Modelling, ontology and wild thought
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> [T]he universe has always appeared to the natural mind as a kind of enigma of which the key must be sought in the shape of some illuminating or power-bringing word or name. That word names the universe's *principle*, and to possess it is after a fashion to possess the universe itself. 'God', 'Matter', 'Reason', 'the Absolute', 'Energy', are so many solving names. You can rest when you have them…. But if you follow the pragmatic method, you cannot look on any such word as closing your quest…. [Each word] appears less as a solution… than as a program for more work….
> William James, *Pragmatism* (1907)

> The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached.
> Edward Sapir, "The status of linguistics as a science" (1929)

> The only way you can catch yourself in the act of reflecting on yourself is by becoming another self – a self which, when it looks down on your reflecting self, will not be included in the reflection. If you want to understand yourself better, you always have to keep on the move.
> Jonathan Rée, *I See a Voice* (1999)

[SLIDE 1]

These days, for perfectly obvious reasons, some of us find ourselves telling a Spenglerian *Untergang des Abendlandes*. Surely we are all going to Hell in a handbasket, as the Americans say. But when I look around what I see is an abundance of compelling scholarship in many disciplines that beckons us to interconnect our own work with it. The connections to be made are reciprocal and recursive: we are to give that others may give back, and so change both. Here my aim is to suggest – I can do no more than that – some of what might come to us in consequence of growing connections with recent work in anthropology and related

disciplines. Anthropologists, you may know, have been interested in doing that since at least 1962 (Hymes 1965). Today both sides have much more to offer each other than was the case then.

My story begins with a curious mid 20th-century co-occurrence in the Anglo-American world: of the digital computer (which must be told what there is) and of the return from philosophical exile of ontology (the study of what there is – or, as Ian Hacking says (2002: 2), of "whatever we individuate and allow ourselves to talk about").[1] Stumbling on this co-occurrence led me to wonder how the two co-occurrents might be connected beyond computer scientists' adoption of the term in the late 1970s.[2] You may know that thirty years earlier, just as the public was becoming aware of computers, philosopher Willard van Orman Quine began giving serious attention not just to ontology but to ontologies in the plural.[3] In Germany the co-occurrence happened earlier, with Martin Heidegger's *Sein und Zeit* in 1927 and Konrad Zuse's Z-series machines from ca. 1935, a year before Turing's foundational paper.[4] I asked myself, what might there be in these co-occurrences to help us explain them? But then I noticed something else: the rather dramatic and fruitful career, seeded by Quine, that ontology has taken in theoretical anthropology and related disciplines for the last few decades. So my question became also this: what might we learn about the creative potential of digital machines from the scholars of human historical and contemporary alterity?

Nothing in the literature suggests that computer scientists took much notice of philosophy when they started talking about 'ontology'. Perhaps they thought they didn't need to, since ontology is obviously fundamental to computing machinery: after all, to do any useful work the machine must be given a model of what there is (Smith 1985). But the complexity of the world and limitations of time constrain any implementable ontology to be domain-specific, to become *an* ontology, one of many.

Hence the implicit, more specific and possibly important connection between the digital machine and both Quine's and Heidegger's pluralisation.

To get further with this, let me take a different tack. When we think about models carefully, as Nelson Goodman did in *Languages of Art* (1968), we can become quite annoyed, as he did, at the ungovernable, viral appeal of the word 'model'. For us its sloppy use makes its specifically computational sense difficult to pick out; in consequence, we are apt to miss what is genuinely new and so have no convincing answer other than 'more, faster' to rightfully sceptical colleagues. But its popularity is an inescapable fact, I realised. So I started to ask, *why* is it so popular? Was the invention of the digital machine a like response, as the coordinated surge of word and thing would suggest? [**SLIDE 2**]. Might the same be true for 'ontology'? What we can learn from that? What are they responses to? Answers aren't as obvious as may seem: Plato's *Symposium* teaches that we tend to go for what is achingly present in its absence, and so desire, and thus *want*. Rather than go for a quick dismissal by reference to technological determinism, *pure* coincidence or the fog of a *Zeitgeist*, I wondered if we might be able to identify a Foucauldian "historical *a priori*"[5] – or, to paraphrase Jonathan Rée, the metaphysical notion that, in the middle of the last century, infiltrated ordinary common sense and became a real force in the world (1999: 382).

