Actor-Network Theory: sensitive terms and enduring tensions

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7. Koordination und Ordnungsbildung in der Akteur-Netzwerk-Theorie

Position

ACTOR-NETWORK THEORY: SENSITIVE TERMS AND ENDURING TENSIONS

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Abstract: ANT is not a "theory", or, if it is, then a "theory" does not necessarily offer a coherent framework, but may as well be an adaptable, open repository. A list of terms. A set of sensitivities. If ANT is a theory, then a theory helps to tell cases, draw contrasts, articulate silent layers, turn questions upside down, focus on the unexpected, add to one's sensitivities, propose new terms, and shift stories from one context to another. In this presentation of "Actor Network Theory" the terms "actor", "network", "theory", as well as the terms "order" and "coordination", will be explored. But mind you. ANT does not define these terms, but rather plays with them. It does not seek coherence. It does not build a stronghold. Instead of crafting an overall scheme that becomes more and more solid as it gets more and more refined, ANT texts are out to move – to generate, to transform, to translate. To enrich. And to betray.

The editors of the *Kölner Zeitschrift für Soziologie und Sozialpsychologie* have asked me to contribute to their special celebratory issue with an article on actor-network theory. Could I please explore and explain what this theory makes of "coordination" and of "order"? Having said "yes", I now face the question of how to do this.[1] This is not obvious, if only because: "ANT is not a theory. It is this that gives it both its strength and its adaptability". This is a quote from Michel Callon, from an article that he published in 1999 in a volume with the telling title *Actor Network Theory and After* (Callon 1999: 194). Callon should know. In the early eighties, in an article in French, he was the first to speak of acteur-reseau. A short while later this term was translated and transformed to become actor-network in English.[2] At some point theory was

1 In 1982/1983 I was lucky enough to attend the sociology of technology research seminar that Michel Callon and Bruno Latour gave in the École de Mines in Paris. It was the best teaching I ever had and this article may be read as a somewhat belated thank you note, even if, or maybe precisely because, it continues to raise difficult questions. I also want to thank John Law, for asking related questions, and for a continuing discussion since the early nineteen nineties. What follows here is a result of our joint work.

2 The earliest use of the term that I could find in English is Callon (1986).

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added and, as abbreviations proliferated in English language academia, the term ANT was coined in the early nineties.[3] But authorship is not ownership: despite the clarity of Callon's warning that "ANT is not a theory", nobody seemed to notice. Nor did anyone listen to Bruno Latour who up to the late Nineties had rarely used the term when he wrote: "there are four things that do not work with actor-network theory: the word actor, the word network, the word theory and the hyphen! Four nails in the coffin" (Latour 1999: 15). One could scarcely be more scathing, yet since 1999 the term has continued to gain in momentum.[4] This is not just remarkable, it is also uncomfortable. For, as John Law put it, and this is again a quote from the same book: "Easy use of the term 'actor-network' has tended to defuse the power and the tension originally and oxymoronically built into the expression" (Law 1999: 8).

What, then, to do? What to do now, ten years after "After"? How to write about "actor-network theory" – a wild and creative theoretical tradition, but a term that stopped working a long time ago? Added to that concern, I have another. Where am I writing when I write for the *Kölner Zeitschrift für Soziologie und Sozialpsychologie*? "Theory" is not transcendental. Academia is somewhere, or rather it is in many different places.[5] Some things move far more easily than others. These days, money is transferred all over the globe all but instantaneously, while viruses move so fast that it gets scary. But even the cosmopolitan bodies that travel business class between Berlin, New York and Singapore, suffer jet lag; while the person from the next village over may never have visited the capital. How, in such a world, to think of the situatedness of academic texts and of the way in which they travel? The present text is a tough case, I have trouble situating it. What is it to write about a tradition with an obvious French ancestry (acteur-reseau), in a *Kölner Zeitschrift* (it is easy to find Köln on the map, but where does this journal come from and where does it go?), asking questions about order and co-ordination that have specific connotations in German sociology (but which?), while doing so in English (the imperialist language in which "ANT" became famous)? A complex situatedness. Zelfs als ik u mijn Nederlands bespaar. (Even if I leave Dutch, my mother tongue, out of it.)

Having conveyed some of my unease and the slight sense of alienation with which I write this text, let me now tell you what to expect. (But can I put it that way? Is it possible to use "I", the first person singular, in the *Kölner Zeitschrift für Soziologie und Sozialpsychologie?* What is it to do so, what might it signal? Will it connote self-indulgence, or a lack of academic rigour, or girl-talk? Or will it remind you of the "I" of phenomenology that elevates a single person's self-ethnography to grandiose proportions? Or might this "I", as I hope it will, evoke the concerns of the self-reflexive turn, that in seeking to move from universalist pretensions, stages the author as one of the sites where a text is situated?[6]) I was going to tell you what to expect. First I will try

3 In 1992 Law still used phrase "the theory of the actor-network".

4 Latour, continuously inventive and inspiring, wasn't very helpful in *this* particular respect, as he agreed to publish a book with the subtitle: *An Introduction to Actor-Network-Theory* Latour (2007).

5 The "social studies of science and technology" tends to insist on *immanence,* and thus on situatedness. For this see Law and Mol (2001) and Haraway (1991).

6 This kind of self-reflection has various sources and backgrounds, notably in feminism and cultural anthropology. In social studies of science it was introduced in Woolgar (1988).

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to bring "the power and the tension originally and oxymoronically built into the expression" actor-network to life by introducing to you both the actor and the network.[7] Where did they come from and what has become of them? Then I will move on to theory and address the crucial question of what it is, theory. Only once the stage has thus been set, will I finally confront order and co-ordination.

I. Actor

Actor. It is easy, everyone knows what an actor is – an actor does things – it, he, she acts. But no, of course it is not easy, because in different theoretical repertoires an "actor" is made to be different things. Look at these sentences. First, they state that an actor acts and then that an "actor" is made to be. From one sentence to the next there is a shift from a real life actor who acts to the term actor which is made to be and, at the same time, a shift from the active to the passive. Making such shifts and playing with them to see what happens, is one of the pleasures of engaging in "actor-network theory".

