

Network as Metaphor¹

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Abstract

The metaphor of network (and its cognate terms node, lattice, inter-linkage, and so on) plays a prominent role in contemporary social science. However, network metaphors come in and go out of sociological fashion, and may be employed in incompatible ways even by sociologists examining the same phenomenon. Writing in the 1980s Wilhelm Baldamus considered it remarkable that a metaphor which had hardly any explanatory power to start with could maintain its popularity for long periods for no tangible reason. This paper will examine Baldamus's critique of network metaphors by looking at some examples in contemporary sociology, specifically the work of Harrison C White, and Actor Network Theory (ANT). The paper argues that the use of metaphors is probably inevitable, and can enhance as well as diminish our understanding of social experience. However, the network metaphor often creates artificial objects and makes us think we have been precise when we have been vague. The paper calls for a more critical and reflective approach to using metaphors in social scientific analysis.

Introduction

[Newton Hoenikker is playing cat's cradle with his father, Felix Hoenikker, inventor of the atomic bomb:]

'But he went down on his knees on the carpet next to me, and he showed me his teeth, and he waved that tangle of string in my face. "See? See? See?" he asked. "Cat's cradle. See the cat's cradle? See where the nice pussycat sleeps? Miaow. Miaow." ...

I burst into tears. I jumped up and I ran out of the house as fast as I could go.'

(Vonnegut, [1963] 1965: 13)

Metaphor is pervasive in the human sciences (Turner, 2010), as it is in everyday language (Lakoff and Johnson, 2003), and this is, most likely, unavoidable. But this does not mean that we should ignore the metaphorical in the human sciences. On the contrary, unless we identify metaphors we will run the risk of confusing the metaphorical with the literal, something that would hamper our inquiries. More than that, the use and articulation of metaphors, particularly spatial metaphors, can have remarkable effects upon our perceptions

There is little doubt that the often remarkable longevity particularly of spatial metaphors is a contributing factor to the survival of obsolete theoretical conventions. The concept of 'network' is of special interest here because it shows that even a metaphor with hardly any explanatory

¹ An earlier version of this paper was presented at the 2010 CRESC conference

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power to start with can maintain its popularity for long periods for no tangible reason. It will also be seen from this example how an apparently unambiguous metaphor may circulate from one speciality to another without anyone noticing the delusions, pretences or sheer inanities which it entails. (Baldamus, [1982] 2010: 107)

Baldamus's work is rich in insight, and his approach to sociology was one of 'serious playfulness' (Eldridge, 2010: 19). In his 1982 paper deriding the concept of network Baldamus shows that it is only ever defined synonymously, and the alleged superiority of network studies comes from the reiteration of a descriptive vocabulary deploying synonymous terms. For Baldamus, network sociology is conceptually vacuous as it is merely applying a different range of labels to objects identified in the world, and will often apply a number of different labels to the same phenomena. The abstraction from real relationships, subjectively experienced, to blockmodels of physically 'observable' representations of relationships is similarly described as being vacuous, and leads Baldamus to conclude that 'The failure of the network metaphor to advance sociological theory by means of mathematic aggregation techniques is not really surprising. Even the most imaginative manipulation of its literal meaning cannot get rid of the strictly physical intuitive implications.' (Baldamus, 2010: 115) For Baldamus, the spatial aspect of the network metaphor structures our perceptions such that it distorts our understanding of the aspect of society we are investigating.

Baldamus, for the most part, confined his criticism of the network metaphor in sociology to examples from the late 1970s, and in particular the mathematical sociology of Harrison C. White. It is, perhaps, a pity that *Networks* remained unpublished and thus unread by White, who has, undaunted, continued in his endeavours to produce a general theory of society based on the core idea of social network and that can be analysed using the mathematical / blockmodelling method (White, 2008: 265-6). I will look in some detail at how White's sociological theory is constructed. I will then compare this to another form of network sociology, one that emerged after Baldamus wrote his paper in 1982: Actor Network Theory (usually abbreviated to ANT). I will argue that in both cases users of these theories have forgotten that they are dealing with metaphors and have confused the metaphor of network with the social phenomenon they are attempting to investigate.

