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Article

Accepted Version

Could There Be A Superhuman Species?

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Abstract:

Transhumanism is the school of thought that advocates the use of technology to enhance the human species, to the point where some supporters consider that a new species altogether could arise. Even some critics think this at least a technological possibility. Some supporters also believe the emergence of a new, improved, superhuman species raises no special ethical questions. Through an examination of the metaphysics of species, and an analysis of the essence of the human species, I argue that the existence of an embodied, genuinely superhuman species is a metaphysical impossibility. Finally, I point out an interesting ethical consideration that this metaphysical truth raises.

Keywords: transhumanism, posthumanism, species, essentialism

1. Introduction

Transhumanism is a hydra-headed movement embracing a multitude of streams of thought. At the more moderate end, transhumanists advocate

the use of technology[1] and 'applied reason' with the aim of 'fundamentally improving the human condition'.[2] At the more radical end, transhumanists promote the use of technology for such things as: extreme cognitive and physical enhancement; massive life extension, even physical or mental immortality; the abolition of all human suffering; the elimination of gender; hastening the 'technological singularity'[3], in which, through artificial intelligence, biological enhancement and/or biological-mechanical synthesis, superintelligence emerges, outstripping mere human intelligence; and sundry other objectives.

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[1] In particular the so-called NBIC technologies: nanotechnology, biotechnology, information technology, and cognitive science. The acronym came into public use via the National Science Foundation-funded report edited by M.C. Roco and W.S. Bainbridge, *Converging Technologies for Improving Human Performance* (Dordrecht: Kluwer, 2003), available online at http://www.wtec.org/ConvergingTechnologies/Report/NBIC_report.pdf [accessed 4 Jan. 2012].

[2] N. Bostrom, 'The Transhumanist FAQ', pub. World Transhumanist Association, v.2.1 (2003): 4, at http://www.transhumanism.org/resources/FAQv21.pdf [accessed 4 Jan. 2012].

[3] A term introduced by the science fiction writer Vernor Vinge in the 1980s and 1990s, and popularized by the futurist Ray Kurzweil in 2005. For further references and historical background, see D.J. Chalmers, 'The Singularity: A Philosophical Analysis', esp. sec. 1, *Journal of Consciousness Studies* 17 (2010): 7-65.

I want to focus on one of the more extreme claims of a minority of transhumanists – that enhancement technologies could, through 'participant evolution', be used to create an entirely new species. This 'posthuman' species would not consist of human beings with enhanced abilities – mere transhumans[4] – but of a new kind of being, wholly superior to humans in sufficient respects for it plausibly to be called a distinct species. Who makes such a claim or at least thinks it a possibility? The scenario is entertained as a technological possibility by Lee Silver.[5] David Chalmers implicitly thinks so as well, when he says in passing: 'given the choice between emulating and enhancing human beings and creating an objectively better species, it is possible to see the moral calculus as going either way.'[6] John Harris also thinks induced speciation is possible but does not consider it to have any distinctive ethical dimension.[7] The roboticist Hans Moravec expects intelligent

[4] The terminology in this area is fluid, with the same term sometimes given different meanings and conversely. My use of 'transhuman' and 'posthuman', although somewhat stipulative, seems to be in line with common usage among transhumanists.

[5] L.M. Silver, *Remaking Eden* (New York: Avon Books, 1997).

[6] 'The Singularity': 33.

[7] John Harris, *Enhancing Evolution: The Ethical Case for Making Better People* (Princeton: Princeton University Press, 2007): 37-9.

machines to take over the earth as a new species dominating mankind[8] (often referred to as 'apocalyptic AI' or the 'apocalyptic scenario'[9]). Some critics of transhumanism also assume that technology could in principle produce a new species.[10] A perusal of the various popular outlets for transhumanist thought shows that posthuman speciation, whether directed or a result of ongoing natural processes, is considered at least a possibility if not highly likely.[11]

2. Some brief stage setting on the metaphysics of species

When it comes to the question of what a species is, what we have is not an embarrassment of riches but a simple embarrassment. On one oft-cited count, there are over *twenty* 'species concepts' in current debate, each

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[8] H. Moravec, *Robot: Mere Machine to Transcendent* Mind (New York: Oxford University Press, 1999).

