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Technology, Text, Subject: 'After' the Human

by Chris Land
University of Essex, UK

ABSTRACT

Recent theories of technology have argued that in order to take constructivism seriously we need to understand technologies as organizational texts, replacing the study of technological artefacts with an appreciation of the ways in which these 'texts' are read, or interpreted, in specific situations. Whilst such approaches offer an effective critique of determinism in explanations of technological change, they also raise some interesting questions around the nature of the human subject which have been given a less comprehensive treatment in the literature. This paper contributes to the development of a thoroughgoing anti-essentialism in theories of technology and organization by considering Deleuze and Guattari's radical constructionist critique of the subject. Placing the technocentric metaphor of 'the machine' at the heart of subjectivization, Deleuze and Guattari's decentring of the human subject offers a fully symmetrical anti-essentialism, capable of accounting for the non-human forces at work in the constitution of human subjectivity.

INTRODUCTION

Although there are significant differences between competing approaches to the question of technology within the social sciences, most theorists of technology are agreed that technological determinism is a theoretically impoverished and politically conservative doctrine that has long and justifiably been discredited. Nevertheless, almost all new theories of technology still position themselves against technological determinism. This opposition reaches what is perhaps its apogee with the publication of Grint and Woolgar's (1997) *The Machine at Work*. In this book, the authors propose that we understand technology through the metaphor of the text. This particular brand of 'radical constructivism' thus reflects a wider trend within organizational studies toward the de-materialisation of organizational analysis and its reconstitution as an abstract form of textual analysis (see Czarniawska, 1999). As it is caricatured in various attacks on post-modernism, this trend may be termed a 'textual turn' within organizational studies. Whilst being sympathetic to this textual turn within the study of technology and organization, this paper seeks to extend the debate by considering the nature of 'the subject' that might act as an interpreter of this discursively constructed reality. Following a brief discussion of Nietzsche's (1968) critique of the subject and agency the paper examines the common ground upon which both objective-positivism and subjective-interpretivism are articulated and

argues that these positions share more than their seemingly opposed epistemologies would suggest. Both assume a centred, relatively stable, human subject who perceives and knows *in relation to* an external world. The apparent difference – positivism assumes that this world is knowable and subjectivism assumes that it is not and that knowledge merely reflects the internal organization of the perceiver – is actually the product of a set of shared underlying assumptions about the human subject.

If approached symmetrically, however, there is a more radical potential in the textual turn. In poststructuralist theories of textuality there is a decentring of the interpreting subject so that binary oppositions like subject/object collapse. Following Deleuze and Guattari (1983; 1987), this paper argues that this decentring opens onto a material heterogeneity in which technological artefacts, inscriptions, and human bodies are formed and distributed along lines immanently encoded in their material composition, rather than externally imposed by a transcendent system of signification. This focus on materiality suggests an inversion of Grint and Woolgar's 'technology as text' to consider 'text as technology'. This idea suggests both the materiality of texts and a kind of 'immanence' of technology and the human (Chia, 1998) similar to that found in cyborg theory. The paper continues by reflecting upon the ways in which the human and technology are co-constitutive in the manner of a Deleuzian becoming to develop a thoroughly symmetrical and anti-essentialist approach to subjectivity and technology. It is the argument of this paper that such an approach has the potential to offer us a way of thinking about social agency without recourse to external determinants, whether these determinants are located in technological objects or in human subjects.

THE QUESTION OF TECHNOLOGY

In starting a paper like this it is useful to ask the seemingly simple question: What is technology? A quick glance at a popular first-year organizational behaviour textbook shows that even basic definitions are not easy to come by. Following Langdon Winner (1977, p. 8), Huczynski and Buchanan (2004, p. 70) employ the broad definition of technology as "an unbelievably diverse collection of phenomena – tools, instruments, machines, organizations, methods, techniques, systems, and the totality of these things in our experience." Even a fairly simple understanding of 'technology' quickly spirals out to include the whole of human phenomenology. Take for example the production line. At one level it is a simple combination of a centrally controlled power source and a moving conveyor which carries a product from station to station as it is assembled. Of course the production line is also a particular form of social organization. Without a detailed division of labour and disciplined bodies present at each of the stations along the line then there is no 'production line' at all. Hence even a fairly basic industrial technology blurs the distinction between material artefacts, scientific know-how, a specific distribution and operation of human bodies, and a disciplinary process of subjectivization. With information and communication technologies the lines are even more obviously blurred:

> *It is no longer clear if a computer is a limited form of organization or it an organization is an expanded form of computer system. Not because, as in the engineering dreams and*

> *sociologist's nightmares, complete rationalization would have taken place, but because, on the opposite, two monstrous hybrids are now coextensive.* (Latour, 1996, p. 302)

As Latour would have it, there is no way to separate out contemporary forms of social organization into 'technology' on the one hand and 'the social' on the other, into object and subjects. From such a perspective the question of technology must be framed in the broadest of terms so it is hardly surprising that simple versions of technological determinism have been widely rejected by social scientists across the disciplines (McLoughlin, 1999). Given the impossibility of defining 'technology', let alone 'the social', as distinct entities the idea that these can be separated out, even analytically, and casual agency be attributed to one or the other is incredible. As the rest of this paper argues, the materially heterogeneous enfoldings that constitute 'organization' are themselves productive of both objects, like 'technology' and 'society', and human subjects. To approach this argument it is worth considering one of the most important books on technology to appear in the last decade.

TECHNOLOGY AS TEXT

In their (1997) book *The Machine at Work*, Keith Grint and Steve Woolgar set up a linear narrative of the development of theories of technology that stretches from naïve technological determinism through various kinds of social constructivism to terminate, perhaps inevitably, with their own perspective: technology as text. At each step of the way, according to these writers, theoretical progress is made but a 'residual technicism' remains to contaminate even the most seemingly radical thinking on technology. Actor-network theory, for example, in their account is ultimately dependent upon technical facts when explaining technological developments (1997, pp. 30-31). To Grint and Woolgar this is unacceptable. Indeed, they want to go further than a rejection of technological determinism to question the validity of any appeal to an external world of 'facts'. This is where the idea of technology as text goes the furthest. Grint and Woolgar reject all previous accounts of socio-technical change as containing a kernel of 'technicism' insofar as they appeal to some concrete, objective fact about the external world (whether technology itself or social factors made objective through technology) in order to explain change. Instead, Grint and Woolgar insist that everything is interpretation. To understand socio-technical change we have to look at how users and designers of technology interpret what an artefact is and what it can do. When discussing Michel Callon's example of the 'failure' of the catalysts for the power source of an electric car (see Callon, 1986) Grint and Woolgar suggest that the use of this fact (i.e. that the catalysts 'failed') as a component of explanation is a kind of technicism. The question that Callon should properly have asked was "Who says catalysts had this unfortunate tendency, how and why did they say so, and why does this particular version prevail?" (Grint & Woolgar, 1997, p. 31). Going beyond a simple rejection of technological explanation to disavow any appeal to external facts, whether social or technical, Grint and Woolgar effectively reframe the question of technology within a dualism of positivism versus interpretivism. They suggest that, as we can never 'know' the external world in itself, the best that the social sciences can hope for is to understand the ways in which people read,

or interpret, events and actions to generate a narrative of explanation.

CAN WE DOUBT TOO MUCH?

As applied to the study of technology, Grint and Woolgar (1997) dub their approach 'radical', or 'thoroughgoing', constructivism or more specifically 'technology as text'. By turning seemingly hard facts and objects into texts and focusing attention upon the ways in which these texts are read Grint and Woolgar perform a textual turn that shifts analyses of technology away from 'the facts' and onto issues of interpretation. The value of this textual approach to the study of technology has been questioned by some theorists who are concerned that, in seeking to remedy the worst excesses of determinism, anti-essentialism pushes things too far in the opposite direction (e.g. Hutchby, 2001). In this paper I want to pursue a rather different line however and suggest that, rather than going too far in its critique of objectivism, the textual approach to technology and organization contains an even more radical, if not fully realised, critique of subjectivism that needs further development.