An actor acts. It he, she does something, makes a difference. If the actor were eliminated from its setting, it would take others a lot of work to replace these actions. Although actors never form a starting point (they are made to be by other actors, see below) the question ANT asks not where the activities of actors come from, but rather where they go: effects are crucial. Not goals, not ends, but all kinds of effects, surprising ones included. Take a door: what does it do? It keeps rain and noise out of a walled space a building, a room while allowing people to go in and out with little effort. If human beings had to replace the activity of the door, they would have a lot of work to do: breaking down the wall, building it up again.[8] A question that is raised time and again: is this really what an actor is – something like a door, a mere thing? ANT is not very sensitive to this question.[9] Its point is not to finally, once and for all, catch reality as it really is. Instead, it is to make specific, surprising, so far unspoken events and situations visible, audible, sensible. It seeks to shift our understanding and to attune to reality differently. It may well be that in the process ANT fails to protect humans from being treated as "mere things", but it offers something else instead. It opens up the possibility of seeing, hearing, sensing and then analysing the social life of things – and thus of caring about, rather than neglecting them.[10]

An actor acts. But how much exactly does it, he or she do? It is striking that some actors receive a great deal of credit: they are celebrated as heroes. But it may well be that they only seem so strong because the activity of lots of others is attributed to

7 This concern with the waning of the "power and tension" of science and technology studies, also emerges in Woolgar (2004).

8 For the example of the door, enriched by that of a door-closer, see Latour (1988c).

9 This gives rise to misunderstandings between social scientists caught up in various versions of the "verstehende" tradition, and ANT-type semioticians. For an obviously failed attempt to end these misunderstandings, see Mol and Mesman (1996).

10 For the argument that *things* are far from alien to love and care, see Latour (1996) on a failed metro system; and Harbers et al. (2002) or Moser (2006) on things in health care settings.

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them. Pasteur was a case in point.[11] All kind of people, journalists, farmers, technicians, vets, were involved in the discovery/invention of anthrax and the inoculations against it. All kinds of things were active as well, Petri-dishes, blood, transport systems. But French towns tend to have a "rue Pasteur" rather than a "rue Petri-dish" and there are no squares that are named after the first cow inoculated against anthrax even though she was the one risking her life. Pasteur was singled out as the hero, the responsible actor behind the pasteurisation of France. Bringing out that he, like any general, could only fight thanks to an entire army of people and things, is a typical ANT move. Against the implied fantasy of a masterful, separate actor, what is highlighted is the activity of all the associated actors involved. A strategist may be inventive, but nobody acts alone.

An actor acts. But while in doing so some become iconic heroes, others hide behind their own deeds and achievements. Take Morgan, the engineer who could have claimed to be the author of, and actor behind, the Zimbabwe Bush Pump type B.[12] He could have filed a patent for it, but he never did. When asked why not, Morgan points to all the others who were actively involved in shaping "his" pump: the person who suggested he might quit bacteriology and help to design clean water technologies instead; his predecessors among Zimbabwe/Rhodesian water engineers; the workers in the pump factory and the factory's director; and of course the Zimbabwean villagers who adapt the pump when they use it. As Morgan shifts out credit to others, his case is a counterpoint to that of Pasteur. Thus he again forms an interesting subject for an ANT-type analysis, because the ANT-tradition rarely works by adding to what has already been established.[13] Instead it introduces variations, sets up contrasts, and, time and again, proposes shifts. The art is not to build a stronghold, but to adapt the theoretical repertoire to every new cases. The story of the Zimbabwe Bush pump suggests that an actor is not necessarily a hero who designs the strategy of the army he depends upon. Rather than taking control, actors may also seek to serve the world around them.[14]

An actor acts. Such acting may be strategic or subservient, and there are other possibilities as well. Stories about other cases experiment with other verbs: loving, tinkering, doctoring, caring. Actors may even, to some extent, let go. But to what extent? Is loss of control the place where actor-ship finally ends? No, it isn't. Once it is singled out as a topic of study, even undergoing appears to have little to do with being passive. It is hard work. Ask amateurs – of music, of drugs, of wine – and follow what they do in practice.[15] They do a lot: their pleasure depends on preparations. Amateurs learn to

11 The case of Pasteur is extensively explored in Latour (1988b).

12 For the case of Morgan and the Bush Pump see De Laet and Mol (2000).

13 I talk about an ANT-*type* analysis and ANT-*inspired* work. Latour is not the only author discussed here who rarely used the term. What to do? If I sample only texts that call *themselves* ANT, much of the spark is lost. If I draw texts together under the heading "Actor-Network Theory", I risk in my turn to solidify a fire. A typical enduring tension. See also Law (2009).

14 Because he serves those around him, the authors jokingly? Call Morgan a *feminist* hero – an "ideal man". Feminism in ANT is not a matter of repeating the categories "man" and "woman" in order to see oppression at work everywhere, but of shifting and changing them. See Hirschauer and Mol (1994) and Singleton (1996).

15 For extensive explorations of the work of "amateurs", see Hennion (2001); Gomart and Hennion (1999).

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be affected. In the case of music, for instance, amateurs learn to listen by acquiring knowledge about the music they seek to attune to and enjoy. They practice a lot, listening and listening again, and they also learn from others: acquire a language, talk, read and otherwise share comments. Amateurs care about technicalities as well: the right recording is important and so is the right equipment and the right kind of light. Block out all noise. Undergoing, then, as in "undergoing pleasure" does not mean doing nothing at all.[16] And this leads to another shift, another tension in the "theory". What is an "actor" if this case be included? An actor may be receptive. Resonate. Attune.