Consider, for example, Quine's argument that translation is inevitably indeterminate (1960, Chapter 2), from which he concludes that we can do no better than many incompatible stock-takings of the world's goods. Put that next to Quine's friend and reader Thomas Kuhn's argument two years later in *The Structure of Scientific Revolutions* (2012/1962) for the inevitability of successive, incompatible, indeed incommensurable paradigms. Consider also my favourite example of a clarion-call within digital humanities: the American literary critic Louis Milic's essay, published four years after *Structure*, in which he wrote that, "We are still not thinking of the

computer as anything but a myriad of clerks or assistants in one convenient console" (and I would go so far as to say 'a myriad of *servants*', since for us their far quicker, less intrusive and better service is so discrete as to be all but invisible). "The true nature of the machine is unknown to us…", he went on to say (and I would add, unknown because this 'nature' is not natural, not a given, but an emergent recursive co-creation of human and machine. Milic saw, as he said, that "Its intelligence and ours must be made complementary….", and so implied the crucial beyond-the-Turing-Test question of what we take intelligence to be. He went on: "Thinking in a new way is not an easy accomplishment. It means", he said, *"reorientation of all the coordinates of our existence"* (1966: 4-5, my emphasis). It means, in other words, a cosmological reconfiguration. He called his brief article, "The next step". I don't think we've taken that step yet.

I intended no causal implications when I said that Quine seeded later developments in anthropology, though his thought-seed did germinate there. What he actually did, on record, was to draw an analogy between the ontologising philosopher and a frustrated anthropological linguist attempting to render a native's exclamation – *gavagai!* – at the sight of a rabbit (2013/1960: 25ff). Such was and is the field anthropologist's dilemma, the core scenario to which some anthropologists have responded by making what has been called "the ontological turn", away from the epistemological angst Quine depicted to something rather new.[6] [**SLIDE 3**] Commenting on Eduardo Kohn's *How Forests Think: Toward an Anthropology beyond the Human* (2013), for example, Philippe Descola refers to

> [the] general predicament that some of us… find ourselves enmeshed in. To put it simply, the project of repopulating the social sciences with nonhuman beings, and thus of shifting the focus… toward the interactions of humans with (and between) animals, plants, physical processes, artifacts, images, and other forms of beings… (2014)

Modelling (we might say) everywhere, of everything, by everyone.

The arguments quickly become complex, intricate, difficult. I can only present a sliver. Almira Salmond's helpful overview in the online journal *Hau* sorts the enthusiastic confusion this turn has become into "three ethnographic strategies for addressing ontological alterity" (2014): Tim Ingold's, Descola's and the one she favours, which is my focus here. She calls it "recursive" because it draws recursively, transformatively on "the imaginative powers of the… peoples and collectives" whom anthropology proposes to explain.[7] Its leading proponent, Eduardo Viveiros de Castro, defines it in stark contrast to what he calls "our modern cosmological vulgate": the multiculturalist supposition of "a single world or nature… around which different partial cultural views orbit" (2010: 329). This vulgate sounds pleasingly liberal and democratic. Look closely, he argues, and the single world it supposes turns out to be *our* world universalised. In other words, take a step back and this world begins to look very much like Michel Foucault's invocation of Jeremy Bentham's panopticon.[8] In the late 18th Century Bentham designed a cylindrical prison with a central watch-tower from which all inmates could be secretly observed [**SLIDE 4**]. Because no inmate could know when he was being watched, the panopticon induced "the sentiment of an invisible omniscience"[9] – a crippling, economical god's-eye view. Hence the predicament of those entrapped by their very visibility, as Foucault has said, and thus Viveiros de Castro's metaphor for the colonising grip of that generously panoptic cosmological vulgate. [**SLIDE 5**]

