Notes on Fish, Ponds and Theory[1]

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Introduction

How does theory weave into practice?

I come to this question from Science, Technology and Society. STS is a discipline that has developed approaches to the social, the material, the human and the 'natural' worlds that have taken it far beyond its original focus on science and technology. It works empirically, but it rarely does work that is *purely* empirical. Instead, it characteristically seeks to develop theoretical insights through case-studies and deft use of empirical materials. So what *is* theory in STS? The answer is that is comes in various forms, but in this paper I will attend to what theory is in so-called *actor-network theory*.

Michel Callon invented this term, ANT, in about 1983. At that time a hyphenated compound was a good invention for exploring the relational character of materials because it cut across and eroded common sense. How could an actor be a network? Or a network an actor? The whole idea was oxymoronic. But then the term became too successful and took on a life of its own. It got itself reified and hypostatised. It became its own distinct – and often distinctly unhelpful – reality. In short, it started to lose its context, its specificities and its surprise value, and little-by-little turned itself into a formula. And that is the problem when we start to talk about 'actor-network theory', or indeed 'theory' *tout court*. Theory including ANT sounds – and often it is – formulaic. It is as if it were there, sitting in a box fully formed, waiting to be applied whole and ready.

Though I have started by talking of 'theory', I would prefer to avoid the idea that there is such a thing as theory out there, and separate from the practices of research. Indeed perhaps in this respect STS is like anthropology: both work by integrating theory with empirical practice. At any rate, in STS (perhaps this came from Thomas Kuhn's understanding of science[2]) theory rarely floats free. Instead, it is almost always embedded in empirical studies. That is how STS does theory in practice. 'Theory', if we still want to use the term, turns up in the form of sets of questions, proclivities and sensibilities in the context of empirical work: the two get articulated together. So it isn't just that theories *are* located, specific, and historically shaped (for this is always true). It is also *recognised* that this is indeed the case. Surely this is another commonality with anthropology.

But let me come to the question of actor-network theory in a different way by thinking about how it relates to animals. Near the beginning of ANT, Michel Callon wrote a paper on the scallops and the fishermen of Saint Brieuc Bay[3]. This paper is immensely popular and this is partly because Callon had the bare-faced effrontery to treat scallops and people symmetrically – that is to say, in the same terms. His argument was methodological. It was that if there are differences between people and scallops (and obviously there are) then these are an *effect* of the relations in which they are embedded – relations which work to enact their differences. The implication is that if we are to understand this process – how it is that entities such as fishermen or scallops take shape – we need so far as possible to explore how this happens without making prior assumptions about the character or form of what is being generated. Scallops, fishermen, and scientists – all are generated in the relations that develop between them.

[2] Kuhn (1970) offered a practice-based account of science.

[3] Callon (1986). As of 15th June 2012 this had been cited 3777 times according to Google Scholar,

The result was a major STS scandal. Many were horrified that people and animals (and machines as well) could be understood in the same terms. Surely people are really different? But despite the scandal, the idea was in the air more generally in the middle 1980s. Indeed other STS writers such as Bruno Latour[4] and Donna Haraway were exploring animals and human being in similar terms. Nevertheless, Callon's 'scallops' piece is perhaps the first and clearest STS methodological and empirical statement of resistance to human exceptionalism. And, as is obvious, the move was thoroughly theoretical as well. It showed what happens if we attend to how it is that objects – or realities – are generated in relations, and to how those relations are done in practices. Crucially, it showed that it is possible to dissolve a-priori divisions between nature and culture and explore how these are put together – and separated – in practice. And indeed, twenty-five years after Callon first dipped his toe into these 'nature-culture' waters this is an insight that has been turned from a cottage industry into a multinational effort. And it's this fecund space to which I want to attend as I explore the relations between theory and practice – in practice.

