and that work practices tend to travel well from one sphere of activity to the next. The material argument, for example, would say that at the limit there is a single political economy (defined broadly as the relationship between ourselves and nature) or there is a single history of bureaucracy which we dress up into a series of separate internalist histories (especially when we make the false divide between scientific, philosophical and other work).

These forms of the ideal and material solutions to similarity all reify a divide between us and the world which Deleuze and others (Bergson, Whitehead) see as problematic. For it still puts us in the position of being outside of nature and interacting with it – either through our consciousness or our practices.

Deleuze on Leibnitz on the Fold

The greatest value that I see in Deleuze's account of Leibnitz is precisely his ability to sketch a position where there need be no great divide between writing grounded history, philosophizing about the nature of reality and doing scientific work. According to Deleuze, Leibnitz gives: "a conception of the object which is not only temporal but also qualitative, in so far as sounds, colors are flexible and are comprised in modulation. It is a mannerist object – not an essentialist one – which becomes event" (Deleuze 1988).

This reading renders the pyramid an event as much as a party or a primrose – and an event which is to be understood by its variable folding into other events. Isabelle Stengers in her account of Whitehead (Stengers 2002) sketches a similarly rich account of an event ontology. The object as mannerist event is not an object which can exist separately in the world (with a well defined inside or outside) and it is inherently multiple – the object: "does not exist outside of its metamorphoses or in the declension of its profiles; perspectivism guarantees the truth of relativism (and not the relativity of truth)" (30). We thus escape the essentialism of Aristotle (with his essences for categories) or Descartes (with his reductions to the machinic). For Leibnitz, "the world itself is an event – and as a predicate it must be taken as a background to (incorporated in) the subject" (72). For Leibnitz, then, there is no contradiction between singularity and multiplicity (80) – through the double dissolution of the object into the event the world can both be radically singular and one (the world is folded into me) and multiple (any event is apprehended through its set of 'accidental' predicates.

Deleuze's Leibnitz motivates the breakdown of what ANT theorists call the human/non-human divide:

> The great difference is not then between the organic and the inorganic, but rather traverses both by distinguishing between what is individual and what is a mass or crowd phenomenon, what is absolute form and what is figure or massive, molar structure. (139)

Through ignoring such divides, Deleuze can bring together a new form of architecture characterized by folds (the Baroque), a new economic system characterized also by folds (capitalism) and a new apprehension of microscopic life folded into our bodies (180). For him, the Baroque instantiates a new kind of narrative – one in which: "description replaces the object, the concept becomes narrative and the subject a point of few, the subject of enunciation" (174).

Bringing Science Studies into the Fold

For the field of science studies, then, what can emerge from this multiple, porous apprehension of science, nature and the world is a new way of reading scientific texts. Serres once made the observation that scientific disciplines were very good at doing what they did – defining then manipulating their objects to achieve a partial vision of the world. The role of the philosopher of science, he said, was to hold open the spaces

between disciplines – to create a productive tension in our reading of science, literature, myth which constantly situated and relativized our certainties. Within the field, we have done in general, just a part of that work. Hampering us from making that the tension we describe so well productive has been a general invocation not to enter as actors into the worlds we describe. The principle of symmetry has been conjured into a claim that we should not make judgments about the scientific programs we analyze – all we can do is use the same sets of causal factors to explain success and failure. Similarly, tricks of the trade like anthropological strangeness do us a disservice when they keep us ever poised at the threshold of a text, refusing to analyze it in its own terms. This means that at the very time we are bringing in the whole mix of ways in which science gets developed we risk losing the ability to read.

I was stirred when I first read actor-network theory (ANT). It provides a theoretical language which simultaneously denies insides our outsides for scientific practice – the work of being a scientist is precisely the work of bringing science into the world and the world into the scientific laboratory. It denies the external category like 'society' existing outside of the natural world and having an impact on our apprehension of it. Society is comprised of microbes, scallops, people, practices and technology; and each apparently separable unit (the scientific truth, the technical artifact; the social fact) has the others folded into it at some point – it's a question of the levels of granularity one is choosing to apply. There is no point at which you can make that final cut which will separate off us and our thoughts from the world and history. To extend actor-network theory, which has a rather bland 'it's turtles all the way down approach' to scale, we can follow Jacques Revel's beautiful analysis of his data on the visible and the invisible in colonial practice: " 'the change in the scale of observation revealed not just familiar objects in miniature but different configurations of the social'" (Revel 1995). ANT also provides a good – though less robust – language for multiplicity. Hence the resonance for Latour with ethno-psychiatry – a discipline which seeks to change the individual not by going back to their origin (childhood trauma) but my changing the self in the present through changing the sets of current connections with the world - talking in clinical sessions about one's current interpenetration with the world (sport, politics and so forth) instead. The ANT self is defined by its connections in the moment; just as any technical artifact or natural object is multiple over time. Hennion and Latour's work on the centrality of intermediation – its existence before objects – is a development of Leibnitz's phenomenology.

Conclusion

I often think of science studies as being predicated on a set of not particularly useful negative commandments. Thou shalt not judge a work of science. Thou shalt not talk ontology, for this is the work of our subjects. Thou shalt not talk about large scale social effects, for each scientific practice is peculiar unto itself.

These negative commandments are all problematic and are all interrelated. I really don't know how one can talk about the nature of reality without talking about the state of society; about the state of nature without talking about the social. Deleuze in The Fold – and of course elsewhere in his work – offers ways of weaving together scientific, philosophical and historical discourse. And he does it in a resolutely irreductionist

(Latour, Smith) way – no one of the trio is determined by the other two, either in the first or in last instance….

We are at an historical period (we always already have been, perhaps) where it is crucial socially that we talk science – as Latour points out, every newspaper swarms with non-human entities created in the laboratory. This means that we must develop ways of engaging politically with science. As a field, science studies has been notoriously bad at doing just that – we have eviscerated our field of political content in the same movement as we have eviscerated it of philosophical content. Let's bring it all back into the fold.

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