Object Lessons[1]

John Law* and Vicky Singleton**

* Department of Sociology,
Faculty of Social Sciences,
The Open University, Walton Hall,
Milton Keynes MK7 6AA

**Centre for Science Studies and
Institute for Gender and Women's Studies,
Lancaster University,
Lancaster LA1 4YN, UK

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Abstract

During research on the management of alcoholic liver disease the authors found that it was difficult to keep the condition in focus through the course of the study. Perhaps this was a sign of methodological failure, but this paper explores an alternative possibility: that social science methods are ill adapted for the study of complex and messy objects. The paper reviews arguments about the character of complex objects as these have been recently elaborated within science, technology and society (STS), and applies these to alcoholic liver disease. Three versions of the object (as region, network and fluid) are found to be relevant. But so, too, is a fourth, fire version, which treats objects as patterns of discontinuity between absence and presence. It is argued that the messiness of alcoholic liver disease in part becomes comprehensible if we imagine it as a fire object.

Introduction

This is a paper about an object. This is not the kind of object you can drop on your toe, but none the less it is an object. It is about the condition called alcoholic liver disease. Alcoholic liver disease is a killer. It is also an object of concern to the health-care system because patients suffering from it occupy beds, often turning up again in acute hospital wards within weeks or months of being dried out and released back into the community. In short, alcoholic liver disease is a costly tragedy.

We were asked to look at the treatment of the disease in an area of the UK that we will call Waterside. The R&D Director of the Waterside acute hospital trust contacted Vicky Singleton to ask her to undertake a pilot study of the management and organisation of the treatment of alcoholic liver disease in and beyond the trust – and she agreed to do this in collaboration with John Law. The full context of this request was not entirely transparent. Clearly senior staff in the trust were concerned that the hospital and the other relevant health-care organisations were not doing the best possible job. They knew that the disease was causing a lot of suffering. They also knew that it was blocking beds and costing a lot of money. Whether this knowledge was corroborated by statistical data was not clear, though subsequent conversation suggested that while such data were available, they were in fact, difficult to extract from the hospital patient record system. Again, whether the R&D Director was acting on his own initiative, responding to a developing concern within the management of the trust, or more broadly to concerns in the National Health Service about the costs, human and economic, of alcoholic liver disease, was similarly unclear to us. Perhaps all of these factors were at work. Nevertheless for the consultant in question the issues were clear. Could the trust do any better? Could it handle and manage the condition better? And, as a part of this, he wanted to know more about how patients with alcoholic liver disease travelled through the hospital system.

We approached our task in a matter-of-fact way. In our research proposal we said that we would:

> ‘seek to map out the processes involved in diagnosing and treating a ‘typical’ patient with alcoholic liver disease – so to speak, the typical ‘trajectory’ of a patient within the organisation of medical care.’[2]

It turned out to be much more difficult to map such trajectories than we had imagined it would be. What was the nature of the difficulty? The presenting symptoms were straightforward. As we did our interviews (in which we met and asked questions of about twenty-five professionals within and beyond the trust) we were given accounts that were so different that it was more or less impossible to fit them together. The idea of a ‘typical trajectory’ proved elusive. (Some of our interviewees indeed warned us that there is no such thing as a typical trajectory of a patient with alcoholic liver disease). We discovered that we were running into other methodological difficulties too. Thus in our interviews we found it difficult to attend, specifically, to alcoholic liver disease. Often the topic of discussion slipped to such related topics as cirrhosis, liver disease, alcohol abuse or alcoholism. So why was this? What was the problem? What was going on?

Rethinking Methods and Objects

We want to suggest that there are four major ways of responding to these questions. Let’s call these respectively, the technical, the managerial, the epistemological, and the ontological.

First, then, the technical. This is quite straightforward: perhaps the problem was that we simply weren’t doing good research. If we could not identify a typical trajectory, or our interviews slid off into different topics, then perhaps we were being vague and imprecise, didn’t have a proper methodological grasp of our investigation, or weren’t asking the right questions and being focussed enough. Accordingly, we tried to take a grip of our interviews, to be more precise, and to hold the topic steady. But at the same time, we didn’t really expect simplicity, so we were not very surprised to discover that this didn’t work. The presenting problem was that what people said was never irrelevant, but neither did it fit with a narrow definition of alcoholic liver disease very well. So after some time we concluded that while we might indeed be failing technically, something else was also going on. But what?

This leads us to a second option, which we’re calling the managerial. Again the story is reasonably straightforward. In this way of thinking, if the treatment of alcoholic liver disease in Waterside was a mess, then perhaps this implied two things. On the one hand, perhaps there was need for some kind of managerial intervention. The hospital trust and its partners needed to get a grip on the way they were handling the disease. They needed to order it better, take inter-agency action, and co-ordinate better. Indeed, probably this is right. The diagnosis, treatment, and after-care of the condition almost certainly needed work. In our report at the end of the study we commented on this, even though it was rather obvious to all concerned. But what’s interesting about this for present purposes is a second and related methodological point. This is that it is not possible to know messy objects. If we think in this way there is, so to speak, little that can be known about mess. Mess is other to clarity, systematic study and knowledge. It defies knowing. If we think in this way

[2] From a letter sent on 7th October, 1998.

then managerialism becomes an executive tool of methodological clarity. It makes a world fit for study. Nice and regular, it makes clear trajectories, and objects that may be known because they don't slip and slide imperceptibly into other and different objects. To caricature the point, but only somewhat, managerialism becomes a way of making objects fit to be known by social scientists.[3]

But can we not know messy objects? This doesn't sound quite right. And, assuming that it isn't right, then we need to ask how we might do it. At this point it is useful to distinguish between two strategies for knowing mess. We'll call these the epistemological and the ontological. What, then, is the epistemological strategy? This works by saying that objects look messy because people have different perspectives on them. For instance a condition such as alcoholic liver disease has different significance for patients, gastro-enterologists, relatives and general practitioners. It simply means different things to these different groups. Looked at in this way, then, messy objects are interpretatively complex objects, and if we want to understand them we need to take this into account. We need to explain (and in some cases explain away) the different perspectives, and so retrieve the real object behind the interpretations.