[9] R.M. Geraci, *Apocalyptic AI* (New York: Oxford University Press, 2010).

[10] G. J. Annas, L. B. Andrews, and R. M. Isasi, 'Protecting the Endangered Human: Toward an International Treaty Prohibiting Cloning and Inheritable Alterations', *American Journal of Law and Medicine* 28 (2002):151-178, at pp.153-4, 161-2, 173.

[11] See, for example, the interview with geneticist Bruce Lahn in *h*+ magazine, one of the most prominent transhumanist publications: http://hplusmagazine.com/2011/05/12/bruce-lahn-interview/ [accessed 5 Jan. 2012].

with its philosophical and/or biological advocates.[12] Part of the reason for this bewildering array of proposals is the tendency of many biologists to ignore the crucial *philosophical* element of the 'species problem', treating the latter as no more than a task for empirical science to sort out and any philosophizing about it to be obscurely metaphysical. Combine this with a natural tendency to pragmatism and instrumentalism (in the loose sense) among working scientists, and we have some explanation for the willingness of not a few theorists about species to let a hundred flowers bloom: what a species is *depends* on your theoretical interests, how you carve up the world of individual organisms, and so on.[13]

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[12] R.L. Mayden, 'A Hierarchy of Species Concepts: The Denouement in the Saga of the Species Problem', in M. F. Claridge, H. A. Dawah, and M. R. Wilson, (eds) *Species: The Units of Biodiversity* (London: Chapman and Hall, 1997): 381-424. For an overview of twenty-six species concepts (Mayden has at least twenty-two), see J. Wilkins, 'Species, Kinds, and Evolution', *Reports of the National Center for Science Education* 26 (2006): 36-45; available at http://ncse.com/rncse/26/4/species-kinds-evolution [accessed 5 Jan. 2012].

[13] Philip Kitcher is a prominent defender of pluralism: 'Species', in M. Ereshefsky (ed.) *The Units of Evolution: Essays on the Nature of Species* (Cambridge, MA: Bradford Books, 1992): 317-41. See further R.A. Richards, *The Species Problem: A Philosophical Analysis* (Cambridge: Cambridge University Press, 2010): ch.5.

It is the lack of seriousness in some quarters about the philosophical component of the species problem that is my concern here. To be sure, many others – such as Michael Ghiselin[14] – take the philosophical aspect of the problem seriously. I submit that the species problem just *is* a philosophical problem – insoluble without careful attention to the biological facts, but not tractable at the level of biology itself. Specifically, when asking what a species is, we are asking a *metaphysical* question about the *real definition* of an organism.[15] The definition provides the constituents of the *essence* of the species and of the organisms that belong to it. At this point many if not most biologists and philosophers of biology will switch off: if what I am arguing for depends on biological essentialism, then the argument must go wrong somewhere.[16] So here is an attempt at eirenicism: my answer to the

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[14] 'The species problem has to do with biology, but it is fundamentally a philosophical problem': see M. Ghiselin, 'A Radical Solution to the Species Problem', *Systematic Zoology* 23 (1974): 536-544; reprinted in Ereshefsky (ed.), *The Units of Evolution*: 279-92; quotation from p.285.

[15] This applies in general to *any* object, but I restrict the term 'species' here to its biological use.

[16] Biological essentialism is, though, undergoing a small revival. See David S. Oderberg, *Real Essentialism* (London: Routledge, 2007), and also: D. Walsh, 'Evolutionary Essentialism', *British Journal for the Philosophy of Science* 57 (2006):

question of whether there could be a distinct 'superhuman' species requires only a few modest assumptions which, whilst they might with further argument entail full-blown essentialism, do not require the latter for the argument to go through:

Assumption 1: There are definite answers to at least some questions of the form 'Is *a* the same species as *b*?'

Assumption 2: There are criteria for providing those definite answers.

Assumption 3: Whilst we might not have metaphysically necessary and sufficient conditions for species identity, there are at least some cases in which we have metaphysically sufficient conditions.