Actors versus Identities

Originating in the work of Bruno Latour (1987, 1996, 1999), Michel Callon (1986, 1987) and John Law (1986, 1991, 1994), actor-network theory is now a heterogeneous set of approaches that coalesce around a post-positivist, post-structural perspective that takes seriously the relationships between humans and non-humans (Erickson, 2005: 82). ANT's roots in SSK and social constructionism are clear. ANT is also the site from which a sustained analysis of technoscience emerged, as it argues strongly that 'technology' and 'science' are inextricably linked. ANT challenges the general social theoretical idea that human social relations 'were simply unmediated relationships between naked human beings, rather than being made possible and stable by artefacts and technologies' (MacKenzie, 1998: 14), as well as received assumptions about the social and the human; crucially, it rejects essentialism and reductionism. ANT is identifiable in a number of clear ways. The first is through self-report and association: a number of theorists and researchers claim allegiance to ANT. The second is through actions: a number of local studies that are placing social action and relationships in the context of acting with other actors and actants inside networks are gesturing their adherence to some of the tenets of ANT. Thirdly, there is the adoption of concepts and vocabulary: enrolment / dis-enrolment, actor / actant, network / region, and so on. And there is, perhaps, a final strategy we can adopt for identifying ANT: simply looking at the theories deployed in Science and Technology Studies (STS), as ANT has now become a hegemonic mode of theorising in this emerging discipline.

ANT is expanding out from its original home in STS, becoming a mode of theorising in sociology and other human sciences. It allows users to see the social world, or parts of it, as an assemblage of networks, each of which is composed of translations between co-existing mediators (Latour, 2005: 108). The result is a rejection of previous categories and understandings of 'the social' in favour of a rather different perspective

I can now state the aim of this sociology of associations more precisely: there is no society, no social realm, and no social ties, *but there exist translations between mediators that may generate traceable associations.* (Latour, 2005: 108)

In contrast, White presents a general sociology that provides a theory of the social world very much in the tradition of Talcott Parsons (1951), and White does make some comments on the similarities of his work and Parsons's AGIL scheme (White, 2008: 76). However, it is the 'general systems theory' of Niklas Luhmann (White, 2008: 14) that White most often refers to (although other followers of Luhmann may not agree with the characterization presented in White's work). White's picture of society starts by positing that all entities in society are identities, and that all identities seek control and to avoid control 'slipping away' to other identities. By identity White primarily means 'persons', but also means organizations. Identities seek control in social situations through gaining footings – fixing themselves inside relationships and thus, for White, producing netdoms (a neologism that is formed from contracting *network-domains*). Identities achieve control through the articulation of stories, accounts that describe the role and position of individuals. Identities keep shifting between netdoms until they find ones that give them the control that they want

Thus the world comes from identities attempting control within their relations to other identities. In their search for control, identities switch from netdom to netdom, and each switching is at once a decoupling *from* somewhere and an embedding *into* somewhere. (White, 2008: 2)

This is a rather stark vision: a world of all against all struggling to gain and retain control. Individuals must secure their identities in netdoms through their own actions and through manipulating ties to give the control that they require to feel secure. Organizations, similarly, must articulate stories that allow them to control their netdom (or, more likely, catnet [*category-network*]) in competition with other organizations trying to do the same thing. For White, the world is a series of stochastic processes: random events that have a predictable outcome. He may be right, of course, but another reason for picturing the world in this way may be that it provides a role for the sociologist. Whilst the social world may appear to be a series of random events to the untrained participant, the Whitean sociologist knows that by analysis and measurement of ties, network structures and the strengths of these they can predict the likely outcomes of stochastic processes.

White's work is very complex, difficult to read and written in a style that reminded me of 1970s machine translations from Russian into English.³ White uses words in surprising ways – discipline, for example, is simply not what one would expect (I think White really means Goffman's 'frame' (Goffman, [1974] 1986)) – and he enjoys making up new words (netdom, streq, catnet) and then abandoning them. Yet White does produce a coherent and systematic account of how social formations come into being, what sustains them and what their purpose is, and a comprehensive network sociology, based on the action frame of reference (i.e. very much in the American tradition).