This kind of perspectival approach is common in studies of objects. For instance, in a classic STS (science, technology and society) paper, Susan Leigh Star and James Griesemer talk of 'boundary objects'[4] and argue that these take the shape that they do because they act as boundaries and crossing points between different social groups with different cultures. They suggest that boundary objects are differently interpreted by those different groups, and this means that they are relatively flexible or multi-interpretable in character. This productive insight has been widely adopted in STS work on objects[5], and there is little doubt that alcoholic liver disease can be understood in this way. It can be treated as a crossing point between different patients, physicians and all the other relevant social groups, a reality that is flexibly interpreted in order to shape the transactions between those groups.

But in this paper we want to explore the fourth option. We want, that is, to conduct an experiment that moves us from multiple interpretations of objects (which we have just been discussing) to thinking about multiple objects themselves. This is why we call it ontological. To make this move we need to take an important detour to do with performativity. We need to say (though we're not going to defend the position at length here) that realities, messy or otherwise, are enacted into being[6]. Then we need to add that in part at least, such enactments take place in the practices of getting to know those realities. This has several implications for our argument that we will try to draw out in the body of this paper, but the most immediate is methodological. This is that while alcoholic liver disease is indeed an object, it is an object that doesn't look like an object because our methods aren't geared up to

[3] The argument about mess is developed more fully in Law (2003; 2004).

[4] See Star and Griesemer (1989).

[5] The literature is very large. See, for instance, Fujimura (1992).

[6] The point has been developed in a range of social science traditions. In STS see Latour and Woolgar (1986), Hacking (1992), Pickering (1995), Haraway (1997), Rheinberger (1997), Mol (2002) and Law (2004).

detect or know it. Instead they lazily make it look like an more or less unknowable mess.

To be clear, this is not a version of the first technical argument. It is not another way of saying that our personal use of method wasn't up to scratch (though that may, of course, have been the case). It is a much more radical position that is, in effect, an attack on social science method for failing to develop tools for knowing (we should add enacting) certain kinds of realities. Instead of trying to know those realities, social science rather prefers to treat them either as more or less unknowable mess (this is the managerial option) or as technical failures to know realities that are wrongly assumed to be definite.

This, then, is our argument. It is possible to know complex objects by adopting an epistemological approach – by looking, for instance, for boundary objects. But we are proposing an alternative, and suggesting that if we want to know certain kinds of (supposedly 'messy') realities well then it is useful to rethink method in quite radical ways. And, to make the same point a little differently, we are saying that we need to think more carefully about the nature of the objects in the world: about what counts as an object. It is our suggestion that objects come in forms that cannot be known within the most obvious versions of common-sense, and that in thinking about this it is useful to work on different models for imagining objects.

In what follows we review the arguments about objects as these have been recently elaborated within parts of the discipline of science, technology and society (STS), and in particular within actor-network theory and some of its successor projects. Enumerating three versions of the object as this is understood in 'ANT and after' (objects as regions or volumes, objects as networks and objects as fluids) we show how these work – and don't work – for the case of alcoholic liver disease, its trajectories, and its treatments. Then, again borrowing from ANT-influenced work, we characterise a fourth possibility, that of objects as fires. The notion of fire, or fire objects, has previously been discussed in one mode[7]. Here we extend that argument, and suggest that the messiness of alcoholic liver disease in part becomes comprehensible if we imagine it as a fire object

Network Objects in STS

If we start with common sense then we tend to think of objects as physically constituted items that occupy a volume in Euclidean space. Writers in STS have been exploring the character of objects for at least twenty years[8] and, as we have just noted, one of these lines of work comes from actor-network theory. In order to explore this it is convenient to start by following Bruno Latour and talking of immutable mobiles. An immutable mobile, says Latour, is something that moves around but also holds its shape. Indeed, in this way of thinking, it holds it shape in two importantly different ways. On the one hand, it does so in physical or

[7] For a summary account of different versions of objects in STS, and their implications for spatiality, see Law and Mol (2001). The present piece builds upon this paper and the work that it summarises.

[8] One predominant approach, the social shaping of technology, says, as its name suggests, that artefacts are shaped by their social circumstances. See the collection MacKenzie and Wajcman (1999).

geographical space. And on the other, it holds its shape in some relational and possibly functional manner where it may, to say it quickly, be imagined as a more or less stable network of associations.

The notion of the immutable mobile was worked up as a tool for thinking about long distance control, and, at the same time, the work that goes into moving scientific facts around so producing their apparent universality. Empires, suggested Latour, including the empire of science, hold themselves together because immutable mobiles circulate in and through narrow networks that allow them to retain their shape. Codes, information, people such as technicians, soldiers or bankers, technological bits and pieces such as ships or scientific instruments, texts such as orders, newspapers, or money orders – if objects such as these are able to hold their relational shape as they circulate around the globe, then long distance control is a possibility. The latter, then, depends upon such immutable mobiles. It depends upon a process in which networks of relations are built up to secure immutability on the one hand, and mobility on the other[9].

The argument is easily seen for an object such as a ship. European imperialism depended upon ships. These had to be mobile, and then they also needed to hold their shape both physically (wreckage does not have the same physical shape as a vessel) and as a set of relations, a network, in which the hull, the spars, the sails, and all the rest worked in the way that they did – had the attributes that they did – because they formed part of a stable network. So the argument works for ships. It also works for documents, codes and texts. Arguably it also works for people (they have to hold their shape as functioning organisms). But how well does it work for alcoholic liver disease?

Let's not get detained for too long by the fact that disease is an abstract entity, for so, too, is the class of ships (or persons), not to mention scientific facts. On the one hand, this makes it difficult to point to an (abstract) object that is located in matter-of-fact geographical space. On the other hand, we can point to 'a ship' but, at least arguably, we can also point to a particular case of alcoholic liver disease. The process of pointing is a little more elaborate, but therein lies an interesting and relevant lesson from actor network theory. What it tells us is that many (probably all) objects putatively located in physical space can only be detected in a network of relations that makes them visible. Such networks might exist, for instance, in laboratories. Indeed many physiological or disease conditions depend on just such a network: a network of laboratory tests, for instance radiological, histological, physiological and/or behavioural that secure their identification – and indeed their reality[10].