As to the first assumption, all we need to admit is that some kinds of organism clearly belong to the same species no matter how you plausibly slice the biological cake, and others to different species. Tom and Jerry belong to different species; Clever Hans and Sea Biscuit belong to the same species, without a shadow of a doubt. As to the third assumption: in any possible world – restrict accessibility if you wish to nomologically identical worlds – in which an organism is a water-

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425–48; M. Devitt, 'Resurrecting Biological Essentialism', *Philosophy of Science* 75 (2008): 344-82.

dwelling vertebrate with gills in the mature case, that organism is a fish. In any world, any organism that breathes air, produces and regulates its temperature from within its own bodily surface, has hair, three middle ear bones and mammary glands functional in the females with young, is a mammal. It's not simply that we have stipulated that all such organisms be *called* 'mammals', but that they all have sufficient in common to be definitely of the same species. Note well: I am not restricting the term 'species' to metaphysically *infima* species, as per biological taxonomy, but to any natural kind of organism in the hierarchy of classification (in other words, any taxon). This is one way in which there is a fundamental metaphysical component to questions of kind membership: we are interested in all the real, objective groupings of organisms, not just those at the lowest level. (In biological taxonomy, mammals are at the level of *class*.)

What about the second assumption, that there are criteria – non-arbitrary, non-conventional, and so on – for determining answers to some questions of species identity? The species problem bites back hard at this point, but all I can do here is state that the criteria I favour are *morphological*: they appeal to the appearance, structure, and characteristic function of organisms – *morphē* in all its traditional Aristotelian glory. The general reason in favour of morphology over other

criteria is that all the others seem, in one way or another, either to piggyback on morphology or to sidestep it in favour of other considerations that to the unprejudiced eye look simply irrelevant. For example, why would a taxonomist be in the least interested in genetic criteria if they did not correlate closely with appearance, structure, and function? In fact they do, as we know; and so the only reason to be interested in them as markers of species identity is that different genes express different characteristics, whether at the macro- or micro-level. For suppose you had two organisms with identical genotypes and yet different morphologies. (Maybe Tom and Jerry, in some world, turn out to be genetically identical.) What possible reason would there be for insisting on their belonging to the same species in that world?[17] Suppose

[17] A nice example, illustrating what is called 'cryptic speciation', is the recent discovery that the freshwater worm called *Lumbriculus variegatus* is actually two distinct species differing in DNA, despite the identity in appearance of all specimens and their similar natural locations. One of the researchers, Christer Erséus, said: 'Different species have different characteristics. If it emerged that these two species differ in terms of their tolerance towards certain toxins, then it could be difficult to make comparisons between different studies.' The point, for our purposes, is that the mere genetic difference does not - and should not - matter. What is important is whether this *shows up* in differences of characteristic behaviour and function, such as toxin resistance. And that is a matter of morphology. (Mere visual appearance is never

Sea Biscuit and Clever Hans had virtually none of their genes in common. (They would have to have *some*, being animals; suppose they both had the same Hox genes[18] and the same Boule gene,[19] but nothing else.) What good reason could we have for separating them into distinct species, assuming their morphologies were exactly the same as in our world where their genotypes massively overlap? It is beside the point to reply that morphology is (in some appropriate sense) determined by genetics: we can adhere to morphological criteria of identity without denying that morphology has an underlying *cause*. We are interested in the criteria, not their causes – except *insofar* as the causes have certain effects – and if the causes in the actual world were different in some other world, while morphology was held constant, this would not imply that morphology ceased to be the proper identity criterion. In brief, if you are

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the whole morphological story.) See further D.A. Price and C. Erséus, 'Genetic variation in the popular lab worm *Lumbriculus variegatus* (Annelida: Clitellata: Lumbriculidae) reveals cryptic speciation', *Molecular Phylogenetics and Evolution* 51 (2009): 182-9; and the article 'Animals That Seem Identical May Be Completely Different Species', *ScienceDaily*, 22 April 2009, at http://www.sciencedaily.com/releases/2009/04/090422121858.htm [last accessed 16 April 2012].

[18] Regulating body plan development.