Thus every time a new case is considered it suggests different lessons about what an "actor" might be. At the same time, the point of extending the list is not to replace one "theory of action" with another. Instead the cases gradually assembled about Pasteur, Morgan's bush pump, amateurs of music, and many others left out here may still all be told. Since they are in tension they do not simply add up, but neither is there a debate with winners and losers, where each new proposal seeks to cancel the earlier ones and each innovation depends on killing the ancestors. The point is not to purify the repertoire, but to enrich it. To add layers and possibilities. In this tradition, then, terms are not stripped clean until clarity is maximised. Rather than consistency, sensitivity is appreciated as a strength. This means that it is not possible to pin down exactly what an "actor" is made to be in "ANT". ANT does not define the term "actor". Instead it plays with it. In that sense, then, ANT is not a theory: there is no coherence to it. No overall scheme, no stable grid, that becomes more and more solid as it gets more and more refined. The art is rather to move – to generate, to transform, to translate. To enrich. And to betray.[17]

II. Network

In De Saussure's version of semiotics, words do not point directly to a referent, but form part of a network of words. They acquire their meaning relationally, through their similarities with and differences from other words. Thus, the word "fish" is not a label that points with an arrow to the swimming creature itself. Instead, it achieves sense through its contrast with "meat", its association with "gills" or "scales" and its evocation of "water". In ANT this semiotic understanding of relatedness has been shifted on from language to the rest of reality. Thus it is not simply the term, but the very phenomenon of "fish" that is taken to exist thanks to its relations. A fish depends on, is constituted by, the water it swims in, the plankton or little fish that it eats, the right temperature and pH, and so on. Fish relate to meat as well – if only because they compete in food markets. But that entities/actors depend on others around them does not mean that they are caused by their surroundings. Causality tends to take a deterministic form. Causal explanations usually remove activity from what is "being

16 This even goes for undergoing pain, see Struhkamp (2005).

17 The trope of the transformation that is always also a betrayal has been around in ANT from early on. John Law put it at the centre of the project in one of his earlier overviews, see Law (1997).

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caused".[18] In a network, by contrast, actors, while being enacted by what is around them, are still active. The actorship implied is not a matter of freedom, of escaping from a causal force. Instead, actors are afforded by their very ability to act by what is around them. If the network in which they are embedded falters, the actors may falter too. If they are not being enacted, actors are no longer able to do all that much themselves. They stop "working".[19]

This is easily seen when entities/actors travel. How much else must travel along with them? How much of a "network" do they need in order to stay active? If there were no cold chains of transport for food to travel in, camembert would never be sold in California: long before getting there it would have disintegrated. The model applies to facts as well as cheese.[20] Transporting the laws of Newton from London to Gabon depends on first transporting the measurement devices, calm spaces, observational skills and other features of British laboratories that allow researchers to establish those laws as facts. The circumstances on which crafting or confirming the laws of Newton depend, are not easy to remake in Gabon. With a leaking roof, most physics experiments are hard to carry through. Or, another example, if the WHO wants to compare strains of HIV between countries, say between Botswana and Uganda, the fridges in both places need to work well, or the possibility of comparison simply disappears. Faltering electricity supplies are all it takes for high-tech networks to collapse.[21] The examples of networks that do not hold are endless. And while sometimes this reflects negligence, often the bug takes even the most attentive designers by surprise. Take the case of the gasogene burners.[22] These were first designed in Scandinavia to burn wood chips, and then adapted to burn the stalks of corn in Costa Rica. They worked. Until a bug discovered the stored stalks (who could have known? never before had stalks been stored) and started to feast on them. Thus the network fell apart – and the burners, lacking fuels, were no longer able to burn. They failed.

Many such failures were documented, and the question arose about what exactly marks "success" and where "failure" sets in. When do techniques (entities, actors) work and when are they no longer "functional"? Laboratories, to start there, are highly demanding. Their syntax is precarious, everything needs to work just so for the results to count. But does, say, health care collapse if diagnostic laboratories falter? Not quite. Not necessarily. Take the diagnosis of anaemia.[23] In laboratories this diagnosis is made by testing a person's haemoglobin level – if this is below a certain threshold, the person is taken to be anaemic. In many intractable places haemoglobin is hard to measure, because there is no lab, no machine, no calibration fluid, no technician, no clean needle with which to draw blood, or simply no time. However, there is an alternative way of working. It is also possible to make a clinical diagnosis. Lower an eyelid and look at a

18 This is beautifully laid out in Latour (1988a). ANT-type work seeks to escape from and provide alternatives to technological determinism. See e. g. Bingham (1996).

19 For an exploration of this in the context of living bodies, that *die* when they are not actively cared for/caring see Mol and Law (2004).

20 The example comes out of the *Irréductions* part of Latour (1988b).

21 The case is from Bont (2000).

22 For this case see Akrich (1993).

23 For this case, in a topological mode, see Mol and Law 1994. For an analysis of the lab-clinic tension in anaemia see also Mol and Berg (1994).

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person's nail beds: if these are pale, this signals anaemia. Clinical diagnosis does not depend on sharp thresholds: its division between health and disease is more fluid than that of the lab. With the clinic it is also harder to tell when and where it still works, and when and where it finally falls apart because there is no doctor, no nurse, no time at all, no remedy. A lot may be tinkered with along the way. Clinical techniques, then, do not hang together like networks. Their syntax is adaptable. They are fluid. Thus alongside the term network another term, fluid was brought into play. Actors may be enacted in networks that have a stable syntax, but it is also possible that their ability to act is afforded to them by a context that is adaptable and varied and behaves in a more fluid way.[24]

Another question arose as well. It had to do with coexistence. Early on in ANT it was shown that introducing a new technology, like an electric car, is not just a matter of making a good design on the drawing board and having a prototype survive a test.[25] The car in question must also catch the imagination – and attract the money – of investors. There must be battery charging points in many locations; various rules and regulations have to be adapted; and the expectations that users have about "a car" must change. The point of this analysis was to show that fixed and vested "interests" cannot explain why this network has so far failed to emerge. Instead, the term "interest" deserves to be read as a verb: to interest. For a technology to succeed, it must somehow interest financers, builders, users. In order for a network to form, associations have to be made. This is hard work. And one of the reasons that this work is so hard, is that "the electric car" is not introduced into an empty world. There are various "modes of transportation" already. How do they relate? Take bicycles and cars. While they collaborate in facilitating transport, they also clash, often all too literally. Separate cycling paths that reduce such accidents take up space where cars can no longer go. Trains, in their turn, depend on people's ability to reach the station. While bicycles and cars are helpful here and serve the trains, if they get too attractive, travellers may no longer take the train at all. And so on. Thus the term "association" cannot begin to cover all forms of relatedness. Further words are needed: collaboration, clash, addition, tension, exclusion, inclusion, and so on. Terms variously adapted to various cases. Terms that help us to attune to different events and situations.