STS most often attended to the creation of objects and depictions of objects within the laboratories and field-sites of natural science. More recently, however, the argument has also been worked out in health-care contexts[11]. For instance

[9] See Latour (1983; 1987; 1990), and Law (1986).

[10] There is a fine tradition of laboratory studies in STS. For influential historical and contemporary instances of the genre see Latour (1979), Knorr Cetina (1981), Lynch (1985), Shapin and Schaffer (1985), Pickering (1995), Rabinow (1996) and Rheinberger (1997).

[11] For a book-length account see Mol (2002). See also Mol and Berg (1994), Mol and Elsman (1996), Mol (1998; 1999), and for related work see the papers collected in Berg and Mol (1998).

philosopher Annemarie Mol has shown for lower limb atherosclerosis how different sets of relations in (for instance) the general practitioner's surgery, the haematology laboratory, the radiography department, the physiotherapy service and the operating theatre each produce their object – the atherosclerosis in question. (Indeed it is more complicated than this since there may be differences between these objects – a point which we will come back to shortly). Returning to the case of alcoholic liver disease, the implication is that it is not possible to point to or at a diseased liver without intervening in, or being embedded in, a network of practice (as, for instance in a post-mortem, an ultrasound scan, or a consultation in a general practitioner's surgery). The object depends on relational work of one kind or another, instrumental and interactive, in the hospital and the general practitioner's surgery. Diagnosis is likely to depend in part on laboratory work and high-tech diagnostic tools, but also, as one textbook puts it, on a 'high index of suspicion on the part of the physician' (Sherlock, 1989, 435). Is the patient drinking? If so, and if s/he reveals a number of possibly diagnostic symptoms (digestive problems, loss of memory, insomnia, hallucinations, jaundice) then the person may be diagnosed as suffering from the disease: a case, an example, of the object, has been identified.

Thus the first take-home lesson from ANT and post-ANT studies is that objects often display – may be understood as being constituted in – a double immutability. On the one hand they probably have a more or less stable shape in physical space – though the definition of that stable physical shape is likely to depend on relational and interactive work of one kind or another (and it may also be that 'abstract objects' don't occupy Euclidean space)[12]. On the other, they certainly have, display, or are constituted by, a more or less stable structure in a network of relations. Stability (one might say spatial stability, though that is another argument) is sustained in two separate and partially related ways (for the network-shape of a ship is related to its physical integrity)[13]. The added ANT argument is that it takes effort to sustain stable networks of relations. This means that objects such as diseased livers or alcoholic liver disease have to be maintained if they are to sustain themselves and move between locations. It is necessary to carry on enacting the network of relations that holds them up and constitutes them. Otherwise things start to lose their shape, lose their characteristics, and seep away. They stop being the objects that they were. Nothing is fixed and for ever in the ANT world. Only some things are fixed, and for a time.

[12] For common-sense objects of certain sizes – shoes, London buses, or even moons – the relational work takes place widely, without fuss, and is therefore generally unremarked and unremarkable. It is for esoterica such as alcoholic liver disease, solar neutrinos, and genomes that the relations have to be carefully constructed in specialist locations such as laboratories.

[13] The argument can be expressed as an informal version of topology, which is the branch of mathematics concerned with the spatial invariance of shapes. It invents conventions, and then explores their implications. Brought into the present context, then, it can be said that objects are shapes that subsist and hold themselves constant in one or more topological system. The issue then becomes understood as one in which new topological systems are elaborated and explored. We have chosen not to use this vocabulary in the present piece, but what we write is consistent with it. For references on topology and the social see Mol and Law (1994), de Laet and Mol (2000), Law and Mol (2001), and Law (2002b).

Fluid Objects in STS

No doubt ANT does all sorts of useful work. The idea that objects may be understood as immutable in this double respect catches something very important. At the same time, the approach has been accused of a variety of sins and several of them are relevant to our argument. These have to do with invisible work on the one hand, and immutability on the other. The first of these worries is quite straightforward though very important. It is the claim that ANT tends to efface the 'invisible work' that keeps the objects and the empires that it studies in shape, gives them their form, keeps their networks of relations stable[14]. The argument, then, is that even though ANT knows well that it takes effort to keep networks in place, nevertheless in practice it tends to delete all sorts of arrangements as it explores how objects become relationally stable[15]. The second anxiety is related to this. It is that the definition of the object proposed in this version of ANT is altogether too rigid. Is it not the case, the critics have asked, that even if we want to think of objects as the effects of the enactment of sets of relations, those relations are a good deal more variable than early versions of ANT tended to suggest?[16]

The two complaints are, to be sure, related. If (we insist on the 'if') objects may be treated as immutable configurations of relations, then these are at best only the tip of the iceberg. By definition all the (indispensable) invisible work lies below the waterline. Or, to put the argument slightly differently, might it not be the case that if we want to understand objects, to characterise and study them, then we need to attend as much to the mutability of what lies invisibly below the waterline as to any immutability that rises above the surface?

Such, at any rate, is an implication of an argument made by Marianne de Laet and Annemarie Mol in an exemplary paper on a technical device, a water pump that is widely diffused through the villages of Zimbabwe and successfully produces clean water.[17] Their argument is that this object is best understood as a mutable mobile. It is mutable in a variety of ways, and for a variety of reasons. For instance over time (and indeed geographical location), its physical shape changes, as do its component parts. This is because when a pump breaks, villagers tend to replace its components with whatever happens to be at hand: bits of old tyres, convenient tree branches,

[14] See, for instance, Star (1991) and Haraway (1997). On the invisibility of technicians and other non-scientists in scientific replication, see Shapin (1989; 1985). An analogous observation – though with slightly different implications – has been made by Bloomfield and Vurdubakis (1999) who note that the attempts by ANT authors to trace networks also reflect assumptions about what is important. For instance, as they observe, the study of Portuguese ships and their operation undertaken by Law, while including all kinds of heterogeneous actors ranging from money through the King of Portugal to the trade winds and the stars, nevertheless excluded God – most certainly an important actor.