[19] Regulating gametogenesis.

interested in species identity, why care about genes except for what they *do*?

An example of irrelevance, on the other hand, comes from the ever-onwards march of phylogenetic species concepts. What they all have in common is the focus on *evolutionary origin* as the criterion of demarcation. Cladistics, for instance, holds that species (and higher taxa, but recall that I am using 'species' to include all taxa) are sections of the tree of life marked by branching points and most recent common ancestors.[20] The motivation behind origin-based species concepts is to bring the admittedly messy state of current taxonomy into some sort of order by aligning it with what we know about the evolutionary descent of organisms. Cladism itself has a number of problems,[21] but the more general worry about all phylogenetic concepts is why anyone should want to mix classification with origin. After all, with enough knowledge we could track the evolution (in the loose sense) of all the chemical elements since the Big Bang. Hydrogen, so physicists think, came into existence at least three minutes after the origin of the universe.[22] They have a model of how it and many other elements were synthesized over time out of pre-

[20] See, for example, M. Ridley, *Evolution* (Oxford: Blackwell, 1993).

[21] See Oderberg, *Real Essentialism*: ch.9.2.

[22] S. Weinberg, *The First Three Minutes* (London: Fontana, 1983): 16.

existing particles. Yet this is not how we *classify* hydrogen, or helium, or for that matter gold and lead. We classify them by appearance (not necessarily at the macro level, of course), chemical and physical structure, and characteristic behaviour. Why should the classification of biological species be any different, other than due to the misguided idea – an ideological prejudice, I would call it – that if we inject phylogeny into the very concept of what a species is and how species differ from one another, and can arrive at a workable system of classification, we shall have an indirect methodological vindication of evolution itself? It is hard to see how the same approach applied to chemical classification would yield indirect vindication of the Big Bang model. More importantly, it is difficult to understand how what a thing *is* can have anything to do where it came *from* unless the thing itself is independently understood to be historical in nature – such as a familial lineage, or a history, or maybe a legend. We cannot, however, say that biological taxonomy must appeal to lineage because species are essentially historical: not only because I am not presupposing full-blown essentialism here, but because to do so would evidently be circular, assuming that the only reason for thinking species to be essentially historical is that they are defined by their ancestry.

3. What are we?

Plenty more could be said about morphology as the preferred criterion of species identity; I have only been able to offer enough in favour of taking it seriously, and for the purpose of setting the scene for what follows.

Some transhumanists, as remarked earlier, think a new species could be induced from our own by technology. (They take it as given that this will happen eventually by natural selection; they simply want to hurry things up.) Now whether this 'superhuman' species is indeed distinct from our own – whether it is genuinely posthuman or merely human – depends on what we are and what it is. I take what we are to be what our form is, i.e. our morphology, and that is to be a *rational animal*. Such is the hallowed Aristotelian definition of the human being – an animal endowed with reason.

To say that the human being is a rational animal looks, at first, very little like what you would find in a biology text. You will be told that humans are members of the species *Homo sapiens*, or the sub-species *Homo sapiens sapiens*.[23] You will be informed of the descent of modern

[23] Depending on whether modern humans are distinguished as a sub-species of the genus *homo* from *Homo sapiens idaltu* and *Homo sapiens neanderthalensis* – all highly controversial to say the least, and hinging, unsurprisingly, partly on what is

humans via a long line of hominids; also that they are primates whose closest genetic relative is the chimpanzee or (for some biologists) the orang utan. 'Rational animal' is not a term to use in polite biological company.

Yet appearances can be deceptive. Sensing the truth in the very

species name, when one inspects the detail, the consensus appears

unanimous that rationality is the hallmark of the human animal, whether

this be characterized in terms of abstract thought, language use, the most sophisticated technical ability, self-consciousness, introspection, moral behaviour, advanced social interaction, and so on.[24] We are animals, to be sure; we are set apart from all other species by rationality; so does it not follow that we are rational animals? It quickly gets more complicated, however. For suppose evidence of rationality, say in the form of handmade tools or other artefacts, were found associated with early

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meant by 'species'. See, for an overview of Neanderthals, R. Lewin, *Human Evolution: An Illustrated Introduction* (Oxford: Blackwell, 2005; 5th ed.): ch.27.