Ontology had to change before the turn in anthropology could be made, from elaboration of a 'great chain of being' to a questioning admitting of multiple ontologies.[10] The modelling machine, working through many disciplines, has undoubtedly been an influential part of this change, so also the viral spread of the term 'model'. Remarkably, throughout the panic of relativism in the 'science wars',[11] modelling and the many ontologies it makes operational have diversified not destroyed the idea of the real. The anthropologists I have quoted have responded by taking seriously by taking on "the enemy's point of view" – Viveiros de Castro's

phrase (1999) – as a recursive instrument of disciplinary self-redefinition. Such recursion is no stranger to modelling. Ancient historian and anthropological fellow-traveller G. E. R. Lloyd has used his half-century of meticulous comparative analyses of ancient Greek and Chinese thought to draw out the 'multidimensionality' of the real and to show the 'semantic stretch' it requires of us.[12] We might call this the agile modelling of an endlessly faceted world. Thirty-five years ago Ian Hacking, in *Representing and Intervening* (1983), argued cogently that new things become real by means of manipulatory experimental modelling. In his essay "Historical Ontology", he has asked, echoing Foucault: "if we are concerned with the coming into being of the very possibility of some objects, what is that if not historical?" What does such reasoning lead to if not specific, local ontologies, "molded in time"?[13]

What is to be done with these anthropological, historical and philosophical inflections of modelling gone viral – with the possibilities they suggest and the demanding help they offer for growing nascent digital humanities into one of the *literae humaniores*? That's the question I struggle with. Half a century on from Louis Milic's "The Next Step" I wonder what we can say his cosmological reconfiguration would entail if we took it seriously by taking on the anthropologists' challenge. To use Clifford Geertz's terms, it would mean something far beyond the mimetic 'modelling *of*' real-world data, beyond also 'modelling *for*' objects that begin as more or less definite ideas and aim at concrete realisation.[14] Both of these will, of course, remain valuable things to do. But they are hardly sufficient for a computing *of* as well as *in* the interpretative disciplines. What I think taking Milic's next step might lead to most immediately is a concerted, experimental, hardware-actualised enquiry into what we mean by 'intelligence', by 'reason', by 'cognition' – recursively involving *the machine's point of view with our own as both develop in interaction with each other*. This is not the already well developed programme to demonstrate that cognition is computational, rather to find out through a back-and-forth conversation *what it is*.[15] It would mean enquiring into the machine's cosmology, as it is now, as it

could become. It would mean, to paraphrase Viveiros de Castro, treating ideas indigenous to digital hardware as concepts to think with, then following the consequences, defining the range of possibilities these concepts presuppose, the conceptual persona they make possible, the reality they delimit (2014/20009: 187). This is in no way to disrespect the Amazonians and the others from whom Viveiros de Castro and colleagues have learned so much. It is, rather, to ask if we can learn from these anthropologists in turn what it means to pull oneself away from the narcissistic self-entrapment that Joseph Weizenbaum discovered in the mid 1960s when users of his conversational program *Eliza* mistook it for their confessor.[16] It is to ask whether the ontological turn in the anthropological sense has taken hold in digital humanities.

It is not nascent in what the scholar-programmer already does, most when designing, building and refining simulations? Elsewhere I have argued that the great lesson to be learned from simulation – which is modelling turned loose to go where it can – is that it shows computing to be just such a producer of fiction: an instrument not so much for nailing down facts (although it can do that) but for imagining them, acting them out, solidifying them, in some cases giving us a new (tentative) reality to probe (McCarty 2017). I know of no better example of this than John Wall's simulation of John Donne's Gunpowder Day sermon in 1622 as it might have been delivered from the long-vanished Paul's Cross preaching station adjacent to the medieval St Paul's, which the Great Fire of London destroyed in 1666. [**SLIDE 6**] With his *Virtual Paul's Cross* Wall explores "what we are doing when we believe we have discovered, from our experience with a digital environment, things about past events that are not documented by traditional sources" (2016: 283). That's a cliff-edge, inviting flight, a fiction (to paraphrase Viveiros de Castro) that is historiographical, but historiography that is not fictional: a digital machine's perspective on the sermon preached on a semi-fictional occasion by a semi-fictional

John Donne from a semi-fictional Paul's Cross in a semi-fictional space to a semi-fictional crowd.