To do this I draw on an interdisciplinary anthropology-STS study of farmed Atlantic salmon in Hordaland in West Norway[5]. This is indeed a 'nature-culture' project that attends to 'salmon and their people'. Through this lens I first review what was learned when Michel Callon opened the floodgates and dispersed all that was solid for people and animals into relationality and its effects. Second, albeit briefly, I touch on what there is to say about objects, animals and societies in the aftermath of that relational revolution. Starting with a focus on multiplicity, I consider how ANT started to put entities such as 'animals' back together again after the 1986 relational storm. This, then, is an exploration of strategies for *reassembling* objects within the ANT tradition. And then, third, I offer some thoughts about how animals are done in a particular human-relevant set of practices. Specifically, I suggest that salmon are beast-like not only because they have been reassembled in such practices into something that is a kind of fluid solid. I also argue that they are creatures partly because they are slippery and evasive in relation to people within those practices[6].

Delousing

We are on the edge of one of those big round sea pens. If you look you can see the fish, some of them, breaking the surface. There are about 50,000 of them down there in each pen, and they are mostly out of sight. We are out here because it's delousing time. Sea lice are a major problem in the industry. [7] They irritate the fish. In large enough numbers they create open wounds and the fish suffer seriously. On the farm there are many fish gathered together in a small area, so that the lice breed quickly too. And then – a major source of environmental concern and controversy – they also spread into the 'villaks' population of migrating salmon. In short, there are many reasons that it is important to keep the lice under control. So how do the farmers do this?

There are various possibilities. They work with fallow periods, when all the farms in a particular fjord hold no salmon. They use a range of poisons, great and small[8]. They also use little fish, 'leppefisk'

[4] See Latour (1988), where it is microbes that are juxtaposed with people, and Haraway (1989) where primates are understood relationally.
[5] Gro Ween, also within the project, undertook fieldwork on 'wild' salmon and their humans on the Tana River in Finnmark/Finnmárkku in North Norway. See Ween and Lien (2012) and Ween (2012).
[6] The argument can be applied just as well to objects, or indeed humans, but I will attend to animals here.
[7] For general discussion and context see Revie et el. (2009).
[8] Revie et el. (2009, 66).

from the wrasse family, that eat the lice off the salmon. But the story I want to tell is about one of the poisons, a preparation called Alphamax™. This contains an insecticide called deltamethrin which is pretty non-toxic except to crustaceans. But how is it applied? The quick answer is that you dilute it in buckets of water, and throw the contents of the buckets into the pen. But for this to work, you first have to lift the net at the bottom of the pen because the fish need to be close to the surface. Then you need to hang a long tarpaulin skirt all the way round the circumference of the pen to stop the water flowing straight through and washing the insecticide away. And that is what we have been doing. My field notes say that this is

> "… extremely hard work. [You need to drag the tarpaulin all the way round the pen, and this is difficult], partly because … [it's heavy] … and partly because it has to be threaded beneath the anchor cables …. The tendency of the tarpaulin is to get itself snagged … and there's always the risk of tearing it…."[9]

So that is the work of the day. We have been doing it for hours, and we are pretty tired. But now the skirt is in place, and we are almost ready to throw the insecticide into the water. But there is one more thing to be done first. We need to finish lifting the net, so that the salmon are near the surface. We have held off on this because the fish get stressed when they are crowded. So we are starting to do this when suddenly the boss, I will call him Christoffer, shouts at us all to stop. He has been measuring the oxygen level in the water. This should be 90%, but it's fallen to 60%. This is bad news. The salmon are in distress. They are thrashing around near the surface. You can see their fins and their gaping mouths breaking the surface. They don't like it. Unless we are careful they are going to start dying in large numbers. This means that we are all going to have to wait while the oxygen levels rise. We sit in the sun for a while, and finally:

> "they set up the oxygen supply and start … to take … measurements. Slowly, and then quickly, the readings … [go] up. After a few minutes the Alphamax … [is] mixed and poured into the pen. Then another wait … while the treatment … [does] its job. All quiet. It … [is] incredibly still and pretty hot in the sun. Then [the waiting is over and] we start… to lift the tarpaulin.

That is the day's work: delousing on the fjord, on a long summer's day.