[24] See, for instance, W. Henke, 'Human Biological Evolution', in F.M. Wuketits and F.J. Ayala (eds) *Handbook of Evolution vol. 2: The Evolution of Living Systems (Including Hominids)* (Weinheim: Wiley-VCH, 2005): ch.6, at p.118.

hominids, several million years before the appearance of *Homo sapiens*.[25] *Homo habilis*, considered a precursor of *Homo sapiens*, may have made and used tools in a human-like way. Maybe he was rational, for all we know. He looked very little like us, judging by reconstructions from skull fragments. For the biologist, then, it is not just rationality but quite specific bodily shape and structure that make for a genuine human being. Moreover, were we non-specialists to see *Homo habilis* crossing the road, we would hardly acknowledge him to be 'one of us'.

Yet why wouldn't we? A relatively cheap remark invites itself here, to the effect that humans have long had false opinions about which beings were human: consider Ota Benga, the African pygmy put on display in the Bronx Zoo in 1906 with an orang utan and a parrot.[26] In the present day, even, the Bantu consider pygmies 'not truly human'.[27] A more substantive point in favour of making a species distinction is the phylogenetic one: *Homo habilis* came before *Homo sapiens*. But

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[25] For speculation on this, see R.L. Susman, 'Fossil Evidence for Early Hominid Tool Use', *Science* 265 (1994): 1570-3.

[26] P.V. Bradford and H. Blume, *Ota Benga: The Pygmy in the Zoo* (New York: St Martin's Press, 1992).

[27] P. Raffaele, 'The Pygmies' Plight', *Smithsonian Magazine*, Sept. 2008, at http://www.smithsonianmag.com/people-places/The-Pygmies-Plight.html?c=y&page=1 [last accessed 6 Jan. 2012].

wouldn't this reason on its own merely beg the question of *why* temporal priority in the phylogenetic tree should make a difference? More precisely, the circularity involved in appealing solely to temporal priority would be that of taking the relevant priority to be one in which speciation is *assumed*. In other words, there is an innocent reading of 'temporally prior', namely that *Homo habilis* existed before (or long before) *Homo sapiens*, to which the response is – so what? And there is a non-innocent reading, according to which *Homo habilis* is not human – not one of *us* humans – because it is an earlier species in the phylogenetic tree. Clearly this will not do.

That it does not do is shown by the fact that taxonomists do not appeal to mere temporal priority: such an appeal is more the stuff of casual banter that is the staple of popular discourse about evolution. For palaeoanthropologists tell us also that *Homo habilis* was, bodily, very unlike modern humans, with less than half the brain size, disproportionately long arms, and a distinctively ape-like appearance.[28] But the question then arises: why should any of that make a difference? After all, if humans are rational animals, then *Homo habilis*, on the assumption I made about rationality, would also count as human – not

[28] For an overview, see B. Wood and M. Collard, 'The Human Genus', *Science* 284 (1999): 65-71.

merely a member of the genus *Homo* as taxonomists now have it, but as *one of us*, metaphysically speaking. But let me put our putative ancestors to one side and take on far more radical scenarios, for if the case can be made for these it can be made for any actual biological ancestor of ours that was also rational.

4. Exotic rational animals

John Locke famously thought that a rational parrot would be a person but not a human being. Rational parrots would, he considered, 'have passed for a race of rational animals' but they would nevertheless have been parrots, not men: 'For I presume it is not the idea of a thinking or rational being alone that makes the idea of a man in most people's sense: but of a body, so and so shaped, joined to it: and if that be the idea of a man, the same successive body not shifted all at once, must, as well as the same immaterial spirit, go to the making of the same man.'[29] Leibniz does not demur: 'there is no obstacle to there being rational animals of some other species than ours. … Indeed it does seem that the definition of "man" as "rational animal" needs to be amplified by something about the shape and

[29] J. Locke, *An Essay Concerning Human Understanding*: II.xxvii.8, P.H. Nidditch (ed.) (Oxford: Clarendon Press, 1975): 332-5.