[15] Formally, this is not really a proper complaint about ANT, since it is very clear that an actor (in this context an object) is a black box containing an endless and ramifying network. Nevertheless, the social status of the hidden work was of relatively little interest in early versions of actor network theory.

[16] It is possible to read the ANT literatures in a variety of ways, and if (as seems fair) the notion of 'translation' is treated as the most fundamental term for imagining relationality, then the tighter and more restrictive notion of 'network' becomes less important in those literatures. See Latour (1988; 1999). On some of the difficulties of the notion of network see Strathern (1996).

[17] See de Laet and Mol (2000).

whatever. Looked at from the position of the designer this is a kind of 'invisible work'. 'The pump' keeps going, but the work that is keeping it going is largely unremarked, and (very important in the present context), that work has the effect of reconfiguring the relations that keep the pump going.

De Laet and Mol also show that the capacity of the pump to produce clean water is similarly variable. This is because what counts as clean water also changes. Sometimes (but rarely given the poverty of Zimbabwe) cleanliness is defined and tested in a laboratory in conformity with international bacteriological criteria. More likely, it is tested by in practice by virtue of the relative absence of disease amongst the users of a pump. The argument, then, is that it is not simply the mechanical configuration of the pump that changes, but also the practices that produce its success. And the argument can be extended further into the social. For instance, the pump has been an important tool in the Zimbabwean national policy of fostering collective activity amongst villagers. But as an object of policy it has been similarly variable. Though villagers are supposed to work together to install and maintain the pump, not infrequently this does not happen and a small group of households play this role.

Overall, then, it is a moot point whether this pump has, or is, a stable set of relations à la ANT at all. The argument can be made that there is a core of stability – perhaps something about the handle, the lever and the valve is invariant, together with the fact that it produces water. Alternatively it can be argued that there is not (this is de Laet and Mol's own suggestion). But this doesn't really matter, because much more important is the general fluidity of the relations that make up the pump. Here de Laet and Mol make their argument carefully. This general fluidity, they are saying, means that it should be seen as a fluid object. This is because it flows and gently changes shape, bit by bit. The implication is that the changes cannot be abrupt. If they were abrupt then the object would disappear – or we would end up with a different object, not one that is 'the same'. The metaphor of gentle flow and undisturbed reshaping is what is important here. Perhaps there is some kind of more or less viscous flow. This, then, is a new definition of the object. In this way of thinking an object may be imagined as a set of relations that changes. Oxymoronically, it is something that both changes and stays the same[18].

Indeed the argument is even stronger than this. This is because staying the same may also depend upon changes[19]. And this is not simply a point of theory. For as the authors show, the success of the pump in practice depends upon its (fluid) adaptability. The company that manufactures the device, which is based in Harare, is entirely relaxed about how the pump is adapted and used. And as it happens this isn't laziness, but a form of political commitment. The priority for the owner of the company is improving the water supply in rural Zimbabwe rather than maximising profit. For this reason he hasn't patented the pump or its components. People are encouraged to borrow from and adapt it. In his way of thinking – and this is

[18] For another account of a fluid object – this time anaemia – see Mol and Law (1994). In this paper the possible family resemblance with Wittgenstein's (1953) notion of family resemblance is also considered.

[19] This has been explored by one of the present authors in her work on the UK cervical screening programme. See Singleton (1996; 1998).

translated into practice – make do and mend is much more important than immutability.

What we have here, then, is a third model of the object. This becomes a mutable mobile. An object or a class of objects may be understood as a set of relations that gradually shifts and adapts itself rather than one that holds itself rigid. In this way of thinking ANT became too managerialist in its early versions as it thought about objects. Its intuition about the importance of relations was right, but it got itself too concerned with standardisation, with the rigidities of immutable mobiles that, if they exist at all, exist within rather specific and rigid networks that try to reach out over long distances and achieve centralised control. Perhaps, then, we need to be looking at networks that are more relaxed, networks where such control is less important. Perhaps we need to be looking at networks where objects precisely have to adapt and change shape if they are to survive.

So how well does this line of thinking work for alcoholic liver disease? The answer is: it is helpful, but only up to a point. First note a major (but salutary) inconvenience. There is pretty much nothing to be said in favour of alcoholic liver disease. If this is a fluid object, then this is not an indirect way of allowing us to say (as is tempting in the case of the bush pump) that fluidity is a good in and of itself. Here, if the condition is fluid, this may well be a bad. But having entered this caveat, it appears that fluidity (and invisible work) are indeed at work. The textbook mentioned above, which includes a chapter on alcohol and the liver, is cautious in almost every respect. Indeed, it offers no definition of 'alcoholic liver disease'. Instead there are numerous questions, and answers to those questions, and all are surrounded by caveats. Examples. Does alcohol abuse lead to cirrhosis of the liver? Sometimes yes, but in most cases no. Is there a relation between the amount drunk and disease? Yes, but the correlation is exceedingly indirect. Does alcohol lead to hepatitis? Usually, but in varying degree. Does the patient suffer symptoms? Answer: yes, but these are variable, and frequently indicate other conditions. Is the patient suffering from alcoholic liver disease able to hold down a job or participate in social life? This is variable: sometimes yes, sometimes no. And even the 'hard science' part of the description, about the oxidation of ethanol in the hepatocyte, is full of ifs and buts. There are, we are told, three major pathways for metabolising alcohol in the liver. None are very desirable, but their relative importance (and the damage they cause) varies, and depends on a range of other factors including diet, pharmaceutical drug-taking, hepatitis B infection, and 'genetic polymorphism' (Sherlock, 1989, 428).

It is tempting, then, to say that this is a fluid object. At the very least its configuration changes and adapts itself. Even within the textbook, where one might expect a serious effort at precision and stability, it shifts gently in its shape from one instance to another. But what of the name-changing that we talked about earlier? What of the slippage between 'alcoholic liver disease', the formal topic of our inquiry, and the other related topics that we found ourselves talking about? In our first self-castigatory and technical response that we mentioned earlier, we simply assumed that we were confusing different objects and told ourselves to shape up and straighten out our methods. After all, we told ourselves, cirrhosis is not the same as alcoholic liver disease, even if it is a possible consequence of excessive consumption of alcohol. But what we have now said about fluidity suggests another way of

thinking about this. The implication is that we weren't being sloppy. Instead we were dealing with and learning about a single – albeit shape-changing – object.