Despite this, I argue here that it doesn't explain very much at all, and seems to add almost nothing to our understanding of the social world. Indeed, the opposite is the case: White's theory removes things, such as contexts, and replaces them with a rather thin soup (one of White's many metaphors) of ties in stochastic processes. The focus is consistently on the individual and this leads to some odd perspectives. For example, in a reading of Elizabeth Bott's work (Bott, 1957, 1971), White posits that stratification effects come from networks, i.e. that your social class is a consequence of your position in a network. 'Stratification might be analyzed as a super-catnet of profiles resulting from stochastic interactions within networks and disciplines.' (White, 2008: 198). White's model is entirely voluntaristic: from this perspective we are all choosing our social class, and class is a

³ A paragraph chosen at random from White's *Identity and Control* may help to illustrate his use of language and deployment of new terms: 'The term *envelope* captures the idea that it is only the outer limits of the cumulation of contingencies that has impact. This is a new sort of embedding where there is no re-forming of identity, but rather a factual accumulation that shapes or reflects a constraint on action that is comparable to embedding.' (White, 2008: 148)

consequence of our actions, not something that precedes us. In a later paper White again cites Bott as the founder of network sociology, but then translates her work into a different terminology with a different meaning: companionate and segregate networks. Where Bott examined relationships *inside* networks, White cites her work as a starting point for his analysis of companionate networks composed of other networks (White et al., 2007: 197), something that Bott did not consider possible. Networks, for Bott, are aggregates of ties that individuals have, and are not nested inside each other. In contrast, White sees networks as being real things that can be made up of ties between identities (and bear in mind the very broad definition this word has, encompassing individuals, groups and even multinational corporations) or ties between networks, where networks can be nested inside other networks. But a more significant issue is that of science: White's theory cannot explain why it is that scientific knowledge, clearly a product of human social action, takes the form that it does, nor how it is possible in his 'bellum omnium contra omnes' world that better work from lower ranked 'netdoms' (i.e. laboratories) gets prestige and identity / control in the scientific community.

White may wish to reply that these are not his concerns, but then in what way has he produced a general sociology? His theory cannot consider anything external to identities (which ultimately are people) so all roles and ideas simply arise inside individuals – but is this really possible: does each doctor really re-construct the narrative of the medic for themselves? Are social roles not arrived at through collective effort? How can one explain tradition, or culture, or religion? The network metaphor has been hammered into a particular shape and form that is a reflection of a set of values that this group of social scientists hold, but it ends up occluding some very significant things in the world. It also confines analysis to a synchronic frame of reference, or at best, to analysis over a very short period of time. But, most crucially, network has ceased to be a metaphor and has become an object we can identify in the world.

From Metaphor to 'Real' Object: Transitions in White and ANT

How did we get to this point? White's early work says that the use of the word 'network' is metaphorical. In his classic 1976 paper on blockmodelling, White agrees with Von Wiese's identification of network as metaphor, where he notes that if we were to stop the constantly flowing stream of inter human activity then 'we would observe an apparently impenetrable network of lines between men...Outside this network, above and below it, there can be nothing that is social, unless we leave the plane of empirical observation'. They go on to note that 'during the past decade, the network metaphor has become increasingly popular with social scientists' (White et al., 1976: 730).

Yet by the time we reach White's magnum opus *Identity and Control* (1992, 2008) the idea of network as metaphor has been forgotten. Now networks (or netdoms, or catnets) *are* the reality that we are inside, they *are* the social totality. They are tangible objects that are produced through specific processes, have a life of their own and their own finality

Networks need not persist just as they happen to be thrown up by stochastic eruption, and more than a particular discipline, with its projected identity, will persist and reproduce itself independent of social context, which is in turn made up of networks. (White, 2008: 112)

Similarly in the core ANT theory texts we see the initial understanding of 'network' as metaphor