Whilst Grint and Woolgar successfully critique the positivistic assumptions underlying appeals to an external technological essence, a *deus ex machina* as they call it, a thoroughgoing anti-essentialism must also engage reflexively with the assumptions of agency mobilised when positing an interpreter as the source of interpretation. As Nietzsche put it:

> *Against positivism, which halts at phenomena – "There are only facts" – I would say: No, facts is precisely what there is not, only interpretations. We cannot establish any fact "in itself": perhaps it is folly to want to do such a thing.*
>
> *"Everything is subjective," you say; but even this is interpretation. The "subject" is not something given, it is something added and invented and projected behind what there is. – Finally, is it necessary to posit an interpreter behind the interpretation? Even this is invention, hypothesis.* (Nietzsche, 1968, p. 267)

At times Grint and Woolgar (1997) are careful to avoid this trap as, for example, when they speak of 'configuring the user.' An example here is a device such as the box around the working parts of a computer that produces a boundary to keeps the majority of users from accessing the machine's innards. Backed up by more literal inscriptions to the effect that tampering with the innards will invalidate your warranty, such technological 'inscriptions' constrain the possible readings of a particular technological text so that the agency of interpretation is never a simple, independent subject. Of course, resistance is possible and many users willfully run 'open' computers but the point here is not to slide back into framing the issue in terms of determinant 'text' versus creative 'reading' (which would really just take us back into the old freewill/determinism debate) but to recognise that Grint and Woolgar's work contains the idea of a completely decentred, non-subjective event of interpretation. Unfortunately this position is not consistently followed through, as when they ask 'who says?' and 'why?' in relation to the failure of Callon's catalysts. Asking such questions implies a human agent who speaks and acts on the basis of given reasons, and that 'we' analysts can understand the constitution of the social and the technological if we can only apprehend the interpretations, motivations, and actions of these agents.

The limits of Grint and Woolgar's methodological scepticism are similar to Descartes'. Descartes (1986) famously embarked upon a project of thoroughgoing scepticism so that from the comfort of his hearthside armchair he rejected, as a ground for knowledge, the existence of everything of which could entertain even the slightest doubt. This philosophical method led him eventually to proclaim with victorious certainty: "Cogito ergo sum" (Descartes, 1986, p. 17; p. 68). The only thing that he could not doubt was that he, a thinking thing, existed. Nietzsche (1989, p. 24), however, suggested that even this celebratory ejaculation was premature, asking wherefore an 'I' that thinks? The subject, he suggests, is merely a grammatical prejudice. Faced with a verb, we assume that it must have a subject. 'Thinking' grammatically implies a subject who thinks, but this does not mean that such is either necessary or true. Nietzsche offers the example of a lightning strike (Nietzsche, 1994, p. 28). When we say that lightning strikes, we imply an agency to the lightning that is little more that a prejudice carried over from primitive anthropomorphism:

> *there is no 'being' behind the deed, its effect and what becomes of it; 'the doer' is invented as an afterthought, - the doing is everything.* (Nietzsche, 1994, p. 28)

Few people today would really believe that there is a subject 'lightning' who 'strikes' like an angry god, yet we have no better reason for assuming the existence of a subject of thought (Nietzsche, 1989, p. 24).

SYMMETRY

Returning to the specific question of technology, this digression on scepticism, interpretivism and the subject highlights a danger with any asymmetrical approach to the study of organization and technology. If only the dominant pole of a significant dualism like object/subject is treated rigorously then there is a danger that the dualism remains intact and with it an underlying epistemology. In contradistinction one of the most important contributions of actor-network theory is an insistence upon a principle of symmetry. In *Science in Action*, Latour (1987) suggests that the human and non-human actors comprising an actor-network should be accorded equal importance in explanations of socio-technical change. If this is taken as meaning that objects should be given equal weight as subjects in social explanations, then Grint and Woolgar's accusation of 'residual technicism' may be justified. Indeed, the assertion that we pay equal attention to technical objects seems entirely in tune with the common-sense reassertion of the importance of the limits of technological interpretative flexibility in approaches such as Hutchby's (2001). The principle of symmetry can also be read the other way however. If we insist upon a methodologically symmetrical treatment of human and non-human, as Latour suggests (1987, p. 144) then it seems clear that Grint and Woolgar's scepticism should equally be extended along its more radical axis to include human subjects. In the final instance, can we take scepticism so seriously that we doubt even the existence of a sceptical subject of interpretation, conceiving instead of a process without external agency: an agency immanent to the event of interpretation? Such a concept necessitates a reworking of the 'it' of agency or the subject of interpretation.