anatomy of the body; otherwise, according to my views, Spirits would also be men.'[30]

Is this view, accepted by pretty much every philosopher at least since Locke and Leibniz, correct? A couple of small points first. Locke speaks of 'the idea of a man in most people's sense', what we might call the nominal idea or perhaps nominal definition of 'man'. Reference to body plan will be found in any dictionary or encyclopaedia entry for 'human', as in academic texts. But this nominal idea might be wrong. Maybe we just haven't thought about the issue hard enough. The first fishermen may well have thought that all fish had scales, but they would have been wrong. The second point is that Leibniz thinks that without supplementing 'rational animal' with reference to the 'shape and anatomy of the body', spirits would also be men. Yet this does not follow, since spirits by definition are *not* animals and do not have bodies at all.

A mistake about whether all fish have scales looks purely the result of inadequate empirical information. Yet when it comes to classification, it is hard to separate the empirical and the metaphysical components. It is an empirical matter whether catfish have scales (they do not), but a largely metaphysical matter whether they are still to be classified as fish.

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[30] G.W. Leibniz, *New Essays on Human Understanding*: II.xxvii.8, P. Remnant and J. Bennett (eds) (Cambridge: Cambridge University Press, 1996): 234-5.

That they behave in a characteristic way similar enough to a certain class of other water-dwellers to be counted as members of that class is a matter of abstracting what is common to particular empirical cases, and this is a metaphysical task – one performed equally by a biologist studying fish and (with less overall accuracy) by a fisherman trawling a lake.

So if we assumed Locke to be mistaken about the rational parrot, we could not conclude that this *must* be due to a mere lack of empirical information and then wonder (for reductio purposes) what this could possibly be. Still, this *could* be the cause. Locke has the parrot carrying out a few simple conversations in 'Brazilian',[31] but what if we augmented its talent by giving it the full panoply of human conversational ability? What if it could pass an avian version of the Turing Test, its squawky voice suitably masked to sound like that of a middle-aged woman? To the question, 'How could you possibly think this was a human?', knowing now that our interlocutor had the body of a parrot, why could one not riposte: 'And how could anyone possibly think this was a parrot?'

Which is where the threat of stalemate looms, unless broken by the seemingly compulsory move of classifying Locke's parrot as a *person of a different species to humans and parrots*. Note: this is *not* the move

[31] From which anyone would conclude this was just a very well-trained parrot – though Locke takes it as proof of rationality.

Locke makes. Nowhere does he assert that what seems to be a parrot is a person of an altogether different species. Rather, he makes it quite clear that the creature in question is both a person and a parrot, an intuition shared by E.J. Lowe.[32] To which I submit we should reply, following Kripke and Putnam, that such a creature would be no more a parrot than a pencil could (in the metaphysical sense) be an organism or a cat could be a robot.[33] Again, if there is a minimal essentialism here, so be it: whatever a parrot could be, it could not be a person.[34] A creature with rationality

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[32] In his review of my *Real Essentialism*, and in disagreement with the position expressed there on rational animals, Lowe says: 'My own intuitions in such matters accord entirely with those of Locke, as displayed in his discussion of the famous example of the "rational parrot". This parrot would be a person, surely, but not a man': *Philosophical Quarterly* 60 (2010): 648-52, at p.651.

[33] H. Putnam, 'It Ain't Necessarily So', in his *Mathematics, Matter and Method: Philosophical Papers, vol. 1* (Cambridge: Cambridge University Press, 1975): 237-49 and 'Is Semantics Possible?', in his *Mind, Language and Reality: Philosophical Papers, vol. 2* (Cambridge: Cambridge University Press, 1975): 139-152; S. Kripke, *Naming and Necessity* (Oxford: Blackwell, 1980): 122ff. Kripke is altogether clearer about the metaphysical impossibility of cats' being robots than Putnam, but wishing to avoid exegetical issues I take Putnam's view to be the same.

[34] I am inserting some necessary conditions here into my minimal essentialism, to be sure, but they are all negative: I am not stating what a parrot *must* be, only what it

and the appearance of a parrot would, à la Kripke's cat-like demons,[35] be a person in a parrot-like form ('form' being used by Kripke in its vernacular sense of 'appearance', not in the technical Aristotelian sense of morphology – total structure and function.)