It demands a degree of stubbornness to make this argument in a world where methods that generate what appears to be mess are so easily dismissed as a sign of technical failing. Specifically, it implies commitment to a form of ontological radicalism: a willingness to push the boundaries about what an object is, or could be. This is because we're not simply pressing an argument about a fluid object of the form proposed by de Laet and Mol (though this is already radical), but also trying to suggest that alcoholic liver disease is an object that flows across entities that, if we think about it more conventionally, are not only different but also have different names. Clearly, then, it is possible to argue this either way. However, we are in favour of ontological (and methodological) radicalism. Our assumption is that the object we were dealing with is indeed an object of an unconventional kind, an object that for this reason is difficult to recognise, at least within some of the conventions of social science method[20]. But what is most important for us in the present context is that we establish that a fluid, shape-shifting, and name-changing object is indeed a conceivable possibility: that this is not ruled out by prior methodological commitments to particular and limited versions of clarity. Thus our argument is that in our study we weren't simply suffering from confusion as we moved between different names (for instance alcoholic liver disease, alcoholic cirrhosis, alcoholic hepatitis, or alcoholism) but rather learning something about a real, albeit difficult, object. We were learning about a phenomenon filled with and made in invisible and more-or-less fluid relations. We had come across a phenomenon wrestled with and handled – often very well – by the professionals whom we interviewed.

This way of thinking stands what we earlier referred to as the managerial approach on its head. Managerialism, we noted, finds mess intractable. Indeed unknowable. Perhaps more radically, managerialism makes mess, not in the nasty and motivated way that is the most obvious way of interpreting such a suggestion (though no doubt this happens), but simply because it, in its nature, demands clarity and distinction. That which is not clear and distinct, well-ordered, is othered. It is constituted as mess, like the plants that are turned into weeds by virtue of the invention of gardening[21]. Perhaps, then, mess is like invisible work except that it isn't invisible. Instead it simply doesn't fit: it flows around and exceeds the limits set by immutable mobiles.

Fire Objects in STS

Is this the end of the road? Do we now have a plausible way of thinking about an object such as alcoholic liver disease – or the object that does not have a single name but has something to do with alcoholic liver disease? Our suggestion is that we're moving in the right direction – perhaps this is in part a fluid object – but we still need to make one further move if we want to understand its apparent disorganisation.

[20] This has been argued at greater length in Law and Singleton (2003) and Law (2004). See also Law (2003).

[21] On gardening, weeds and social ordering, see Bauman (1989).

To think about this it is helpful to return once again to the complaints about – and limits to – ANT analysis, and to the post-ANT STS literature that has attempted to respond to those limitations and complaints. Thus we've seen that in the way it makes sense of objects ANT has been accused both of effacing invisible work, and of committing itself to an inappropriately rigid and centred version of relations. At the same time, and partly in response to such difficulties, various post-ANT studies have loosened up on networks, considered fluidities, and explored the ambivalences and displacements that (sometimes) keep networks in place[22]. But there are further important questions. One concerns what is sometimes called the problem of difference, and the other is the suggestion that ANT has colonised the other. A word on each.

The 'problem of difference' is explored in – and is indeed the focus of – the work on atherosclerosis by Mol mentioned above. Difference is important in healthcare because different health-care practices may produce different diagnoses for individual patients. What looks like lower limb atherosclerosis in (for instance) the general practice may look like something else when ankle/arm blood pressure is subsequently tested and is found to be normal. Or what appears to be an obstruction in a blood vessel after radiographic investigation may not be discovered and corroborated in subsequent ultrasound measurements of blood flow[23]. Sometimes the different diagnoses line up, but often they do not. Difference, then, is the lot of health-care professionals: faced with a patient who is suffering they have to sort out what to make of any differences.

So how to think about this? Typically the problem is imagined as a matter of perspective. It is assumed that different diagnostic techniques more or less imperfectly discern an underlying disease object. Seen in this way the issue is to try to sort out what that object really is on a basis of insufficient information. This, we might say, is an epistemological approach. We mentioned an alternative version of this epistemological approach above. This would treat the condition as a boundary object, a single reality that makes it possible to negotiate and secure transactions between different cultures or professional groups. This is plausible, but Mol argues differently. She follows the relational STS line which argues, as we have seen, that the accounts of realities and the realities that they describe are produced together. Accordingly, she recommends that difference be understood ontologically. This means that difference is no longer a matter of different perspectives on a single object, but the enactment of different objects in the different sets of relations and contexts of practice. The title of Mol's book, The Body Multiple, catches the implications of this turn to ontology. The body, usually imagined to be a single entity, is also multiple because it is enacted in multiple practices. The problem of difference then becomes one of relating these bodies together or holding them apart in one way or another. Objects become ontologically complex, multiple and (in some cases)

[22] See, for instance, Singleton and Michael (1993) and Singleton (1996; 1998).

[23] For details see Mol (2002).

mutually exclusive[24]. Sometimes, though this is an empirical matter, they are Other to one other.

Though this is not her major concern, Mol's argument thus overlaps with the second concern about ANT: that the approach colonises the other[25]. The issue at stake here is what it is (in addition to invisible work) that ANT does not see in its talk of networks and relations, and in its descriptions of (relatively) centred actor-networks. The question is not susceptible to a single answer. Otherness is limitless. Nevertheless, the logic behind the question is important. It is inspired, like ANT itself, by a post-structuralist critique of what is sometimes called the metaphysics of presence. The point is straightforward but its implications are far from banal. Simply stated, the argument is that not everything can be brought to presence. Or, to put it differently: to make things present is necessarily, also, and at the same time, to make them absent. Presence, in short, depends upon absence (just as absence depends on presence). This is a matter of logic, of definition. The point is developed in a variety ways in the relevant literatures[26]. But if we think about the implication of the argument for objects it runs something like this: an object is a presence. It is present, here and now. But whatever the form of its presence, this also implies a set of absences. The present object implies realities that are necessarily absent, that cannot be brought to presence. That are othered. So (to put it slightly differently) an object is a pattern of presences and absences.