When Fish become Ponds

The story takes us to west Norway, but it also takes us to the world of actor-network theory *circa* 1986, the kind of world conjured up by Michel Callon in the paper on scallops. We are located in both – or at least I want to weave them together. So let me play with a word. *Monadology*. This is the kind of philosophically off-putting word that sometimes appears in actor-network writing. It comes from philosopher Gottfried Wilhelm Leibniz:

> "Every portion of matter can be thought of as a garden full of plants, or as a pond full of fish. But every branch of the plant, every part of the animal, and every drop of its vital fluids, is another such garden, or another such pond." (Leibniz, *The Monadology*)[10]

[9] Quotations without attribution are taken from field notes.
[10] Leibniz (1973, 277).

It is clear enough why these sentences might appeal to anyone interested in salmon and their people. But given that there is a whole lineage of philosophical debate here, what should we make of them?

Two points. First, it is wise to be a little careful when you go fishing for philosophical resources. These indeed have their own context, and sheer eclecticism is pretty risky. This is because it is difficult to know when you are getting yourself in to unless you exercise suitable caution. So that is one argument and it needs to be taken seriously. On the other hand it also pays to be somewhat disrespectful. Philosophy has a tendency to present itself as foundational – or as a ground-clearing exercise necessarily undertaken before particular disciplines can get to work. But this is not how it is in practice, at least most of the time. It turns out that anthropology, or indeed physics, prosper perfectly well in the absence of philosophical clarification. So it is in this spirit that I want to suggest that for our purposes philosophy is best thought of as a source of possible insights. Indeed, if we look at it in this way, then it is not very far removed from fieldwork materials. It becomes a set of specificities, a collection of possible resources, an aid to thinking, and a set of sensitising suggestions. So with this thought in mind, what happens if we stick with this term, monadology?

The answer is that we are sensitising ourselves to something that is somewhat counter-intuitive for those raised within Euro-American common-sense. We are saying that the whole world lies within whatever it is we are looking at[11]. Or, perhaps better, we are saying that there is no inside or outside[12]. Or, perhaps even better still, we are saying that the outside is also inside and the inside is also outside: that they are folded up together[13]. (It may help to think of monadology as a Mobius strip which folds and twists around itself so that the inside and the outside are one.) At any rate, and to back off the intricacies, Leibniz is telling us that there are fish in the ponds, and then that there are ponds in the fish. And he is telling us that if we turn up the magnification, then there are more fish in *those* ponds (think perhaps of Chilean feedstock), and more ponds in *those* fish (think of the Pacific). And so on, *ad infinitum*. 'Young man,' as the apocryphal old lady might have said, 'it is salmon and ponds all the way down'.

What does this all of this mean in practice?

First, and translated into fieldwork, it suggests that if we look we will find the whole world folded into a field site or a practice. It is just a matter of paying attention, of going slow, of not assuming too much. Note in passing that this suggests that we need to attend to practices and not just to what people say they are doing. This is surely what Bruno Latour meant when he said that we should 'follow the actors'[14] by tracing whatever is doing the acting wherever it takes us (though there is an inconvenience with this form of words that I will come to in a moment.) So that's the first point.[15]

[11] Kwa (2002).
[12] Hills (2007).
[13] The idea of the fold is developed in a philosophical idiom by Deleuze (1993). For an introduction see Law (2011).
[14] Latour (, 1987 #180}.
[15] How does this relate to anthropology? This might be debated. However, as I have noted, in a monadology or in actor network theory, the extent to which observation would be of 'culture' as opposed to 'practices' is limited. There are nuances here that I cannot explore in the present paper, but see Marianne Lien's contribution to this volume.

And then, two, and translated into theory, what Leibniz is telling us is almost the same as actor network theory. I have said this already. In this way of thinking, an actor is a network (or a web, or a tissue[16]) of relations and other actors. Each actor in the network is itself a network of further actors. And so on. If we want to put it philosophically we might say, then, that actor-network theory is a form of monadology.[17]

Here is a *sensibility* though not a formula. It is a sensibility that grows out of an intersection between ethnographic fieldwork on the one hand, and a theoretical or philosophical resource on the other: out of the salmon farm *and* out of ANT. But, of course, it is not without its inconveniences. For instance, if Latour says we should 'follow the actors', then we quickly trip over a question often posed by students: when we are doing actor-network theory, *where should we stop tracing the networks*? This is a nice question – 'nice' in the proper sense of being subtle – and the answer has to be that it all depends. Indeed, people working with actor-network theory have been wrestling with this issue since the middle 1980s, and I want to suggest that their different answers to this vital question help us to distinguish different actor-network successor projects from one another.