This is but an assertion I must leave unargued, since the burden of

the discussion concerns, not what a so-called rational parrot could *not* be,

but what it *would* be. And my claim is that it would be not only a person

but a *human* person, i.e. a human being.[36] In other words, being a rational animal simpliciter is sufficient to make the so-called rational parrot one of us, that is, sufficiently like us to count as one of our species. The reason is that all rational animals share the two characteristics that matter most in constituting the way in which they fundamentally live and act in the world. Being rational, the rational animal has the capacity for such things as: abstract thought, that is, the ability to abstract from particulars to reach general judgments involving concepts; language; knowledge of why it does many of the things it does, what Aristotelians call knowledge

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could *not* be; and even here I am not offering an exhaustive list of the things a parrot could not be, only one example.

[35] *Naming and Necessity*: 126.

[36] I make no distinctions here (or elsewhere) between human beings and human persons.

of finality; the conscious ordering of ends or objectives; development of and adherence to a life plan; reflection, meditation, puzzlement over, attempts to understand and resolve, matters concerning its own life, the lives of others (be they rational or not), the state of the world, the connections between things and events; a moral life, with all that is entailed by a grasp of morality as a system of norms for living. We can easily add to the list, of course: humour, irony, aesthetic sensibility, the creation and maintenance of families and political societies…we all know the sorts of things we rational animals are capable of.

Now I do not wish, or need, to begin the difficult task of drawing all the logical and conceptual connections between these multifarious aspects of life as a rational animal. All I claim here is that rationality as the capacity for abstract conceptual thought is explanatorily basic relative to a large number of the sorts of characteristic listed here. Language is the most important case in point. Abstraction from particulars and ascent to the level of conceptual thought necessarily involves some kind of representational system because it essentially involves the composition and division of concepts: mental elements are put together or divided in order to make judgments, and judgments are put together to make inferences. The elements have to have some kind of meaningful structure, by which I mean a structure involving at least the basic operations of

reference, predication, logical operation, and the like, put together in a certain way, such that other ways of combination are excluded. A creature that can do all of this must have language; in fact, language is what I have just described.

One wonders, moreover, just what rationality could be for a

creature that did *not* have any of this repertoire. Ethologists with an axe

to grind might like to appeal to some kind of complex problem-solving,

or perhaps a set of specific social interactions supposedly manifesting a highly developed sense of self and other, and the like. But to take this tiny subset of the things that we do, the paradigmatic rational animals – the only ones we know of in the universe – and treat it as a surrogate for the whole says more about a prior agenda than it does about what marks us rational animals out as distinctive among all living creatures. The linguistic capacity is a direct result of, if not identical with, the capacity for abstract thought, and it makes possible most of the other features enumerated earlier. To take some feature or other and elevate it to the status of 'mark of rationality' on its own is misleading precisely because it draws attention to a kind of ability – problem-solving, say, or the making of artefacts – that is *language-like* while severing the genuine linguistic element that gives the ability any special interest in the first place.

It is one thing, however, to insist that all rational animals have language,[37] and another that they must be capable of communication. We can now bring in animality to say something about this. All rational animals are, by definition, living things. To live is to have a certain kind of body, one that can sustain the so-called vegetative operations of nutrition, metabolism, reproduction, self-preservation, homeostasis, and so on. In addition, animals have sensation, the ability to pick up and process information from their environment, distinguishing the harmful from the beneficial, avoiding or repelling the former and employing the latter in the vegetative functions. Now, leaving aside the question of a

[37] The question as to whether rationality entails language is controversial, and my brief remarks are not intended to sweep a significant debate under the carpet. Much depends, of course, on what one means by 'rational' and by 'having language'. Fodor's 'language of thought' hypothesis, for example, relies on a computational theory of cognition and seems (given Fodor's fairly loose and occasional remarks about the matter in his *The Language of Thought Revisited* (Oxford: Clarendon Press, 2008)) to take paradigmatic rationality to involve certain basic inferential abilities. The tie to language, for him, involves computation over contentful syntactic structures in Mentalese, a language not to be counted among the natural languages with which we are familiar (though it is of course natural). Although I do not regard the necessity of language to rationality as having anything essential to do with either computation or a 'language of thought', I cannot pursue the matter here.