IT'S MACHINES ALL THE WAY DOWN…

In the first part of *Beyond Good and Evil*, 'On the Prejudices of Philosophers', Nietzsche (1989, p. 24) questions whether the "it" that thinks – the locus of human agency – is the 'famous old "ego"'. The question of what "it" might be is also taken up by Deleuze and Guattari at the start of *Anti-Oedipus* when they write:

> *It is at work everywhere, functioning smoothly at times, at other times in fits and starts. It breathes, it heats, it eats. It shits and fucks. What a mistake to have ever said the id. Everywhere it is machines – real ones, not figurative ones: machines driving other machines, machines being driven by other machines, with all the necessary couplings and connections.* (Deleuze & Guattari, 1983, p. 1)

In a critique that thoroughly decentres the Cartesian ego Deleuze and Guattari privilege the 'it' – closer to 'id' than 'ego' – as the site of human actions and drives. But if there is no coherent unified ego or id then what is 'it'? What is a subject? In a move that gives new meaning to the phrase 'the machine at work', Deleuze and Guattari suggest that *it* is machines. Far from 'the machine' being a question of textual interpretation by a reading subject, the subject is itself a question of machines and their connections and breaks. Like Nietzsche, Deleuze and Guattari recognise that 'it' is not even singular; it is a multiplicity. As they put it elsewhere, "the brain is a population" (1987, p. 64).

We should not assume that Deleuze and Guattari's machines are simple extensions of the mechanical metaphor however. If we read these ideas in the light of Nietzsche's critique of atomism, we might rather consider Deleuze and Guattari's ideas as a tongue-in-cheek rejection of mechanism and development of what Nietzsche (1989, p. 20) called 'a new soul-hypothesis'. This multiplicity cannot be simply located (see Chia & Kallinikos, 1998, p. 137) as it is not singular. It is not even made up of discrete objects. As Deleuze and Guattari note, the machines of which they speak are part-objects and only make sense in relation to the connections and the flows that they simultaneously interrupt and produce (1983, pp. 5-6). To explain these machines they use the example of a suckling infant and the mouth-machine that breaks/produces the flow of milk emitted from the breast-machine. As Ronald Bogue explains:

> *A mouth-machine is coupled to a breast-machine, a flow of milk passing from the breast-machine to the mouth-machine. The infant's mouth-machine is in turn coupled to the various machines of the alimentary canal (an esophagus-machine, a stomach-machine, an instestinal-machine), the flow of nutrients gradually being converted into various energy circuits of collateral desiring-machines (circulatory, neural, hormonal, etc.) within the infant's body, emerging eventually as flows of excretions. The flow of milk from the breast-machine itself issues from an alimentary circuit that extends to the multiple nutrients that enter the mother's mouth-machine.* (Bogue, 2003, pp. 60-61)

Machines are the breaks and producers of multiple flows. The infant's mouth is also "a breathing-machine, a spitting-machine, a crying-machine, and so forth" (Bogue, 2003, p. 61) so that there is no singular function for the orifice. It functions in multiple ways depending upon the

connections it couples with. It is also partial as it only exists in relation to the flows that it emits and breaks. It is this partiality of the desiring machines that renders them always already heterogeneous:

> *…no circuit of desiring machines exists in isolation from other circuits, the infant's alimentary circuit, for example, being connected to ocular circuits (the infant's eye-machine focussed on a living-room lamp, say), olfactory circuits (the nose-machine coupled to flows of kitchen odours), tactile circuits (epidermal-machines in touch with heat, fabrics, flesh, mists, air currents).* (Bogue, 2003, p. 61)

For Deleuze and Guattari these circuits are not produced by a pre-formed subject. The connections that are made and the flows that produce these circuits trace out the full range of possible, or rather 'virtual', connections and circuits whose totality comprises the body-without-organs (Deleuze & Guattari, 1983, p. 50). This body is not something outside of these connections, which produces them and unites them in a totality, but an immanent production of these circuits of desiring production, their virtual existence as it were, which is actually produced by their connections and flows and upon which they are recorded or registered as productions. For Deleuze and Guattari the subject is only produced as a kind of after-effect of this registering of the flows of desiring production on the body without organs. The subject is produced in the last of the three syntheses that provide the basis for desiring production in *Anti-Oedipus*. The desiring machines produce the circuits of flows in the first, connective synthesis. The body without organs registers these actual circuits of flows next to and against all the other virtual circuits in the second, disjunctive, synthesis. The third, conjunctive synthesis produces "a summary movement in which the heterogeneous elements of connective flows and disjunctive chains coalesce in an additional part that "consumes the states through which it passes and is born of those states"" (Bogue, 2003, p. 65, citing Deleuze & Guattari, 1983, p. 49).