The "transportation assemblage" that ensues, does not form a friction free "system". It is not a single network either: instead, different "networks", simultaneously interdependent and in tension, coexist. To talk about this, various terms have been tinkered with. Discourses has (pace Foucault) all too often been used for linguistic realities alone and this is not easy to undo. Logics holds some appeal, as this term stresses that what makes up a distinct network/logic and what belongs to another, partly depends on what makes sense in the terms of the network/logic at hand.[26] However, it has the disadvantage that it seems to suggest a rationally compelling coherence – it hides fissures, contradictions and the work involved in ordering. Modes of ordering in its turn,

24 While in a network actors are clear-cut, in a fluid their *outlines* are less sharp. For their *ambivalent character*, see Singleton and Michael (1993).

25 This comes from one of the great classics of actor-network theory (Callon 1986).

26 See for the term *logic* in this context Mol and Berg (1994) and Mol (2008).

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shifts from a noun – network – to the gerund of a verb – ordering.[27] There is also an attractive openness to the plural "modes". However, while introduced in a study of organisation where it fitted very well, it seems to work less well in relation to, for instance, bodies. A problem with all of these words is that they cannot quite catch that something may hang together here, in this instance, for this purpose, while it is also in tension, there, a little later, in relation to another issue. What, then, about practices as a term?[28] This, at least, calls up situated events. But it is overused and may have been emptied out, sucked dry. The quest for terms continues. But one way or another, these days most ANT researchers no longer unravel singular networks, but attend to co-existing ones in tension.[29]

This was the starting point: actors associate with other actors, thus forming a network in which they are all made into "actors" as the associations allow each of them to act. Actors are enacted, enabled, and adapted by their associates while in their turn enacting, enabling and adapting these. While the verbs keep on moving between active and passive, the relations that make actors be, may take the form of stable syntaxes or, alternatively, of fluid associations. But as actors come to participate in different "networks", discourses, logics, modes of ordering, practices, things get complex. The "actors" start to differ from one network, discourse, logic, mode of ordering, practice to the other. The anaemia diagnosed in the laboratory, is not the same thing entity/actor/object as the anaemia diagnosed in the clinic. The woman who gives birth in the middle of a lot of machinery does not do the same deeds, nor feel the same, as the woman who is free to move, but obliged to carefully attend to her pain. One "woman" differs from the other and "giving birth" is not the same event from one setting to the other.[30] Thus, reality – the reality of anaemia, woman, birth and so on and so forth – differs between sites.[31] Such "sites" are not necessarily far apart. Take the operating theatre where a patient's brain is laid bare for surgery.[32] It harbours two versions of "blood pressure". The anaesthetist enacts the blood pressure of the patient on the operating table by constantly measuring it with an apparatus. The brain surgeon regularly puts his finger on the fascia to feel the pressure in the brain. At any given moment, one of these two "pressures" may be higher or lower than the other. At the same time, anaesthetist and surgeon cannot each go their own way. They need to work together. They negotiate between their different versions of reality, and in that process trust and truth shift from one "blood pressure" to the other.

27 This term was introduced in Law (1994).

28 ANT crucially shifts analyses from ideas to practice. For one of the most compelling cases, escaping from Western arrogance as well as cultural relativism by foregrounding the practices of *counting* in Nigerian class rooms, see Verran (2001).

29 In related theoretical traditions the shift to analysing coexistence has come with the mobilisation of other terms, like *economies of worth* Boltanski and Thevenot (2006) and *frames,* Dodier (1998).

30 See the compelling study on giving birth in the Netherlands and France by Akrich and Pasveer (2000, 2004).

31 For an exploration of how "reality" rather than being "constructed" once, fluidly dances from one version into the other, see Cussins (1998).

32 Early multiplicity-work shifted from historical "construction" to topological "co-existence". Moreira added time back in again. See for blood pressure Moreira (2006) and for "shared action" Moreira (2004).

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III. Theory

ANT is not a theory, says Callon. This is true in various ways. For a start, ANT writings do not offer something that remotely resembles a "law of nature" – or, given that typically the social and the physical are studied together in ANT work, a "law of nature-culture". Not at all. There is no attempt to draw the findings of various studies together into an overarching explanatory framework. There is no attempt to hunt for causes: the aim is rather to trace effects. And these effects do not hang together in a determinist scheme that runs forward rather than backward: the effects being traced are mostly unexpected. This is facilitated by calling all entities actors: what actors do is always again, in one way or another, surprising.[33] But this implies that ANT does not tame the world theoretically, or suggest that events might be predictable. However much research is done, surprises are never banned. Instead they are attended to.

ANT is not a theory. It does not give explanations, and neither does it offer a grid or a perspective. Since "ANT" has become an academic brand name, many authors start their articles with the promise that they will "use actor-network theory". Let me disappoint them: this cannot be done. It is impossible to "use ANT" as if it were a microscope. "ANT" does not offer a consistent perspective. The various studies that come out of the ANT-tradition go in different directions. They do different things. They not only talk about different topics (electric vehicles, music, anaemia, organisations, cheese, childbirth, blood pressure in the brain and so on) but also do so in different ways. If studies relate to earlier ones, this is not in order to consolidate or expand on "a theory" that is thereby rendered more and more solid. From one study to the next, there are shifts. These cannot be mapped on a single line, they go in different directions and what I have presented so far is not a summary, but rather a snippet of the work that has been done. Over the years new questions are constantly taken up and new concerns addressed. Thus, do not think of it as a scheme or a system, think of it as a kaleidoscope.