Arguably early ANT didn't see this very well (though counter-arguments can be made). However, it is certainly a possibility that has been provisionally explored in post-ANT writing, and perhaps most explicitly in an account of an aerodynamic formalism[27]. A brief rehearsal. The formalism in question was created by aerodynamicists working in a British aircraft company to describe and define (that is, bring to presence) the relations between a series of features of an aircraft wing. The interest was how this might behave in gusty air. So brought to presence and included in the formalism were factors known to affect such 'gust response'. These included wing size, the lift of the wing at various angles in the air, and airspeed. Some of these terms were fixed. For instance the wing needed a lot of lift: more, for instance, than would be typical civil aircraft. But why? The answer is: the Russians. This is because the aircraft that would use the wing was a warplane be used (in part) in a European war against the Russians. The assumption was that the Russians would try to destroy conventional runways right at the beginning of any hostilities, so the aircraft would have to take off from short airstrips. The Russians, then, were both present in the formalism yet at the same time necessarily absent (there is no room for the Soviet air force on a sheet of paper). Another looming absent-presence was the bodies of the human pilots (parts of the formalism about the limits to gust were set by the physiological limits of the human form which can withstand only so much

[24] A similar argument is developed for a technical object, an aircraft, by Law in his (2002a). It is also explored in somewhat different idioms for health-care contexts by Singleton in (1998), Singleton and Michael (1993) and Dugdale (1999).

[25] See Lee and Brown (1994).

[26] Jacques Derrida (in (1982) amongst many others) talks, for instance, of différance, deferral, and the lack of completion of texts that treat themselves as complete, and Jean-François Lyotard (1984) talks of the distinction between discourse and figure.

[27] See Law (2002c), Law and Mol (2001), and Law and Singleton (2003).

acceleration). A third absent-presence was the density of the atmosphere. (This was set by nature together with the Russians, since the aircraft needed to fly low, in dense air, over Eastern Europe, or it would be shot down by Russian anti-aircraft missiles). Absent-presences, then, (and this is only a small subset of the possibilities) helped to bring the formalism to presence in a particular way. Their juxtaposition generated it in the particular form it took. But that presence, once created, in turn generated novel (perhaps deferred) forms of absence. That is, it shaped other new but absent realities: a wing, for instance, of a particular shape; a series of wind-tunnel tests of possible wings; and, in due course, an aircraft designed in a particular way with particular aerodynamic properties.

The argument, then, is that we can't understand objects unless we also think of them as sets of present dynamics generated in, and generative of, realities that are necessarily absent. Such objects are transformative, but the transformations are not the gentle flows discussed above in fluid objects. They are more like some of the differences mentioned by Mol. This is because they take the form of jumps and discontinuities. In this way of thinking, then, constant objects are energetic, entities or processes that juxtapose, distinguish, make and transform absences and presences. They are made in disjunction. Here (and following the STS lead again) we will talk of such entities as fire objects. (The argument in part is that fires are energetic, transformative, and depend on difference – for instance between (absent) fuel or cinders and (present) flame). Fire objects, then, depend upon otherness, and that otherness is generative.

What does this suggest for alcoholic liver disease? The most obvious answer is that this is indeed an object that juxtaposes and transforms discontinuous realities that cannot be held together or brought to presence. So, for instance, the hospital version of the disease and its treatment hinges around a series of different but closely related absences and presences. Examples.

First, treatment starts with withdrawal from alcohol. Continued abstinence is necessary for sustained improvement. 'Success', said a Ward Sister, 'is if they don't drink.' A consultant gastro-enterologist said that patients: 'enter into a contract with us. We will try to help them, but only if they also try to help themselves [by abstaining] as well.' So, first, alcohol is absent from or other to the disease and its treatment, but is at the same time necessary to and present in it.

Second, and slightly differently, absent from the hospital is the drinking person. At the same time, that person is a necessary prelude to the diagnosis and treatment as this takes place in the hospital. But, then, absent too is the person after discharge. The person in the community is someone who has withdrawn from alcohol and is no longer drinking – and he or she is no longer in the hospital. The hospital patient, at least in theory, is generative of the post-withdrawal person-in-the-community who abstains.

Third, and in a way that is somewhat connected, there are organisational distinctions between the Acute Hospital Trust (which is responsible for the hospital), the Community Trust (which is probably responsible for aftercare) and a series of other agencies (Social Services, Alcoholics Anonymous, Primary Care Trusts, specialist clinics, and advice centres). All of these are organisationally other to the hospital, but at the same time all are juxtaposed with and included in its version of alcoholic liver

disease. The latter takes the shape that it does because it relates to – and refuses – these looming absent-presences. To get a flavour of what this means in practice, see how a ward sister responded when we asked her how she would like to see the system changed:

> 'I would like to see more support for alcoholics. The fact that there is no psychiatric support makes me mad. Social work support is limited. If they can't re-house them, can't move them, then they are likely to be going back to the situation which made them drink in the first place. That's distressing. If they want to get out it would be much easier if they could have proper support.'[28]

Fourth, if alcoholic liver disease in the hospital is conditioned by these (organisationally defined) absences, these in turn resonate with a set of distinctions between mind and body, or perhaps between society, mind and body. This, as is obvious, is a set of divisions with a long and elaborate genealogy. In Europe since at least the seventeenth century, it has usually been imagined that minds operate best by effacing their embodiment. Conversely, it has often been seen as at best an inconvenience that bodies appear to be related to minds, and cannot be dealt with as bodies, pure and simple. Health care currently wrestles with this problem in a hundred manifestations – for instance in the form of informed consent. Unsurprising, a version of these divisions is being enacted here. Thus the Acute Trust is (mostly) supposed to deal with bodies. In the first instance minds are a bit of a nuisance[29]. Who it is that is supposed to deal with minds (or societies) is less clear (social work, psychiatry?) But, as the quotation from the ward sister also suggests, the embodied disease in the hospital is conditioned by – and conditions – these othered realities. Perhaps we are inclined to say (following the ward sister) that this multi-named condition is an object that spreads across body, mind, and society, but it does not simply flow, because the latter two appear, from the point of view of body, as othered realities, that both belong and don't.