I'll return to this thought in due course. For the moment, however, let me do Callon-like work by exploring the *relationality* of the salmon and their practices: by dissolving these into some of their component relations. If we do this, what happens? What are the relations that replace an animal when we turn up the magnification and refuse the division between inside and outside? Here are some candidates.

Initially, it is possible to transmute the salmon into a *hazard*. They become *carriers of lice*. They are converted into a threat to the environment – and indeed to themselves. But this is just a beginning because we need to see how this is done. So first, we might visit *environmental science*. The point is obvious. Environmental scientists have modelled the epidemiology of infestation, and concluded that you need to try to kill the lice just before the 'villaks' make their journey down the river to the sea. This is why we have gathered round the pen at this particular moment in June. So this is a first web of relations. **Environmental modelling-populations-timing-people-chemicals**: such would be a way of imagining this first chain of associations, a first way of dissolving the nature-culture division, and a first dissolution of the salmon. A dissolution in which the creature has been transmuted into a *biohazard*.

Then second, we might attend to *the nation state and its regulations*. Thus the Norwegian state and its agencies take an active interest in the relations between salmon and their sea lice. If Sjølaks is delousing, it's partly (only partly) because the state says that has to. And as a part of this entanglement, the state also wants to know about levels of sea louse infestation. The people at Sjølaks measure this every two weeks. Marianne and I have watched them and it is quite a job: fishing them out, anaesthetising them, laying them on a slab, looking for lice, counting them, and making a note of the result[18]. So **environmental science-regulations-timings-anaesthetics-statistics-people-and-chemicals**: this is a second chain of relations that dissolves the division between nature

[16] The choice of specific metaphor for connectivity is not crucial. Donna Haraway (1994) writes of cats' cradles, and the notion of rhizome works just as well (Latour (1999); Deleuze and Guattari (1988)).
[17] Bruno Latour explores this beautifully in a philosophical mode in his (1984). See also
[18] Lovdata (2010). Note that the sea louse has its own dedicated Norwegian web page. See http://www.lusedata.no.

and culture and the solid salmon. If there's a creature being created here then it is the *regulated animal*.

Third, it is important to visit the *market*. Most obviously, if the salmon make it to the slaughterhouse alive and in good condition they will be transmuted into a commodity in the form of *tradable flesh* at around €20 per fish[19]. If they don't then it's all cost (perhaps €15 per fish) and no return. So this is another reason why we all pause in our work on that sunny June day. As I said a moment ago, if the fish get really stressed and short of oxygen they will die – and any level of stress is likely to affect their growth. So here is a third chain of mediations at work dissolving the nature-culture binary. Minimally it includes **market prices-costs-biomass-mortality rates-growth rates and oxygen levels**. And here, as I just said, the salmon has been transmuted into *tradable flesh*.

Finally it is also important to attend to the *world of welfare*. This takes us first to biological science. Most fish scientists would argue that fish are sentient beings: that they experience pain[20]. Second, it takes us, and somewhat separately, to the worlds of animal welfare activism[21]. Third, it takes us back to the state and its regulations. And finally, it also leads us to the common-sense of the people of west Norway who, after a lifetime of fishing, know a suffering fish when they see one. Again all of these versions of welfare are embedded in the work of that hot June day. The suffering caused by lice. The suffering caused by oxygen deprivation. So this is a fourth chain. **Animal neurophysiology is being woven together with animal activism, state regulation, and local knowledge about sick salmon and their killing**, to dissolve both the solid salmon, and the nature-culture binary. If there's a version of the salmon here it's the creature as *sentient being*.