ANT is not a theory. It offers no causal explanations and no consistent method. It rather takes the form of a repertoire. If you link up with it you learn sensitising terms, ways of asking questions and techniques for turning issues inside out or upside down. With these you may go out and walk new roads. But beware: as you walk nobody will hold your hand, there are no assurances. In "linking up with ANT" the art is not to repeat and confirm, but to seek out cases that contrast with those that came earlier. A contribution to ANT gently shifts the existing theoretical repertoire. And then, as the theoretical repertoire shifts, it becomes possible to describe further, different cases, and to articulate so far untold events (relations, phenomena, situations). These, in their turn, will help to add to and shift the theoretical repertoire ... and so on. The point is not to fight until a single pattern holds, but to add on ever more layers, and enrich the repertoire. One might say that, in analogy with amateurs of music, drugs or wine, researchers involved in ANT are amateurs of reality. Their theoretical repertoires allow them to attune themselves to the world, to learn to be affected by it. Thus, ANT re-

33 For an analysis of how actors-enacted, keep on being *surprising*, see Law and Mol (2008b).

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sembles the props, equipment, knowledge and skills assembled by other amateurs. It helps to train researchers' perceptions and perceptiveness, senses and sensitivity.[34]

Having said all this, I propose that we may call ANT "a theory" after all. But this implies that in good ANT fashion we radically alter the meaning of the term "theory". For if ANT is a theory, then a "theory" is something that helps scholars to attune to the world, to see and hear and feel and taste it. Indeed, to appreciate it.[35] If ANT is a theory, then a theory is a repository of terms and modes of engaging with the world, a set of contrary methodological reflexes. These help in getting a sense of what is going on, what deserves concern or care, anger or love, or simply attention. The strength of ANT is not in its coherence and predictability, but in what at first sight, or in the eyes of those who like their theories to be firm, might seem to be its weakness: its adaptability and sensitivity. If ANT is a theory, then a theory helps to tell cases, draw contrasts, articulate silent layers, turn questions upside down, focus on the unexpected, add to one's sensitivities, propose new terms, and shift stories from one context to another. If ANT is a theory, then being an amateur of reality is not merely being an amateur. Instead, and in contrast, it is a great good.

IV. Order

If I present ANT here as a tradition in which each new study slightly shifts the repertoire that has been shaped by those preceding it, it may seem that those involved in ANT-related research only talk to each other. But that is not the case. In practice each new study not only stands within the ANT-tradition, but also relates to wider discussions about the topic it explores. One text may be in dialogue with epistemology, the next with aesthetics, while others contribute to disability studies, feminism, ecology, political theory, organisation studies – what have you. Some ANT studies seek to interfere with the status of clinical trials, others with the democratisation of science, the way disasters are handled, or the relations between animals and humans.[36] And so on. Questions emerge, fade away, circulate or are foregrounded. Among these (though not particularly prominent) are questions to do with "social order".

ANT inherited, related to and actively shifted the Foucauldian mode for thinking about social order. Here, social order was not just linked to centrally set laws, rules and regulations. Instead, variously dispersed ordering modes and modalities were brought to the fore. But while Foucault was primarily interested in their form, ANT researchers insist on the work involved in "ordering".[37] They point out that when

34 As *method* was meant to exclude the specificities of researchers, there has been little attention for the figure of the researcher and the "I" of the text. For an ANT-exception, see Law (2000).

35 "Appreciation" escapes from the dichotomy observation/judgement. For a great ANT-inspired argument for research that "appreciates appreciations" rather than "asking for people's perspectives" (Pols 2005).

36 For ANT inspired studies that feature their concerns prominently, see Moser (2008); Rabeharisoa (2006) and Thompson (2002).

37 It would be interesting to compare the ANT-insistence on "work", with the way "Arbeit" was spread out in Negt and Kluge (1981).

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norms have been set, "normalisation" does not automatically follow.[38] Making networks that hold, does not come easy. Call a meeting together, get on the phone, use a spread sheet, make an inspiring speech, convey to those involved what might be in it for them, design an artefact that condenses a relation. Things are crucial to the ordering work at hand. The phone that links voices and ears over long distances, the spread sheets that provide managers with an overview, the doors that allow walls to be opened and closed.[39] And such things are not just crucial to what in other theoretical traditions would be called "governance", but likewise to the market.[40] Markets are composed of far more "variables" than the few that are mentioned in the textbook formulae of neoclassical economics. Like laboratories, hospitals, nursing homes, schools and practices in ever so many other sites, markets depend on devices.[41]

But do devices, as they help to order, also make "societies"? In ANT (as in various other theoretical traditions) it makes little sense to separate out an object called "society" and to then say that this has "an order". While the question as to where to find "society" has been moot for a long time,[42] it is now obvious that the object of a discipline that might for historical reasons still want to call itself "sociology", has a complex spatiality. It may stretch out globally, it may be local, or it may be these two things at the same time.[43] It may be dispersed and "multi-sited". It may form a network or a fluid.[44] It may also resemble a fire in that what is elsewhere emerges, hides itself again, remerges, and then disappears, all the while being relevant as an included absent-present "other".[45] With such complex spatialities where "others" are included, while what is included may also be in tension, one may ask whether talking of order still makes much sense. Does it?

Modes of ordering may be the better term.[46] Shifting away from the noun, order, it contains the gerund of a verb, ordering, thus stressing that ordering involves work. The plural modes indicates that more than one "mode" is relevant in any given time and place. And as the ordering is open ended, it is indicated that ordering is an always

38 Still Callon and Rabeharisoa (2004) were surprised when in their study on handling muscular dystrophy they came across an "informant" who did not particularly want to be informed or to inform them, but who escaped such "normalisation".

39 For the managerial examples, see Law (1994). As sociology gives scant attention to things, Latour (1992) called them the *missing masses*, crucial to understanding social order.

40 For an exploration of how "things" are implied in "governance", combining the ANT- and the governance research traditions, see Barry (2001).

41 This sentence points to an impressive body of work in ANT-inspired sociology of markets. See e. g. Callon (1998) and Callon et al. (2007).

42 This comes out quite well in a history of the object "society" in an "ANT-related" collection of histories of the "coming into being" and sometimes passing away of scientific objects (Wagner 2000).