We're arguing, then, that alcoholic liver disease and its treatment in the hospital are fire-like objects. They are generated in juxtaposition with realities that are necessarily absent, even though they bring versions of those realities to presence. At the same time, they work upon those presences and transform them, for instance in the form of abstinence, medical support for withdrawal, nutritional regimes, and all the rest. And they depend, in due course, upon a further process of othering, in which the dried-out patient disappears from the hospital. We have tried to show that these fire-objects, the disease itself and its treatment, work energetically upon a series of absent-presences that include patients, but also include versions of the disease, the organisation of health care, and recurrent mind-body dualisms. In these respects, then, they follow the pattern of the fire-object, the aerodynamic formalism, discussed by Law.

So far so good. But something else is going on too, and it speaks to the initial issue to do with mess. To see this we need to move beyond the hospital. In order to make our point we will very briefly visit two further sites of practice. First, we quote the

[28] Reconstructed from interview notes with ward sister H, 3rd March, 1999, page 14/2.

[29] There is some space – though not that much – for psychiatry.

words of a community-based psychiatrist working in a substance abuse clinic. We'd asked him a question that assumed the necessity of abstinence, and this was his reply:

> 'No. It is not just a question of being substance-free. It also has to do with improving other aspects of life. Such that the substance, or the alcohol, becomes secondary. Then people begin to be free, free of the substance, and enjoy health and a social life. These become more important than the substance. So, for instance, success would be talking with the children a couple of times a week in the evening, instead of going to the pub the whole time.'

We can treat this as another but different fire object, another version of alcoholic liver disease, another set of relations. Absent is withdrawal. Absent is abstinence. Absent is the hospital version of the disease. Absent, indeed, is the hospital. Instead, a series of other realities have become present in their absence. In particular, we learn that included in (but different from) this new object are: spending time with the children; moderate drinking; and a certain amount though not all of the time in the pub[30]. The pattern, quite simply is different. It is possible to find matter-of-fact reasons for this. For instance, the hospital is confronted by people whose drinking has induced an acute (and possibly life-threatening) crisis. Those visiting the substance abuse centre are not likely to be in the same position. Perhaps they are worrying about their family life. Perhaps their partners or those they work with have given them an ultimatum: 'sort out your drink problem, or else'. Nevertheless, not only is the object being made here in the abuse centre different, but the list of its othered but present realities is both very different and inconsistent with that of the hospital.

The second site is that of a general practice in a sink estate on the outskirts of Waterside. Here are the words of the general practitioner:

> '[It] is not an issue to [talk with patients] about the physical consequences of alcohol. I cannot talk about such things to many of the clients – this might provoke a violent response. It just is not relevant to them. Long term issues are not considered. Many people have accepted that will never work again and do not aspire to a fancy car and different housing.'[31]

This general practitioner goes on to tell us that for many alcohol is the least of their problems: that the consequences of alcohol abuse are minor compared with the alternatives that include heroin addiction. 'Frankly', she says, 'they'd be better off on alcohol'. And to drive the point home she also described one patient who'd been told by a hospital consultant that she would die if she did not stop drinking. The warning was supposed to scare her, the patient, into abstinence, but in fact her response was quite different. Matter-of-factly, she simply wanted to know: 'How many months have I got to live, doctor?'

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[30] In this way of thinking, some level of drinking is more or less inevitable – as was noted by the surgeon who supervised George Best's liver transplant after the former football player was discovered to have spent time one weekend in his local pub. See BBC News Online (2003).

[31] From interview notes with community doctor Dr F, 11th June, 1999, page 55/3.

So what are the absent-presences here? The list is different yet again. Any answer is going to include: desperation; poverty; long-term unemployment; violence; heroin; crack cocaine; and continued drinking. These are the realities absent from, but also present in, alcoholic liver disease in this practice. In short, if we set alcoholic excess up against a job or a failing liver, or an acute admission to hospital, the answer may be abstinence. If, however, we set it up against hard drug abuse then the response is quite different.

So we have three fire-objects, three versions of alcoholic liver disease. Each is made in a series of absences, but (and this is crucial) each is made differently. In the hospital it is a lethal condition that implies abstinence. In the substance abuse centre it is a problem that implies regulation and control. In the general practitioner's surgery it is a reality that is better than hard drugs. Each includes and relates to a different set of absent-presences. Each is transformative and generative. Each moves the patient and the patient's body on: to abstinence; to family life; to alcohol rather than drug use. But this means that the pattern of absent-presences over the three locations is itself a pattern of absent-presence, of necessary otherness. For the three versions of alcoholic liver disease – and the three versions of treatment – are other to each other. They cannot be included in each other. At the same time (and this is the difficulty and the complication) they are also necessarily related to one another because they are part of the same health care system and interact with one another. Patients, instructions, guidelines, forms, files and professionals, these all circulate between the different sites.

It is at this point that the reason for the managerial difficulty with the disease becomes clear. This is not an object that can be domesticated. The metaphor of fire can be developed in several ways. But what we are learning is that alcoholic liver disease is not like a fire in a grate, reproducing a series of absences and presences that are in principle susceptible to control. This is not a fire-object in which the fuel that feeds it can be limited, and the ashes raked out. It is not a fire that stays in the same location, drawing on and making a constant set of absences and presences. It is not like a domestic fire. Instead the better metaphor is that of a bushfire. In this way of thinking, alcoholic liver disease becomes an object, that jumps, creatively, destructively and more or less unpredictably from location to location. It is an object in the form of a dancing and dangerous pattern of discontinuous displacements between locations that are other to (but linked with) each other. Perhaps it flows too, perhaps it is a fluid object. Indeed it is tempting to think of it in that way, and the metaphor catches something important. But it is also, or so we believe, much more dynamic, more sporadic, less predictable, yes more discontinuous than is suggested by the metaphor of flow. This is why, for us, it is a fire object: it lives in and through the juxtaposition of uncontrollable and generative othernesses[32].

Conclusion

In this paper we have followed an ANT-and-after trajectory and imagined objects in four different ways: as volumes in Euclidean space; as stable networks of relations; as fluids that gently reshape their configurations; and finally, as generative links

[32] For a fascinating account of a brush fire and its tragic consequences, albeit written for very different purposes, see Weick (1993).

between presences and absences that are both brought, and cannot conceivably be brought, together.