If technoscience may be described as being so powerful and yet so small, so concentrated and so dilute, it means it has the characteristics of a *network*. The word network indicates that resources are concentrated in a few places – the knots and the nodes – which are connected with one another – the links and the mesh: these connections transform the scattered resources into a net that may seem to extend everywhere. Telephone lines, for instance, are minute and fragile, so minute they are invisible on a map and so fragile that each may be easily cut; nevertheless, the telephone network 'covers' the whole world. The notion of network will help us to reconcile the two contradictory aspects of technoscience and to understand how so few people may seem to cover the world. (Latour, 1987: 180) [*Italic added*]

Here, Latour is suggesting that we can imagine technoscience (a concept) as being *like* a network (i.e. using 'network' as a metaphor). He uses attendant metaphors in constructing his analogy: mesh, net, links. He doesn't say that this is an *actual* network, rather that we can picture the abstraction he calls technoscience as being a network of nodes.

Another key originator of ANT, John Law, provides a similar, metaphorical approach. He notes that we can imagine the notion of network as a descriptive tool that allows the observer to identify connections in, for example, scientometrics. But his 'actor-network' is different from this. It is 'a semiotic machine for waging war on essential differences' (Law, 1999: 7) (more metaphors being brought to bear). This metaphorical network allows the sociologist to cut through essentialism, and to challenge the hegemony of preceding spatial metaphors. But, Law notes, there is a danger here, namely that the success of ANT leads to the naturalization of its own topological assumptions (Ibid: 8). An example, taken from Law's earlier work, illustrates this clearly

People are networks. We are all artful arrangements of bits and pieces. ... We are composed of, or *constituted* by our props, visible, invisible, present and past. (Law, 1994: 33)

The slippage between network as metaphor and network as object in the world is clear here, and in many other ANT studies. For example, Maggie Mort's study of the enrolment and disenrolment processes in the Trident nuclear submarine programme provides us with a good example of the problem common to many ANT studies which see network as actuality, not as metaphor. Where Latour is deliberately and provocatively ambivalent about the concept of network, and about the usefulness of the network metaphor, Mort shows no hesitation in quickly identifying networks in the social world she investigates. Her book aims to provide

...a narrative about Trident submarine production and about the history of VSEL (the key design / construction company) that did not focus on the views and actions of managers. I have gone about this first by identifying a network within a network (the BAEC [Barrow Alternative Employment Committee]) and attempting to describe the relationship between the two and second by attempting to theorize the relationship between the dominant (Trident) network and its marginalized or expelled actants: workers who had been made redundant and technologies that had been abandoned. (Mort, 2002: 8)

All notions of metaphor have been abandoned here in favour of analysis of actual objects visible in the world. Yet there are still problems and ambiguities here, particularly the lack of reflection on whether it is possible to have a network inside a network (note the similarity of Mort's formulation of network to that of White), and the need, in her account, for networks to possess agency, visible in the way that they can expel or enrol. On top of that, we also need to consider if it is possible for us to represent these 'real' objects in the 'real' world.

Similarly in White's work, networks are very tangible. In applying his theory of identity and control White has tended to focus on the world of business and organization. For example, a recent study of the aerospace industry looked at how the identities of two corporations, Airbus and Boeing, engaged in a struggle for control and 'footing amidst chaos' which resulted in a network of ties. These ties get 'encrusted into institutions' such that an aircraft industry becomes an identity in itself (White et al., 2007: 181). Throughout this analysis White et al. find agency in these networks: they can act, have impacts on other networks, are made up of actual things. They work through processes, become interwoven with other networks, and arrange themselves into hierarchies. Networks also own things: they have their own network resources which 'may include identities, for example, particular personnel assigned to a given project or who have special expertise, or material resources such as budgets, patents, logos or specialized equipment' (Ibid: 184).

In ANT, Latour has recently attempted to replace 'network', or rather reconfigure it. But rather than the concretization of the metaphor being the problem, it is the attendant ambiguity that Latour dislikes: 'The word network is so ambiguous that we should have abandoned it long ago' (Latour, 2005: 129). This is not the same as the point made by Baldamus – that our definitions of 'network' are invariably synonymous ones, and that, lacking definition, network should be abandoned. On the contrary, Latour does want us to keep the word, but to use it in a different way.