43 ANT studies are reproached to focus on local, micro objects, leaving "macro" phenomena out of focus. But things *change size:* "big" events may grow out of small ones, while "small" events may have large consequences (Callon and Latour 1981; Law 2002). "Small" events may also *contain* traces of the wider world, like monads (Law and Mol 2008a).

44 For a great ANT-inspired study of a dispersed object, the human genome diversity project, see M'Charek (2005).

45 For a study into an absent-present "other" in a formula pertaining to the size of the wings see Law (2002).

46 This is developed in Law (1994).

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precarious achievement. At the same time, this term does not primarily evoke the question how we are being governed. Instead it asks about co-existence. Here, this is not a question about the ways in which different people with their different inclinations may hope to live together. What is at stake is rather the co-existence of different ways of handling problems, framing concerns, enacting reality.[47] The point, then, is not how to avoid or foster revolution (an upheaval in the social order). Instead, the research explores the merits and drawbacks of different modes of ordering and, along with that, of different kinds of coordination.

V. Co-ordination

As soon as attention shifts to the co-existence of different realities (or logics, or modes of ordering) the question arises as to how these hang together. The term co-ordination is helpful here, since it does not evoke a single, overarching and coherent order in which everything fits just fine and friction-free like the bits and pieces of a mosaic or the components of a watch. Instead, the term co-ordination suggests continuing effort. Tensions live on and gaps must be bridged, hence the need for "co-ordination".[48] Co-ordinating efforts may take many forms. To mobilise the anaemia case again: deviant lab values and clinical symptoms of anaemia, may be drawn together by establishing a statistical correlation between them; but also by sending patients who have clinical symptoms to the lab, accompanied by the request to "test for Hb level". Even keeping potentially competing versions of reality (or modes of ordering, or logics) out of each others' way – by distributing them over different sites – may be glossed as a form of co-ordination.[49] It helps, after all, to avoid confrontation and, along with that, chaos.

But if the term "co-ordination" works here, like any other term it also has its drawbacks. It may seem to suggest that someone somewhere is deliberately and mindfully engaged in co-ordination work. However unwelcome this connotation, it is there, lurking in the language. Co-ordination is a strategic term that hints at the existence of a centred strategist, someone with an overview. A network, however, does not have a single centre. It is not by accident, then, that early in the ANT tradition another term was used to indicate how gaps are being crossed. I've mentioned this already: the term was association. Rather than calling up a centre this term suggests that all the entities/actors associating deserve credit for the action involved in their getting together. There is no external actor "doing" the association. The limit of this term is that "association" does not hint at the frictions that persist even after linkages have been made. It hides the fact that, more often than not, gaps are only partially bridged, while tensions endure. It does not call up complexity.

ANT does not define its terms, let alone consolidate them. Instead, over the years, again and again, new words have been borrowed, invented, adapted. They open new possibilities and throw up surprising insights. Less strategic in its connotation than

47 This suggests a politics of *what* rather than a politics of *who*, see Mol (2002, 2008).
48 There are interesting cross-overs here with the work of Strathern (e.g. 2004).
49 For various forms of coordination (addition, distribution and mutual inclusion) see Mol (2002).

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"co-ordination", and better at stressing an ongoing effort than "association", is tinkering.[50] This suggests persistent activity done bit by bit, one step after another, without an overall plan. Cathedrals have been built in a tinkering mode, and signallers or aircraft designers also work in this way.[51] As technologies and techniques are being tinkered with, they are fluidly adapted. As bodies and lives are being fluidly adapted, the term doctoring seems more fitting. Both terms, however, suggest that there is a tinkerer, or someone doctoring, separate from the "object/subject" being tinkered with or doctored with.[52] Might the term adjusting be more symmetrical? This stresses that the actors involved in a practice may mutually adjust themselves to one another. Here, in good ANT-mode, passivity and activity are ambivalent and shift around more easily. People may adapt and/or be adjusted to the wheelchair that they use, while the wheelchair, in its turn, may adjust and/or be adjusted to the people involved with it (sitting in it, pushing it, repairing it).[53]

Symmetrical, likewise, is the term affordance, that stresses that actors do not and cannot act alone: they afford each other their existence and their capabilities. This calls up an activity that resembles giving, while the term attuning stresses that receiving also involves activity. If an actor attunes to actors and entities around it, it attunes itself. Thus it becomes more sensitive and better capable of seeing, hearing, tasting, feeling. But nobody and nothing can attune itself to "the world" all alone. The world "itself" is involved in the process. In order to get attuned to, for instance, good food, in order to learn to taste it and appreciate it, a person needs the collaboration of such food.[54] An eater may only develop a "good taste" if she has access to food that "tastes good". I might say that overall appreciation only increases if, somehow, eater and food are well co-ordinated. And if I put it that way, I close the circle and underline that there are resonances between the various terms that I have presented here. At the same time: there is no circle. ANT is a theory of the kind that produces lists of terms. The list that starts with "co-ordination" assembles terms that evoke, resonate, shift or stage "what it is to hang together". It is not closed, this list, but open.

VI. Conclusion

ANT is not a "theory", or, if it is, then a "theory" does not necessarily offer a coherent framework, but may as well be an adaptable, open repository. A list of terms. A set of sensitivities. The strength of ANT, then, is not that it is solid, but rather that it is adaptable. It has assembled a rich array of explorative and experimental ways of attuning to the world. The terms and texts that circulate in ANT are co-ordination devices. They move topics and concerns from one context to another. They translate and be-

50 Levi Strauss took "bricolage" to be a pre-modern way of working, ANT research imports it into the heart of technoscience.

51 For the cathedrals, see Turnbull (2000); and for the signallers see Law and Mol (2002).

52 For doctoring see Mol (2008) and Struhkamp et al. (2008).

53 The reference here is Winance (2006).

54 See for this argument, with the term "adjustment" as word for what it is to come to hang together, Méadel and Rabeharisoa (2001).