Following Deleuze and Guattari's machinic ontology the subject is a part and product of the overall operation of the desiring machines. Whilst it unifies to an extent, it nevertheless remains a distinct part of this process of desiring production. Its unity is not over and above the process of desiring production, but is a totality produced alongside this process and immanent to it. In such a view the 'machine at work' could be refigured as a comment on the machinic nature of desiring production at the heart of a Deleuzo-Guattarian ontology of flows and connections. This does not make the subject an irrelevant consideration, but it does mean that it must be rejected as a stable ground for an interpretivist epistemology or anti-essentialist ontology. It must also be recognized that, in a much more limited sense, the event of interpretation cannot be contained within either a body or a subject. The production of bodies and their affects, and interpretations and their subjects, are part of a more general process of desiring production that is necessarily materially heterogeneous, even in the most seemingly 'natural' of bodily phenomena like breast-feeding an infant. If we turn our attention to more recent 'technological' developments this heterogeneous and machinic production process resonates with the quite inhuman metaphor of the cyborg.

A COOPERIAN REVOLUTION

Taking up Deleuze and Guattari's ideas, Robert Cooper has suggested that

technologies form elements of the human sense perception apparatus. For example, Renaissance art, perspectivism and the point of view, the camera etc. have all become elements in the production of contemporary subjects. This observation is important because it demonstrates that apparently external artefacts stand in a complex relationship of becoming with the human subject (Cooper, 2001; Chia, 1998). In Deleuze and Guattari's terms, this becoming is not one of imitation – the eye becoming exactly like a camera – but one of mutual co-adaptation. As they put it in relation to the question of the orchid becoming bee:

> *…the orchid seems to reproduce an image of the bee but in a deeper way deterritorializes into it, at the same time that the bee in turn deterritorializes by joining with the orchid: the capture of the code, and not the reproduction of an image.* (Deleuze & Guattari, 1986, p. 14)

In this way, the development and use of a new technology means that an element of the human is captured by that technology and, in being captured, is translated in a quite literal sense: it is transformed, not simply transplanted. Within the context of a continually changing technological environment, to talk of a stable human subject at one end of an oppositional binary with 'technology' is not only overly simplistic, it also has important political and axiological ramifications. It is for this reason that I have somewhat jokingly entitled this section 'a Cooperian revolution'. Just as Copernicus' scientific revolution was to de-centre the place of the human in the universe by moving from a geocentric to a heliocentric world view (Kuhn, 1970), the decentring of a pretechnological subject, explored in the work of Robert Cooper and his colleagues, suggests that the anthropocentric world view is grounded in an all too human arrogance.

If we return to our earlier discussion of language, we can see that what Nietzsche called a 'grammatical prejudice' is precisely a component of such a becoming. Comprised in part by linguistic norms, the mind is able to locate, and thereby speak of, the subject as a seat of understanding and knowledge. It does so 'naturally', as it were, because of the ways in which this component of the sensing and conceptual apparatus is configured. This is not to say that such a configuration is fixed, least of all by an external 'nature'. Indeed, the disruption of culturally specific modes of perception has been actively pursued in the arts by, for example, the multi-perspectival paintings of the cubists or the literary cut-ups of William Burroughs (Miles, 1993). What is important is to distinguish this location, a product of the mind, from the mind itself:

> *…the mind is not a place – it doesn't have a specific location. Places and locations are the products of the mind's work… The conscious mind is an active field of cognitive strategies which orders the matter of the world – it literally puts things in order.* (Chia & Kallinikos, 1998, p. 131)

What should be clear is that language, its grammar and conceptual categories, is itself a part of this mind that orders and structures. If we recognise that the mind is a kind of ecology (Bateson, 1973; Guattari, 2000) that is characterised by a number of becomings with what, in more conventional terms, would be considered external objects, tools or technologies – particularly technologies of representation – then we can appreciate that language is itself one such technology, albeit one that has a major influence on perception and cognition.