In 1962 Cambridge linguist Margaret Masterman proposed that the computer could become a "telescope of the mind", changing, as Galileo's telescope once did, our whole conception of the world (1962: 38-9). Some toss this off. But is the instrument as unproblematic as her metaphor seems to imply? To echo Hacking, do we *see* through, or see *through*, a telescope? (1981) Today (just as in microscopy) optoelectronics interpose a hermeneutic black-box between the eye and its object, complicating – but not essentially altering – the philosopher's question. For when Galileo looked through his *occhialino* much of what he saw had been seen before, but the differences were enough to make 'what was' "momentarily mutable", stuff of the eye reshaped by his mind into "a compelling argument for Copernicanism".[17]

It's an altogether more interesting challenge we face than we have so often supposed.

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[1] A convenient date for the first public exhibition of a large-scale digital computer is the launch of the Selective Sequence Electronic Calculator (SSEC) at IBM World Headquarters (New York) in 1948, visible from street-level until 1952 (McCarty 2011: viii). For ontology see note 3.

[2] For early examples see Kosslyn 1978 (drawing *inter* alia on Goodman 1968) and McCarthy 1980, Alexander et al 1986. Formal definition came with Gruber 1995. See also Gruber 2009, Sowa 2000: 51-131 and Zúñiga 2001. For related activities in NLP see e.g. Margaret Masterman's work in the 1950s and 1960s (Priss and Old 2009; Sowa 2010: 245-50); for database design see Sølvberg 1979; Ramsay 2004: 195.

[3] See Quine 1948, 1961/1953 (his note on "Identity, ostension, and hypothesis", p. 169, in particular), 2013/1960 and 1969. For the status of ontology at the time see Feibleman 1949.

[4] At the very beginning of *Sein und Zeit* (2001/1927: §3) Heidegger makes a distinction between ontological (Being as such) and ontic (regional or specific Being, i.e. delimited and implicitly temporal, as studied in the sciences); see Steiner 1978: 79-80. For Zuse's development of his stored-program computer see Zuse 2007/1993, Chapter 3. Heidegger's work became known in Anglophone computer science with Dreyfus 1972 and important in that discipline thanks to Winograd and Flores 1987.

[5] The phrase is from Georges Canguilhem's review of his former student Michel Foucault's *Les mots et le choses* (1966) in Canguilhem 2005/1967: 90, quoted and discussed in Hacking 2002: 5.

[6] Increasingly noisy since Henare, Holbraad and Westel identified "a quiet revolution" and applied the term "ontological turn" to it (2007: 1, 7).

[7] Viveiros de Castro 2014/2009: 40.

[8] Foucault, "Panopticism", in Foucault 1995/1975: 195-228; plate 3 shows Bentham's design). See Bentham 1843: 35-248.

[9] A widely quoted phrase, not in Bentham's works, often attributed to an anonymous architect. See Nugent 2011; Lyon 2006.

[10] Lovejoy 2001/1936; see also Lovejoy 1909.

[11] Hacking 1999; Geertz 1984.

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[12] Lloyd 2015: 5. See Inwood and McCarty 2010, contributions to which embrace all three of Salmond's ethnographic approaches to ontology. For a summary of Lloyd's work, https://en.wikipedia.org/wiki/G._E._R._Lloyd (19/12/16);

[13] Hacking 2002: 2, 4; Foucault 1984; Hacking 1995. See also Lovejoy 1909.

[14] For a discussion see McCarty 2013/2005: 24, referring to Geertz 1993/1973: 93.

[15] Yes, some of this goes on in the cognitive sciences, but we in the humanities have not included ourselves, nor have these sciences looked often to the humanities for more than window-dressing.

[16] See esp. the introduction to Weizenbaum 1976. Note that according to its author *Cannibal Metaphysics* is a commentary on an unwritten, fictional book entitled *Anti-Narcissus: Anthropology as a Minor Science* (Viveiros de Castro 2014/2009: 39).

[17] Thanks to Crystal Hall (Bowdoin) for the commentary on Galileo, in private e-mail, 6/1/17. The literature is extensive; see esp Lipking 2014; Biagioli 2006, Chapter 2.