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tray what they help to analyse. They sharpen the sensitivity of their readers, attuning them/us to what is going on and to what changes, here, there, elsewhere. In one way or another they also intervene, not from a place of overview, but rather in a doctoring mode. They care, they tinker. They shift and add perspectives. That is what I have tried to articulate and get across in this text for the *Kölner Zeitschrift für Soziologie und Sozialpsychologie*. Rather than seeking to say something about electric cars, anaemia, or other socio-material actors, I have been concerned with theory here. With the question what theory is. With theoretical terms and what these may do for analysing reality – and for "sensing" it. Questions to do with theory and the status of terms are the source of most misunderstandings about ANT. I said "yes" when asked to write for this special issue in the hope of being able to address this. Redressing it is another matter. About that I have few illusions.

And now there will be a discussion. I know. This was made clear to me in the very first *Kölner* email message. A good colleague has been invited to now engage in criticism (of me? of this text? of actor-network theory?). We will see. I do not think that I have prepared us (myself, this text, actor-network theory) very well for a fight. I have not crafted a stronghold that is easy to defend. There are no walls around this text, instead it is quite open. I have written this as a present. Here it is. Enjoy it or forget it. Eat from it, as much as you like, and digest it – or push your plate away. Run with it or feel comfortably reassured that, since ANT is not a Theory, there is nothing serious to learn from it. Argument is war.[55] How to engage in other kinds of conversation?

References

Akrich, Madeleine. 1993. Essay of technosociology: a Gasogene in Costa Rica, In *Technological choices. Transformation in material cultures since the Neolithic*, ed. P. Lemonnier. London: Routledge.

Akrich, Madeleine, and Bernike Pasveer. 2000. Multiplying obstetrics: techniques of surveillance and forms of coordination, *Theoretical Medicine and Bioethics* 21: 63-83.

Akrich, Madeleine, and Bernike Pasveer. 2004. Embodiment and disembodiment in childbirth narratives. *Body & Society* 10: 63-84.

Barry, Andrew. 2001. *Political machines. Governing a technological society.* Athlone: Continuum International Publishing Group.

Bingham, Nick. 1996. Object-ions: from technological determinism towards geographies of relations. *Environment and planning D: Society and Space* 14: 635-657.

Bingham, Nick. 2008. Slowing things down: Lessons from the GM controversy. *Geoforum* 39: 111-122.

Boltanski, Luc, and Laurent Thévenot. 2006. *On justification. Theories of worth.* Princeton: Princeton University Press

Bont, Antoinette de. 2000. *De organisatie van een virus. Over de wereldgezondheidsorganisatie, wetenschap en transnationale gezondheidspolitiek.* Maastricht: Thesis.

55 This is a quote from Lakoff and Johnson (1980), who show that the language to do with "argumentation" is filled with war-metaphors winning, losing, devastating, powerful, weak, etc. For the mistrust of fighting as a way to engage in theory, see also Serres (2007). And for the argument that it might be time to shift from "critique" to "concern", see Latour (2004).

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Callon, Michel, and Bruno Latour. 1981. Unscrewing the Big Leviathan. How actors macrostructure reality and how sociologists help them to do so. In *Advances in social theory and methodology*, eds. K. Knorr-Cetina, A. Cicourel, 277-303. London: Routledge & Kegan Paul.

Callon, Michel. 1986. The sociology of an actor-network: the case of the electric vehicle. In *Mapping the dynamics of science & technology*, eds. Michel Callon, John Law, Arie Rip, 19-34. London: McMillan.

Callon, Michel, ed. 1998. *The laws of the markets*. Oxford: Blackwell and the Sociological Review.

Callon, Michel, Yuval Millo and Fabian Muniesa. 2007. *Market devices*. Oxford: Blackwell Publishing, Sociological Review.

Callon, Michel, and Vololona Rabeharisoa. 2004. Ginos lesson on humanity: genetics, mutual entanglements and the sociologists role. *Economy and Society* 33: 1-27.

Cussins, Charis. 1998. Ontological choreography agency for women patients in an infertility clinic. In *Differences in medicine: unravelling practices, techniques and bodies*, eds. Marc Berg, Annemarie Mol, 166-201. Durham: Duke University Press.

Dodier, Nicolas. 1998. Clinical practice and procedures in occupational medicine: a study of the framing of individuals. In *Differences in medicine. Unraveling practices, techniques and bodies*, eds. Marc Berg, Annemarie Mol, 53-85. Durham: Duke University Press.

Gomart, Emilie, and Antoine Hennion. 1999. A sociology of attachment: music amateurs and drug addicts. In *Actor network and after*, eds. John Law, John Hassard, 220-247. Oxford: Blackwell.

Harbers, Hans, Annemarie Mol, and Alice Stollmeijer. 2002. Food matters. Arguments for an ethnography of daily care. *Theory, Culture & Society* 19: 207-226.

Hennion, Antoine. 2001. Music lovers. Taste as performance. *Theory, Culture & Society* 18: 1-22.

Laet, Marianne de, and Annemarie Mol. 2000. The Zimbabwe bush pump. Mechanics of a fluid technology. *Social Studies of Science* 30: 225-263.

Lakoff, George, and Mark Johnson. 1980. *Metaphors we live by*. Chicago: University of Chicago Press.

Latour, Bruno. 1988a. Mixing humans and nonhumans together: The sociology of a door-closer. *Social Problems* 35: 298-310.

Latour, Bruno. 1988b. *The pasteurization of France*. Cambridge, Mass.: Harvard University Press.

Latour, Bruno. 1988c. The politics of explanation: an alternative. In *Knowledge and reflexivity: new frontiers in the sociology of knowledge*, ed. Steve Woolgar, 155-176. London: Sage.

Latour, Bruno. 1992. Where are the missing masses? Sociology of a few mandane artefacts. In *Shaping technology, building society: studies in sociotechnical change*, eds. Wiebe Bijker, John Law, 225-258. Cambridge, Mass.: MIT Press.

Latour, Bruno. 1996. *Aramis, or the love of technology*. Cambridge, Mass: MIT Press.

Latour, Bruno. 1999. On recalling ANT. In *Actor network theory and after*, eds. John Law, John Hassard, 15-25. Oxford: Blackwell and the Sociological Review.