Rather than looking for networks in the world, Latour now proposes that we use network as a tool that helps to describe something, and as a measure of energy and movement

So, network is an expression to check how much energy, movement, and specificity our own reports are able to capture. Network is a concept, not a thing out there. It is a tool to help describe something, not what is being described. It has the same relationship with the topic at hand as a perspective grid to a traditional single point perspective painting: drawn first, the lines might allow one to project a three-dimensional object onto a flat piece of linen; but they are not *what* is to be painted, only what has allowed the painter to give the impression of depth before they are erased. In the same way, a network is not what is represented in the text, but what readies the text to take the relay of actors as mediators. The consequence is that you can provide an actor-network account of topics which have in no way the shape of a network – a symphony, a piece of legislation, a rock from the moon, an engraving. Conversely, you may well write about technical networks – television, e-mails, satellites, salesforce – without at any point providing an actor-network account. (Latour, 2005: 131)

This rather begs the question: why *network* and not some other metaphor? Latour sticks with it for the imagery it provides – the point-to-point connections, gaps / emptiness, a necessity for making / construction. However, he also notes that there are some problems with the metaphor, and suggests thinking instead of ‘worknets’ as a term to describe and analyse the social world; the reason for this is to maintain a view on the net-like nature of the things we are examining

If it is true, as ANT claims, that the social landscape possesses such a flat ‘networky’ topography and that the ingredients making up society travel inside tiny conduits, *what is in between* the meshes of such a circuitry? This is why, no matter its many defects, the net metaphor remains so powerful. Contrary to substance, surface, domain, and spheres that fill every centimetre of what they bind and delineate, nets, networks, and ‘worknets’ leave everything they don’t connect simply *unconnected*. Is not a net made up, first and foremost, of empty spaces? (Latour, 2005: 242)

Perhaps it is, but then what about all the other attendant imagery – why are ANT accounts not about catching things? Why do ANT-account nets not ‘trawl’ through some medium? Latour himself destroys the metaphorical networkiness of network by noting that ‘you can hang your fish nets to dry but you can’t hang an actor-network: it has to be traced anew by the passage of another vehicle, another circulating entity’ (Latour, 2005: 132). But that’s not what we think networks in the everyday world do – the telephone network or the electrical power network are not traced out anew every time we want to use them. And can fish nets themselves, or fish net stockings be the subject of an actor-network account? If so, are they being ‘traced anew’ on every use?

Where is this taking us? Is network a suitable metaphor or not? Why does Latour want to keep it? And what about those other metaphors that Latour drops in to his recent writings: social fluid, meshes, circuitry? It does rather look as if Baldamus was correct and that network is always defined synonymously. Latour’s step back, from network to net, doesn’t really change anything, indeed it perhaps explains less as we really aren’t talking about nets as a fisherman or hosier would know them.

Why Worry?

Perhaps we shouldn’t worry about the use of the network metaphor. All language is, to some extent, metaphoric and, as Wittgenstein noted, no language can accurately describe our thoughts and experiences, even though we tell ourselves that it can (Wittgenstein, 2001). But that is not really sufficient here. Lakoff and Johnson’s work (2003) is useful in reminding us that what we are really dealing with are metaphorical concepts, and that these, when we use them, construct a picture of the world. When we use the network metaphor we are creating a picture that prescribes our understanding of the world. What we really need to consider when we do this is, what are we missing, what do we not attend to? This is the core question for both ANT and White: by deploying the network metaphor,

by seeing the world as being just network, what are you not seeing. To borrow their metaphor – what falls through the gaps in the mesh?