But let me stop and pose that student question again: ***when and where to stop tracing the relations***? When to stop looking for salmon in ponds in salmon in ponds? Where, at Marilyn Strathern puts it, to cut the network?[22] If we stop now, it might be that this is more or less arbitrary. Perhaps we have we simply run out of time, space, or ingenuity. Perhaps, however, and less arbitrarily, it is because we have set ourselves the task of addressing some more or less *theoretical* topics. Perhaps, then, it is because we have *dissolved salmon:*

1. into a network of relations that sprawls over and help to undo the *nature-culture binary*;
2. into an array that distributes itself across *science, economics, care and the state*;
3. and/or because into a web that undoes the division between the *macro and the micro* and created an Escher-like monadological strip where inside and outside are both different but also the same;
4. into what, following Annemarie Mol, we might think of as the *salmon multiple*[23]. Thus as we have seen, the solid salmon has been replaced successively by the salmon as *hazard*; the salmon as *state-regulated entity*; the salmon as *saleable flesh*; and the salmon as *sentient being*.

[19] Calculated with market price information drawn Fish Information & Services (2010).
[20] For recent samples of the literature see Huntingford *et al*. (2006), Damsgård *et al*. (2006) and Turnbull and Kadri (2007).
[21] For an example, see Eurogroup for Animals (2008), though this is primarily about animal welfare and slaughter.
[22] Strathern (1996).
[23] Mol (2002). See also Law (2002).

Going On

So in this weave of theory and practice, everything that was solid is being dissolved. The actor has been turned into a set of networks or rhizomes, and the salmon has been rendered multiple. This set of moves illustrates how 1980s ANT worked – though it took some time to come to terms with the implications of the move to multiplicity. But after the dissolution into networks, the next problem that ANT faced was how, despite that dissolution, sometimes relations held together. Sometimes, after all, these webs successfully produced actors such as people, salmon, objects, or even 'nature'. So how did this happen?

To formulate this issue is to suggest a further response to the student problem about 'where to stop?' And now the answer becomes something like this. *We stop our empirical work when we have discovered putative mechanisms or strategies for holding practices and/or objects such as salmon together*. And this, I suggest, is what actor-network theory and its successor projects have been exploring since the middle 1980s. They have been working on this second problem, the problem that immediately follows the dispersal generated by the first move. And this effort has led to a whole series of different answers, and an increasingly flexible and nuanced understanding of what objects (or humans or animals) might be. Here is a short list of some of the possibilities. They

- hold together because they delegate relations into *durable materials*[24] including inscriptions that preferentially hold their shape in a wide variety of circumstances[25];
- hold together as a result of sets of *tactics* for enrolling allies in their networks[26];
- they hold together because they enact self-replicating *discursive strategies*, regimes of enunciation[27], or modes of ordering;
- they hold together *non-coherently* because they enact multiple and intersecting sets of self-replicating discursive strategies, regimes of enunciation, modes of ordering[28], or versions of the real[29];
- they hold together because they maintain these non-coherences in *tension*[30];
- they hold together because they link living in a *common world* with more local interests, and *vice versa*[31];
- they hold together because they recognise *difference* and disconcertment, and patch things together by simultaneously softening ontological realities and social identities[32];
- they hold together because they *tinker* themselves along[33];
- they hold together because they are *fluid* and change shape[34];
- and they hold together because they include *alterity*[35].

[24] Latour [, 1991 #441}; Johnson (1988).
[25] Latour (1990).
[26] Latour (1988).
[27] Latour (2010).
[28] Law (1994)
[29] Mol (2002); Law (2004).
[30] Latour (1993).
[31] Callon, Lascoumes and Barthe (2009); Latour (2005).
[32] Verran (1998; 2001); Law and Lin (2011).
[33] Mol (2008).
[34] de Laet (2000); Mol and Law (1994).
[35] Law and Singleton (2003); Hinchliffe et al (2005).

It is beyond the scope of a short paper to explore any of these possibilities: the list needs to stand in place of an argument. Nevertheless, in a short paragraph I have touched on a dozen literatures and a dozen ways of thinking about how scenes and entities hold together. Having monadologically dispersed objects, animals and bodies across the networks of social, cultural, political, technical and scientific relations, people working in actor-network theory and its successor projects have spent the last twenty-five years trying to understand what it is that makes objects cohere at all in the first place. This has been the resonating theoretical sensibility that has been articulated in and through many case studies. So, though I won't discuss this either in the present paper, if I were asked what I could say of 'the salmon' as an animal, I would start by talking of tinkering, of fluidities, and of multiplicities. I would start by imagining the salmon – the farmed Atlantic salmon – as a non-coherent assemblage that is none the less just that when it intersects with people: *an assemblage*.