Latour, Bruno. 2004. Why has critique run out of steam? From matters of fact to matters of concern. *Critical Inquiry* 30: 225–248.

Latour, Bruno. 2007. *Reassembling the social: an introduction to actor-network theory*. Oxford: Oxford University Press.

Law, John. 1992. Notes on the theory of the actor-network: ordering, strategy and heterogeneity. *Systems Practice* 5: 379-393.

Law, John. 1994. *Organizing modernity*. Oxford: Blackwell.

Law, John. 1999. After ANT: topology, naming and complexity. In *Actor network theory and after*, eds. John Law, John Hassard, 1-14. Oxford, Keele: Blackwell.

Law, John. 2000. On the subject of the object: narrative, technology and interpellation. *Configurations* 8: 1-29.

Law, John. 2003. *Traduction / trahison: notes on ANT*. TMV. Working paper 106. Oslo: University of Oslo. Also available at http://www.lancaster.ac.uk/fass/sociology/papers/law-traduction-trahison.pdf (Stand: 1997).

Law, John. 2001. *Aircraft stories: decentering the object in technoscience*. Durham: Duke University Press.

Law, John. 2009. Actor-network theory and material semiotics. In *The new Blackwell companion to social theory*, ed. Bryan S. Turner, 141-158. Oxford: Blackwell.

Law, John, and Annemarie Mol 2001 Situating technoscience: an inquiry into spatialities. In *Environment and planning D: Society and Space*, 19: 609-621.
Law, John, and Annemarie Mol. 2008a. Globalisation in Practice: on the Politics of Boiling Pigswill. *Geoforum* 39: 133-143.
Law, John, and Annemarie Mol. 2008b. The Actor Enacted. Cumbria Sheep in 2001. In *Material Agency. Towards a non-Antropocentric Approach*, eds. C. Knappet, L. Malafouris, 57-77. Heidelberg: Springer.
M'Charek, Amade. 2005. *The human genome diversity project. An ethnography of scientific practice.* Cambridge: Cambridge University Press.
Méadel, Cécile, and Vololona Rabeharisoa. 2001. Taste as a form of adjustment between food and consumers. In *Technology and the market. Demand, users and innovation*, eds. Rod Coombs, Ken Green, Albert Richards, Vivien Walsh, 234-253. Cheltenham: Edward Elgar Pub.
Mol, Annemarie. 2002. *The body multiple. Ontology in medical practice*. Durham: Duke University Press.
Mol, Annemarie. 2008. *The logic of care. Health and the problem of patient choice*. London: Routledge.
Mol, Annemarie, and Marc Berg. 1994. Principles and practices of medicine. The co-existence of various anemias. *Culture, Medicine and Psychiatry* 18: 247-265.
Mol, Annemarie, and John Law. 1994. Regions, networks and fluids: anaemia and social topology. *Social Studies of Science* 24: 641-671.
Mol, Annemarie, and John Law. 2004. Embodied action, enacted bodies. the example of hypoglycaemia. *Body & Society* 10: 43-62.
Mol, Annemarie, and Jessica Mesman. 1996. Neonatal food and the politics of theory: some questions of method. *Social Studies of Science* 26: 419-444.
Moreira, Tiago. 2004. Self, agency and the surgical collective. *Sociology of Health & Illness* 26: 32-49.
Moreira, Tiago. 2006. Heterogeneity and coordination of blood pressure in neurosurgery. *Social Studies of Science* 36: 69-97.
Moser, Ingunn. 2006. Disability and the promises of technology: technology, subjectivity and embodiment within an order of the normal. *Information, Communication & Society* 9: 373-395.
Moser, Ingunn. 2008. Making Alzheimer's disease matter. Enacting, interfering and doing politics of nature. *Geoforum* 39: 98-110.
Negt, Oskar, and Alexander Kluge. 1981. *Geschichte und Eigensinn. Geschichtliche Organisation der Arbeitsvermögen.* Frankfurt a. M.: Suhrkamp.
Pols, Jeanette. 2005. Enacting appreciations: beyond the patient perspective. *Health Care Analysis* 13: 203-221.
Rabeharisoa, Vololona. 2006. From representation to mediation: the shaping of collective mobilization on muscular dystrophy in France. *Social Science & Medicine* 62: 564-576.
Serres, Michel. 2007. *Parasites.* Minneapolis, MN: University of Minnesota Press.
Singleton, Vicky. 1996. Feminism, Sociology of scientific knowledge and postmodernism: politics, theory and me. *Social Studies of Science* 26: 445-468.
Singleton, Vicky, and Mike Michael. 1993. Actor-networks and ambivalence: general practitioners in the UK cervical screening programme. *Social Studies of Science* 23: 227-264.
Strathern, Marilyn. 2004. *Partial connections.* Oxford: Rohman & Littlefield Publishers.
Struhkamp, Rita. 2005. Wordless pain. Dealing with suffering in physical rehabilitation. *Cultural Studies* 19: 701-718.
Struhkamp, Rita, Annemarie Mol and Tjalling Swierstra. 2009. Dealing with independence: doctoring in physical rehabilitation practice. *Science, Technology & Human values* 34: 55-76.
Thompson, Charis. 2002. When elephants stand for competing philosophies of Naturel Amboseli National Park, Kenya. In *Complexities. Social studies of knowledge practices*, eds. John Law, Annemarie Mol, 166-190. Durham: Duke University Press.
Turnbull, David. 2000. *Masons, tricksters and cartographers.* Amsterdam: Harwood Academic Publishers.
Verran, Helen. 2001. *Science and an African logic*. Chicago: The University of Chicago Press.
Winance, Myriam. 2006. Trying out the wheelchair. The mutual shaping of people and devices through adjustment. *Science, Technology & Human Values* 31: 52-72.

Woolgar, Steve, ed. 1988. *Knowledge and reflexivity. New frontiers in the sociology of knowledge*. London: Sage.
Woolgar, Steve. 2004 What happened to provocation in science and technology studies? *History and Technology: An International Journal* 20: 339-349.

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