By seeing the world as just nodes connected by some kind of ties we are missing some important context – pre-existing knowledge and discourses external to us being the most obvious – that have significant effects on our lives. We are also buying into an atomised and individuated picture of the world, one that, admittedly, chimes well with the neo-liberal conception of society. In terms of method and field work, ANT encourages a form of mimesis – a re-inscribing and re-labelling of things in the world, but not a mode of understanding. Re-labelling a conversation as a translation between mediators in a network, or a move to achieve control in a struggle between two identities, does not clarify *why* things are happening. We produce a mimesis of the world in the language of the sociologist, a reassembling of objects that we ourselves are responsible for making. Finally, network makes it difficult to see hierarchy: the ‘flat topography’ of ANT is far removed from the tough realities of exclusion, discrimination and subordination experienced by many people. We are faced with a radical disjuncture between the experiences and perceptions of most people and the description of the world offered by professional sociologists.

There are many critical points we could raise here, but two are, I think, of importance. The first is that we are replacing uncertainty with precision, a precision that is fictive. This happens when we replace, or re-inscribe, an unknown entity – society – with something that we have constructed a partial definition of – network. By saying society = network it looks as if we have provided greater precision and understanding of the social world. But we have actually done the opposite: we didn’t know what society was in the first place, and we have avoided discussion of this by replacing the whole with a part (for networks, if they exist, must at least be a part of society, and if not, if they are all of society, then we are just swapping one unknown thing for another). This metonymy is certainly prevalent in the social sciences, but may not be helpful. Apart from anything else, using the metonym ‘network’ to represent the whole means that we will not see other things, things that are perhaps more useful for sociological analysis. An obvious one is ‘community’ – a term that is rarely deployed by either Whitean sociologists or ANTs.

The second is a criticism that many post-structuralists laid at the door of the modernists: the replacement of actors’ intentions with other things. In White’s network sociology whatever we think we may be doing – talking about the weather, discussing laboratory data, rubbishing the England football team’s latest outing – are actually attempts at control of identity. In ANT similar replacements take place: the laboratory worker thinks they are analysing data, but actually they are constructing a network of relations with human and non-human actors.

And this takes us to another point: what does it mean to be identified as being a part of a network when one is not aware of it? Is the network ‘real’? What would that mean, in terms of how we might experience it? And have we as sociologists learned anything by assigning or identifying people as being members of networks if they themselves don’t think that they are? In White’s recent work he looks at the restructuring of a fashion brand, Armani, using network sociology. The Armani fashion house shifted from being one brand in 1975 to being a ‘companionate / segregate family of brands in 2006’ (White et al., 2007: 196). Perhaps, but in what ways can we say that the *customers* of the Armani fashion house are ‘dynamic stochastic networks of customers’ (Ibid)? How can customers of a brand form a network with each other when they have no knowledge of who the other customers are? At least in most ANT studies the actors being discussed would probably have some knowledge of the other actants being posited as part of the network; in White’s sociology one need have no cognisance of one’s position in a network, or even that a network exists. It is only the sociologist, with their specialised tools, that can identify the network and also understand what the network is for.

Of course, many people do think they are part of a network: we talk of our network of friends or colleagues, and we, particularly academics, talk about networking as an activity that is part of our job. This everyday usage of the network metaphor blurs the line between the abstract and the actual: we conceptualise ourselves as part of a network, and then we find that we are in a network of companions / colleagues doing ‘networking’ when we meet up. We can even appraise our skills at networking – we know how good or bad we are at networking, or at least doing some of the actions that are associated with networking, by counting and comparing the number of ‘friends’ we have accumulated on our social networking sites of choice (e.g. Facebook, Twitter or MySpace).

These networks, however, are different from ANT or White's networks, and for two reasons. The first is a mundane, perhaps even trivial, reason: they are not the sort of networks that are studied by either White or ANT. The second is more significant: ANT and White's networks exist objectively, independent of actors in much the same way that society exists, according to many sociologists (e.g. Durkheim or Simmel). Our Facebook network exists only in our actions and thoughts and does not have objective features discernable to others.