In a sense this Cooperian move, following Deleuze and Guattari, effectively inverts Grint and Woolgar's approach as texts are themselves 'technologies' or machines plugged into the circuits of human production. This idea is similar to Katherine Hayles' (1999) discussion of language as a primary pros(e)thesis where language is simultaneously something external to the human subject and a distinguishing feature of the human. Indeed, language use is one of the key criteria by which philosophers have traditionally separated humans from other animals and from machines (e.g. Searle, 1984; Fellows, 1995). This is one respect in which we can claim that we have always been cyborgs or, to put it another way, that the human has always been post-human (Davies, 1998, p. 10). The human mind and its perceptual apparatus is constituted by a relationship of becoming with its prosthetic technologies, primary amongst which is language.

There is a danger however that adhering to a prosthetic logic will keep technology, so to speak, at arms length (Plant, 1997). It would be an error to imply that technologies of representation were ever external to a pre-existent, pre-technological human subject (the pure human that *we* have always been 'post'). The relationship of becoming is a kind of enfolding without inside or outside. To consider this idea further we need to look at the later work of Deleuze and Guattari who address this question in relation to the production of the human form through the metaphor of stratification.

ALL ABOARD THE ANTHROPOMORPHIC STRATUM

In the third of their Thousand Plateaus – '10,000 B.C.: The Geology of Morals (Who Does the Earth Think It Is?)' – Deleuze and Guattari (1987) inform us, in the guise of Conan-Doyle's Professor Challenger, that the Earth, despite being a body without organs, is nevertheless subject to a process of stratification. Indeed, what we usually call reality is made up of a series of strata. The most obvious of these is the physico-chemical stratum, which includes those strata more traditionally studied by geologists. A second stratum is the organic stratum, which includes embryology and genetic code. Of more interest to us here however is the third stratum that Deleuze and Guattari discuss in detail: the anthropomorphic stratum.

Deleuze and Guattari do not begin their analysis with an *a priori* human subject that is separable from technology or the external world of objects. Instead they start by considering the relationships, distributions, or enfoldings, that characterise the anthropomorphic stratum of reality. Following André Leroi-Gourhan, they consider the ways in which the key properties of human-beings, "technology and language, tool and symbol, free hand and supple larynx, "gesture and speech" are in fact properties of [a] new distribution" (Deleuze and Guattari, 1987, p. 60). For Leroi-Gourhan, human evolution has been the result of complementary changes in the mouth and the hands which have enabled tool use and language to emerge in parallel. When movement takes a more upright position, the hands are freed from their locomotive functioning to take on other functions, such as making and using tools. With free hands and tools, the mouth is freed from those functions where it has to act on the external world, for example to carry things, or to tear and grind food. This deterritorialization of the mouth frees it up for other purposes, such as language (Bogue, 1989, pp. 128-9). These parallel de- and re-territorializations of the hand and tool, mouth and language are what the human is. From this perspective there is no

human subject outside language and technology, no clear separation of subject and object. Rather, it is a specific stratification, the result of shifting territorializations and codings on the strata, that produces the distribution we usually call 'human'. Further, such shifts do not occur in isolation:

> *Not only is the hand a deterritorialized front paw; the hand thus freed is itself deterritorialized in relation to the grasping and locomotive hand of the monkey. The synergistic deterritorializations of the other organs (for example, the foot) must be taken into account. So must correlative deterritorializations of the milieu: the steppe as an associated milieu more deterritorialized than the forest, exerting a selective pressure of deterritorialization upon the body and technology (it was on the steppe, not in the forest, that the hand was able to appear as a free form, and fire as a technologically formable matter). Finally, compensatory reterritorializations must be taken into account (the foot as a compensatory reterritorialization for the hand, also occurring on the steppe).* (Deleuze & Guattari, 1987, p. 61)

Neither can they be separated. The supple larynx, lips, and the flattening and 'motricity of the face' could not come about without changes in the hands and tools. A more contemporary example is given by Sadie Plant (2001) when she discusses the ways in which the advent of text-messaging on the mobile phone has led members of the 'text generation' to have their thumb as the dominant digit, employed in activities such as the ringing of doorbells that were previously the preserve of the forefinger (itself dominant partly in relation to its territorialization through pen control).