But in the rest of this paper I will pull on a different thread to make a third move that is also a third response to the 'where to stop' student question. This has to do with last entry in the list: with alterity and the elusive. The argument I want to make is that salmon are also *excessive* in particular ways: that they fit in, and they don't fit in either. To be clear, I don't want to say that they are *simply* excessive. But this is a *part* of what they are. To see what this might mean, we need to return to the fish farm, and weave theoretical lessons into and out of four further brief ethnographic stories about excess.

The Elusive

First scene: slippery

First scene: there are 600,000 salmon in the city of fish. Even if everything is going well a few of them die every day, and they need to be removed. First you suck the dead fish up from the bottom of the pen. They arrive, bang-slither, on the deck. They're quite large, around 5 kilos, and they are just remarkably slippery. You put on rough waterproof gloves, and you go to grip a salmon, but it slithers away. You try again, grab it round the tail, and you try to lift it. Again it slithers away. You try a third time. You take hold of it by the tail, and you try to slip the other gloved hand under its head to take some of the weight. Then you lift it off the deck. This time perhaps you are lucky. But then again, perhaps you're not, and it flops with a dull thud down onto the deck again. It is almost as if it has a life of its own. A life after death.[36]

So yes, this is still an animal. And this is the hypothesis. It's an animal, in part precisely *because* it is slippery. Or because and more precisely, when it meets with humans, it exceeds the grasp and *becomes* slippery.

Second scene: invisibility

Second scene: there are 50,000 salmon in the pen. You need to keep them fed to keep them growing. So the feed pellets blow from the silos and rain into the pen sixteen or eighteen hours a day. But you don't want to waste feed either because it is expensive. So how do you tell whether you're doing this or not? In the end this is a matter of judgement. This is because once you have dropped the feed into the pen what you need to know is: is it all being eaten? Or is it falling through the bottom of the pen? And it is difficult to know this.

[36] The slippery character of salmon from the point of view of people is explored in more detail in Law and Lien (2013).

Four, five, or six times a day Christoffer climbs the gantry. He walks out above each pen and looks down. He watches the fish. Does the water 'boil' as they break the surface greedily, to eat the pellets? If so, then feed is not being wasted. But what if the water isn't boiling? This is more difficult. Wearing his polaroid sun glasses, he peers down into the pen. He tries to see what the salmon are actually doing. Are they ignoring the pellets? Or are they just feeding quietly? He can't see very far down. No more than a meter or two. In the end he has to guess. He has to use his judgement.

Here is the point of this story. The salmon in the pen are more or less invisible. Sometimes you can see what's going on, but most of the time you can't. Instead, all that you can see is a few dozen salmon out of 50,000. This is the paradox. Even though they are being controlled, the salmon are also dissolving themselves into invisibility. So this is the argument. If salmon are animals this is precisely because in relation to human beings they are also elusive. Down there in the water, so far as the people are concerned, they are also doing their own sweet salmon thing. They are excessive. Again.

Third Scene: anomaly

In the vaccination cabin the fish are only twelve centimetres long. They arrive up a pipe in a flow of water and then they are anaesthetised. When they are quiet and floppy, they slide down a chute, and Ingrid drops them onto a conveyer belt. This moves them into the vaccination machine. First the machine measures them. It does this automatically. If they are eleven centimetres or more, then they are vaccinated. But if they are smaller then the machine separates them and spits them into a different pipe. They slide down this into tank 15.

If you go and look in tank 15, you can see them at the bottom. They dart about when you approach the tank. But this tank is not quite like the others. First you notice that it is only one third full. Then you realise that the fish are not being fed. And then you note that there is no oxygen feed to the tank either. So what is it, this tank? The answer is that this is where the fish that are rejected go. If they are less than 11 centimetres long they do not get into the farm. They do not get fed. They do not grow. They will never end up in the big pens out on the fjord, or, indeed, on your plate. They have been separated out and in due course they will be asphyxiated. This is because they may be slow growers – which means that they will cost more to feed up. It is also because they may suffer in due course in the competition for feed with other larger salmon.