There is much more that might be said. For instance, implicit here is a commitment to a spatial way of thinking. Objects are shapes that hold their shape, but they do so in four radically different ways: as volumes; as stable network configurations; as gentle relational re-orderings; and as patterns of absent-presence. But if we think about it in this way it becomes difficult to imagine that objects subsist in only one of these versions. Indeed, it may be a defining character of an object that it subsists in several forms and that it flows (or discontinuously jumps) between them[33]. But this is important, because these are spatial forms that are both other to each other, different, and at the same time partially connected. So, for example, it seems plausible to suggest that if one were to follow particular patients diagnosed as suffering from alcoholic liver disease (or the bodies of those patients) one might generate not only a different kind of narrative, but also one that was smoother, more fluid-like, and less discontinuous[34]. The issue, however, is why would one do that? Or, conversely, why would one insist on the significance of radical ontological discontinuity as we have above by talking of an elusive object that starts out as (though it escapes from) a contested biomedical category, that of alcoholic liver disease?

Here there is no right answer. The tradition of medical sociology precisely presses the importance of the patient perspective as a corrective to the power of biomedicine and the medical profession. The approach and the concern here has been different. Thus arguably, if attention is directed to enactment, then the opposition between biomedicine and the patient perspective dissolves, to be replaced by studies of specific practices that create complex bodies and subjectivities that no longer bifurcate along this join[35]. This, however, takes us beyond the scope of the present paper. More immediately, it has been our concern to attend to and press the importance of differences and othernesses. To press the importance of radical disruption and othering. And then to attend to the creative disjunctions of absence/presence that, or so we suggest, in part produce objects – including 'messy objects', objects that cannot be narrated smoothly from a single location. And this is why we choose not to treat alcoholic liver disease as a boundary object. Thus, in the way we have handled it, the condition is not simply a trading zone between two different cultural zones (though it can, of course, be understood that way). Rather, it subsists in, and participates in the enactment of, entirely different, spatial logics or realities, and those spatial realities have complex relations with one another. Alcoholic liver disease is a spatially complex object. It is ontologically lumpy. It is, one might add, organisationally lumpy too. Thus though we do not show this above, the implication of this turn to enactment is that different objects – that are also said to be the same object – are created even within the same

[33] See Law and Hetherington (2000).

[34] We are grateful to Frank Blacker and Yrjö Engeström for this suggestion. An experiment of this kind has been undertaken by Mol and Mesman where they followed both staff and food in a neonatal ward to produce quite different narratives and politics. See their (1996)

[35] This argument is developed for regimes of treatment for diabetes and the management of blood sugar levels and their implications for hypoglycaemia in Mol and Law (2004).

organisation. Alcoholic liver disease is different in accident and emergency, in the laboratory, in the gastro-enterology ward, and in the out-patient clinic. It is, so to speak, a multiple disease. Everything we have said about its differences between different organisations thus applies equally within (say) the hospital. All the issues about otherness, about knowing the condition, about knowing it well, and about relating different versions of the disease apply just as much here. In short, as Annemarie Mol shows in her study of atherosclerosis[36], objects within organisations are ontologically complex too. There is no collapse into simplicity.

Are there further versions of object-ness? No doubt: there is no particular reason to imagine that the four that we have identified exhaust the possibilities. Is there more to be said about fire objects, their novelty, their creativity, their destructiveness? Certainly. Thus even in our data about alcoholic liver disease we are struck by its generative character. It is difficult to avoid the conclusion that much that it creates takes the form of tragedy. Broken lives and families, broken bodies. But there are moments of optimism and humour too. One of the consultants told us that alcoholics and their families are endlessly ingenious: 'People have brought alcohol into the hospital, for instance by injecting fruit. You would be amazed how much alcohol it is possible to inject into a banana.' We've cited the community psychiatrist who saw progress in patients who come to spend time with their children. And we've mentioned the general practitioner who tries to help in the best way she can in the lives of the wretched, even if it is simply to tell a patient about the number of months she still has to live. But if matters are mostly bad, then good things are created too. For instance a ward sister told us:

> 'a lot of patients do come back in, but the nursing and ancillary staff build up relations with them, and often this is good. They will know how a patient is going to be, how he is. People are not as judgmental as you hear they are. If patients treat staff well, then you get along OK.'[37]

Death is in the offing. But not only death. The unbounded otherness of undomesticated fire, we insist, is generative. Productive. It depends on and creates the unknowable and the unexpected. And this is only sometimes destructive.

We want, however, to conclude by returning to the methodological issue with which we set out: our failure to map the disease and its trajectories. Was this a technical failure on our part? We think not. Perhaps we made mistakes, but we persist in the view that something else was going on. Was it, then, a managerial problem? Did our failure to make sense of alcoholic liver disease result from the fact that the condition and its treatment was simply a disorganised mess? The answer was, possibly yes. Its organisation didn't look brilliant. Things might have been improved. Was it a boundary object, a product of different perspectives? No doubt it can be understood in this way. But by now we have a better way of thinking about the fourth, ontological, possibility. This is because what we've tried to do in talking about fire objects is to show that absence, otherness, is integral to objects. But this implies something important for our methods of study. Method is an ordering that makes otherness. To put it differently, otherness in one form or another always escapes

[36] See Mol (2002).

[37] Reconstructed from interview notes with ward sister H, 3rd March, 1999, page 13/1.

method. It cannot be domesticated. But then, and as a version of this, if objects are both present and absent, then we cannot know or tell them in all their otherness. Things will escape. In principle this is not a problem: otherness is always with us. But faced with an object such as alcoholic liver disease that is complex and generative in multiple and discontinuous absences, the limits of representational method are thrown into relief. We cannot bring it all to presence in conventional texts. We cannot bring it all to any particular presence. We cannot expect to be able to tell a consistent tale. And the implications of this? Other possibilities – for instance the allegorical, the tolerance or art of ambiguity – might help[38]. But in the first instance this suggests the need for methodological humility. If the world is messy we cannot know it by insisting that it is clear.

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[38] We have explored this possibility in Law and Singleton (2003).

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