Conclusion

When we try and understand the world – and this is the shared project we are all involved in – we social scientists are perpetually faced with the problem of abstraction: how do we adequately represent the world we see around us when we are constantly abstracting it into concepts and theories? The to-do list for a conceptual scheme that helps us to understand everything 'social' (and that is, after all, the task that both White and ANT set themselves, albeit in very different ways) is quite challenging, and clearly we are always going to be producing partial or inadequate accounts in some way or other. But perhaps reflecting on this can help to move us forward. One thing we can do is move from metaphorical constructs to experiences in the world – and in terms of human social relations using the categories and meanings that people deploy in their everyday experiences would be useful. Alternatively we could, perhaps, follow Baldamus who noted that there is only one theoretical method in sociology, Max Weber's 'celebrated method of constructing ideal types' (Baldamus, 1976: 9). Yet Weber's method, powerful though it is, does not help us address the other fundamental problem we face: the metaphorical aspect of our language. As Lakoff and Johnson note, we cannot escape the metaphors we live by (Lakoff and Johnson, 2003). But that doesn't mean we should ignore this: quite the opposite is in order. What we need to do is to notice the metaphors that we are using, and to clearly describe them as such. Our endeavours in explaining and understanding the social world can only be based on our experiences, and the experiences of others; we need to recognise this, and focus on this, and also recognise that some metaphors will work at the expense of metaphors whilst others will enhance our experiences, a point Turner makes in comparing sociology and literature (Turner, 2010). Goffman's dramaturgical metaphor (Goffman, 1959) enhances our experience of social interaction, but also hides some aspects of social experiences, and Goffman himself was clear that the metaphor is scaffolding that can be taken down when the job is done (Turner, 2010: 111). Similarly with the network metaphor: it can enhance our understanding of some aspects of social experience, but may occlude other things that are equally important.

The network metaphor is as prevalent as ever, and as powerful as ever. In ANT and in White's social network sociology we are presented with reductive pictures of the world where phenomena are reduced to their inclusion in networks, and, in White's work, where people are all and always engaged in a perpetual struggle for footing, security and control of identity. The power of such approaches is obvious: clear, crystalline and simple explanations of motivations and interconnections. But what they omit is far more significant: meaning. This omission of meaning is at two levels. The first is the removal of the actors' meanings that are attached to their actions and their replacement with the metaphor. The second is the lack of reflection by the social scientist on what meanings they are attaching to the metaphor. For example, the network metaphor implies a particular spatial configuration, and this can in some cases be helpful. But as Baldamus points out, the two-dimensional imagery of the network metaphor is unhelpful, particularly in sociology of science

[T]he threads connecting the knots are spread out across a flat surface. As a result the net cannot capture the temporal dimension of the genesis of new concepts and new levels of abstraction. Thus, the problem of the growth and the vanishing of 'knowledge' remains largely inaccessible and undecidable in this approach. (Baldamus, [1982] 2010: 120)

We need to use an alternative approach, where we gradually work up more and more sophisticated concepts that participants can already identify their membership of, or exclusion from, attachment to

or repulsion from. Whilst doing this we will need to recognise our own deployment of metaphor and should critically reflect on the meanings we are attaching to these. One, final, step is also necessary: a critical reflection on the necessity of the metaphors we are using. Latour's incredibly detailed studies of what people actually do, be that making law, designing a transport system, working in a biochemistry laboratory, tell us a huge amount about the social world and how it works. So much so that the metaphor of network seems rather *unnecessary* in these studies and Latour's exhortation to 'just describe the state of affairs at hand' would seem to support this observation (Latour, 2004: 66). In contrast to Latour's decorative networks, White's networks are generative, forming the world around us and in his theory you cannot ignore them. Yet their necessity is never questioned or even discussed in White's work.

Reducing everything to network hides things from us, and makes us think we have been precise when we have been vague. Even just deploying the network metaphor binds us to a way of picturing the world that may inappropriate in many cases: our language is creating objects that we then go and find. The deployment of this metaphor means we will inevitably make certain assumptions about the world and its structure. We are also becoming used to describing our everyday world in terms of 'networks' and 'networking', a consequence of how Facebook, Twitter and other online resources are presented to us. But despite its prevalence, persistence and power the network metaphor is just an abstraction, and we need to remember this

'No wonder kids grow up crazy. A cat's cradle is nothing but a bunch of X's between somebody's hands, and little kids look and look and look at all those X's.'

'And?'

'No damn cat, and no damn cradle.' (Vonnegut, [1963] 1965: 105)

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