So this is a story of control. The fish farmers would never put it this way, but they are after what we might think of as normalised fish. But what is important here is that control also implies the *absence* of control. Sociologist Zygmunt Bauman, in the very different context of the Holocaust, talks of gardens and weeds. His point is that weeds go with flowers. You don't get the one without the other. So any story about control is also an account of the limits to control. Necessarily, it is also about anomaly or excess. Yes, the losers are really going to lose out. They will die within a few weeks at most. But the argument is that that even as they die the process of normalisation constantly generates excess: the small, the intractable, that which is *excessive*.

Fourth Scene: marginality

Some of the salmon get away. There are those that escape entirely[37], and then there are those that *half* escape. Indeed, if you know where to look for them and tiptoe up without scaring them off, you

[37] See Naylor *et al.* (2005) and Thorstad *et al.* (2008).

can get to see glimpses of them before they dart off. They live there on the margins of the farm, in the sluices. These are the places they carry on living, almost out of sight, at least for a time. They cannot escape – there are grilles, filters and walls round the farm – and it is unlikely that they will get very far. Nevertheless these are places where they are beyond, and yet not entirely beyond, human control. More *excess*: a kind skulking and elusive excess, these are salmon living on and in the *margins* of human practice. Domestication always brings its hangers-on, microbial or parasitical. Rats in the granary, bed bugs in the mattresses. Salmon have their specificities, held at a distance by the fact the people prefer to breath air rather than water. But there they are, even so, marginal and excessive. A part of human practice, but Other too. Because they are slippery, invisible, anomalous, and marginal. Because they slip in and out of the edges of human practices in their particular salmon-like, ways.

A salmon is ….

I have been saying that theory – or actor network theory – is not best thought of as something separate that is *applied* to empirical materials. Instead, it is better understood as a set of threads that are densely woven into our fieldwork practice. It informs how we see whatever it is that we are looking it, and it is something, a set of propensities and sensibilities, that shapes what we look at and poses questions, issues, possibilities of whatever it is that we come into contact with. To say this is not to say that these propensities and prejudices are always productive. Clearly it is sometimes the case that our theory-threads block us off, creating dead ends, or leading us to sterile places. Doing good theory and doing good empirical work – articulating them together – is pretty tough going and it takes luck as well as judgement.

At the same time, if we think about theory in this way, it follows that when we do ethnography (but the same would be true for any research method) we come up with materials that reflect our theoretical propensities. Marianne Lien and I have undertaken fieldwork together in Hordaland, coming and going from the salmon farms for over three years. And as a part of this we have observed that in that fieldwork we often notice different things. To caricature the point, whereas she sees people and interactions I am more likely to see pipes and systems. We joke that this is something to do with gender, and no doubt this is right. We also assume, however, that it reflects different disciplinary sensibilities. Anthropology is interested in material culture, but it is just a little more focused on people and their cultures than the ANT versions of STS. The latter, on the other hand, tend to obsess about materials and enacted relations. The overlaps are large, but the differences are real too.

There are many stories to be told about what a salmon is, but if I am to talk about this from an STS point of view then I need to weave together the three kinds of answers that I have rehearsed above.

- First it is important to tell stories that undo the obviousness and the taken-for-granted of the solid; it is necessary to tell stories about the dispersed and *heterogeneous networks* of practices that generate the possibility of being a salmon. This is old ANT.
- Second, (more old ANT) it then becomes important to talk about *modes of assembling* – about how the salmon puts itself back together again once it has been taken apart and distributed into practices.
- But then, and third, it is necessary to address the issue of *excess*. STS in its ANT mode needs to say something about the moments when the beast slips out from the edges of our human

practices; about the moments that hint at fishy heterotopias. It becomes important to note those moments and to try characterise them. And then, and as part of this, it becomes necessary to acknowledge that it, the salmon, goes to places where people cannot follow; to places that people do not know.

The bottom line is that in this way of imagining how they relate together, theory is woven into ethnographic practice while ethnographic practice is woven into theory. The combination is difficult, infuriating, rewarding and beautiful, all at the same time.

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