Of course, such changes do not take place completely at random. They occur within a wider machinic assemblage that takes up these elements and enfolds them into the anthropomorphic stratum. Using the example of Lynn White Jr's (1962) study of the stirrup and Feudal society, then we can ask what it was that put horses, men and iron into such a specific relationship:

> *The history of technology shows us that a tool is nothing without the variable machine assemblage which gives it a certain relationship of vicinity with man, animals and things:… the stirrup is a different tool depending upon whether it is related to a nomadic war-machine, or whether, on the contrary, it has been taken up in the context of the feudal machine. It is the machine that makes the tool and not vice versa.* (Deleuze & Parnet, 1987, pp. 104-105)

Rather than reading White as a determinist, Deleuze and Parnet emphasize the constitutive relationships that he draws out in his analysis. These relationships are themselves always multiple and heterogeneous, connecting in their networked flows the organic, animal, metallurgical, religious and political-economic. It is the immanent logic of organization, flowing through and produced by these connections, that assembles them as *machine*. This idea of a machinic assemblage, therefore, offers a thoroughly decentred, anti-essentialist and immanent model for theorising the agency of socio-technical change and subjectivization.

IN-CONCLUSION

Deleuze and Guattari employ the concept of 'folding' to describe a relationship between inside and outside, so that the subject is an enfolding of the external

(Wise, 1997, p. 60). By thus rejecting the Cartesian logic of separate subjects and objects, Deleuze and Guattari have developed a thoroughly anti-essentialist starting point for explorations of 'the human' and the relationships between language, technology, epistemology and subjectivity. Instead of starting with a pre-given human subject, they begin by considering the relationships, or distributions, that characterise the anthropomorphic (or human) stratum. Although the precise relationship between technology and language needs to be addressed more concretely and empirically than the general theoretical framework of this paper permits, this discussion has suggested the need to pay greater attention to the specificities of this relationship and the conceptions of agency underlying anti-essentialist ontologies of socio-technical change. Doing so should enable us to consider afresh the subject/object duality that provides the epistemological basis for most theories of technology within organization studies, even the most seemingly radical anti-essentialism. In this sense the work of Deleuze and Guattari, and Robert Cooper, might provide the basis for a genuinely thoroughgoing anti-essentialism that is dependent upon neither pre-formed objects, nor subjects, as its ground. In such a model both causal determinacy and agency would need to be reworked on the basis of an ontology of becoming and an epistemology that refused to privilege a fixed human subject as its foundation.

The question remains however, as to what would happen to human being in such a world view. In *Creative Evolution*, Henri Bergson shows that epistemology, or the philosophy of knowledge, is inseparable from bio-philosophy or the philosophy of life (Bergson, 1998, p. xiii). In a similar vein, Nietzsche remarks that:

> *After having looked long enough between the philosopher's lines and fingers, I say to myself: by far the greater part of conscious thinking must still be included among instinctive activities, and that goes even for philosophical thinking… Behind all logic and its seeming sovereignty of movement, too, there stand valuations or, more clearly, physiological demands for the preservation of a certain type of life.* (Nietzsche, 1989, p. 11)

Behind the apparently 'sovereign logic' of independent truths and certainty is the valuation of a distinctly human type of life: precisely that which Nietzsche sought to overcome. If we allow ourselves to question even the foundations of human being we may find that we need new concepts of existence and subjectivity. Given the importance of technology within this process, which I hope I have demonstrated in this paper, perhaps a better metaphor than human being would be becoming-cyborg. The implications of this shift for thinking about agency and organization have not yet been fully thought through, though several starts have been made (e.g. Wood, 1998). What I hope that this paper has done is to ensure that we are at least asking the right questions.

REFERENCES

Bateson, G. (1973). *Steps to an ecology of mind: Collected essays in anthropology, psychiatry, evolution and epistemology*. London: Palladin Books.

Bergson, H. (1998). *Creative evolution*. Mineola, NY: Dover Publications.

Bogue, R. (2003). *Deleuze on literature*. London: Routledge.

Bogue, R. (1989). *Deleuze and Guattari*. London: Routledge.

Callon, M. (1986). The sociology of an actor-network: The case of the electric vehicle. In M. Callon, J. Law & A. Rip (Eds), *Mapping the dynamics of science and technology: Sociology of science in the real world* (pp. 19-35). London: Macmillan.
Chia, R. (1998). Introduction: Exploring the expanded realm of technology, organization and modernity. In R. Chia (Ed.), *Organized worlds: Explorations in technology and organization with Robert Cooper* (pp. 1-19). London: Routledge.
Chia, R. & Kallinikos, J. (1998). Interview with Robert Cooper. In R. Chia (Ed.), *Organized worlds: Explorations in technology and organization with Robert Cooper* (pp. 131-180). London: Routledge.
Cooper, R. (2001). Un-timely mediations: Questing thought. *ephemera*, *1*, 321-347. Available online at www.ephemeraweb.org
Czarniawska, B. (1999). *Writing management: Organization theory as a literary genre*. Oxford: Oxford University Press.
Davies, E. (1998). *Techgnosis: Myth, magic and mysticism in the age of information*. London: Serpent's Tail.
Deleuze, G. & Guattari, F. (1983). *Anti-Oedipus*. London: Athlone.
Deleuze, G. & Guattari, F. (1986). *Kafka: Toward a minor literature*. Minneapolis, MN: University of Minnesota Press.
Deleuze, G. & Guattari, F. (1987). *A thousand plateaus*. London: Athlone.
Deleuze, G. & Parnet, C. (1987). *Dialogues*. London: Athlone.
Descartes, R. (1986). *Meditations on first philosophy: With selections from the objections and replies*. Cambridge: Cambridge University Press.
Fellows, R. (1995). Welcome to Wales: Searle on the computational theory of mind. In R. Fellows (Ed.), *Philosophy and technology*. Cambridge: Cambridge University Press.
Grint, K. & Woolgar, S. (1997). *The machine at work: Technology, work and organization*. Cambridge: Polity Press.
Guattari, F. (2000). *The three ecologies*. London: Athlone.
Hayles, N. K. (1999). *How we became posthuman: Virtual bodies in cybernetics, literature, and informatics*. Chicago: Chicago University Press.
Huczynski, A. & Buchanan, D. (2004). *Organizational behaviour: An introductory text* (5th edn). Harlow: Pearson-Education.
Hutchby, I. (2001). Technologies, texts and affordances. *Sociology*, *35*: 441-456.
Kuhn, T. S. (1970). *The structure of scientific revolutions* (2nd edn). Chicago: University of Chicago Press.
Latour, B. (1987). *Science in action*. Cambridge, MA: Harvard University Press.
Latour, B. (1993). *We have never been modern*. Hemel Hempstead: Harvester Wheatsheaf.
Latour, B. (1996). Social theory and the study of computerized work sites. In W. Orlikowski, G. Walsham, M. Jones & J. DeGross (Eds), *Information technology and changes in organizational work*. London: Chapman and Hall/IFIP.
McLoughlin, I. (1999). *Creative technological change: The shaping of technology and organisations*. London: Routledge.
Miles, B. (1993). *William Burroughs: El hombre invisible*. London: Virgin Books.
Nietzsche, F. (1968). *The will to power*. New York: Vintage.
Nietzsche, F. (1989). *Beyond good and evil: Prelude to a philosophy of the future*. New York: Vintage Books.
Nietzsche, F. (1994). *On the genealogy of morality*. Cambridge: Cambridge University Press.
Plant, S. (1997). *Zeros and ones: Digital women + the new technoculture*. London: Fourth Estate.

Plant, S. (2001). On the mobile: The effects of mobile telephones on social and individual life. Report for Motorola, available online through: http://www.motorola.com/mediacenter/news/detail/0,1958,534_308_23,00.html
Searle, J. (1984). *Minds, brains & science*. London: Penguin.
White, L. (1962). *Medieval technology and social change*. Oxford: Oxford University Press.
Winner, L. (1977). *Autonomous technology: Technics-out-of-control as a theme in political thought*. Cambridge, MA: MIT Press.
Wise, J. M. (1997). *Exploring technology and social space*. Thousand Oaks: Sage.
Wood, M. (1998). Agency and organization: Toward a cyborg-consiousness. *Human Relations*, *51*, 1209-1226.

BIOGRAPHICAL NOTE

Chris Land recently completed his PhD at Warwick University examining the post-human subject in relation to new technologies of communication with particular attention to the ideas of Deleuze and Guattari and the writing of William S. Burroughs. For the last two years he has also been conducting empirical research into the use of communities of practice as an IT mediated mode of organization. More recently this has spilled over into a research interest in 'alternative' communities, particularly communes, co-operatives and protest movements. He is currently a visiting fellow with the Innovation, Knowledge and Organizational Networks research unit at Warwick Business School, and a member of Radical Routes, a network of co-operatives working toward radical social change (http://www.radicalroutes.org.uk/).
Chris has recently joined the University of Essex, UK as a lecturer.

Email: cland@essex.ac.uk