singleton rational animal necessarily alone in some environment (not something transhumanists are interested in anyway), if we have: several rational animals, each knowing the other is rational (since rationality entails being able to recognize similarities, including the presence of rationality outside oneself at least in some circumstances), all employing the same generic vegetative functions, with the same generic sensory abilities, in the same environment, then at the very least it is highly likely they will communicate with each other. Why must they be able to? Take a simple line of thought: a rational animal will want to know the answer to something; so it will pose a question; and if it recognizes another rational animal that might know the answer, it will pose it to the other. If the animal has language, can ask a question, wants an answer, and thinks it can get one from another animal, does it not have everything it needs to be able to communicate? And if it can, why would it not? Don't we rational animals show exactly how this works?

So we can be fairly certain that all rational animals are able to communicate. What we haven't shown yet is that they can all communicate with each other. What we do know is that they can all *attempt* to communicate with each other, for the same reason that they can successfully communicate with some others. That some rational animals might not be interested in communicating with others is

irrelevant, as is the fact that rational animals suffering some kind of deformity, damage, or environmental limitation might not be able to communicate at all ('able' in the Aristotelian sense of 'first actuality/second potentiality'). The only other thing that would prevent actual communication between some rational animals is a lack of uptake due to untranslatability.

At this point I am quite unashamedly going to put to one side general questions of a Quinean sort concerning radical translation, inscrutability of reference, and underdetermination of theory by behavioural data.[38] For if these are genuine problems (which I doubt),[39] they are problems for all radical translation, *including* that between the only rational animals we know of – us in the sense of *Homo sapiens*. Since I am simply assuming that we *Homo sapiens* do successfully engage in translation as radical as we can find,[40] the question is not whether, given Quinean worries, such translation is possible in general,

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[38] W.V. Quine, *Word and Object* (Cambridge, MA: MIT Press, 1960) and elsewhere.

[39] For a useful critique, see H. Glock, *Quine and Davidson on Language, Thought and Reality* (Cambridge: Cambridge University Press, 2003).

[40] With a few exceptions such as Linear A and Etruscan, but who knows whether we will translate those one day? We managed with Egyptian hieroglyphics and Linear B despite the sceptics.

but whether there is some other reason of principle preventing it in the case of rational animals very different from us *Homo sapiens* – whether parrot-like rational animals, rational Martians, or some future posthuman of a kind significantly different from our own. It is hard, for me at least, to see what sort of reason there could be apart from general sceptical worries about whether there is a single world we and they inhabit (we and the rational Martian inhabit the same world even though we are on Earth and they are on Mars) and whether, if so, their experience of it is so radically different from our own that we simply cannot communicate with each other about what we experience.

Again, I am going simply to *assume* that we all inhabit a single world. For a sceptic about this (such as a devotee of the Sapir-Whorf hypothesis),[41] nothing I say will have much force. I will also assume the possibility that *some* of our and their experiences are so different that we cannot talk to each other about them. For a sceptic about *all* such experiences, however, there will be nothing much here to persuade them

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[41] E. Sapir, 'The Status of Linguistics as a Science' (1929), in Sapir, *Culture, Language and Personality* (ed. D.G. Mandelbaum) (Berkeley: University of California Press, 1958); B.L. Whorf, 'Science and Linguistics' (1940), *Technology Review* 42: 229-31, 247-8, reprinted in Whorf, *Language, Thought and Reality* (ed. J.B. Carroll) (Cambridge, MA: MIT Press, 1956).

out of their scepticism. It might be objected at this point that I have made my case easy by shunting aside all the most interesting and pressing objections! Yet all of these general sceptical worries can be applied, and have been, to the possibility of communication between at least some *Homo sapiens* and others. Do we all inhabit a single world? Do we all carve it up in the same way? Are our experiences commensurable? If this is what bothers you, then you will see the question of transhumanist species membership as just more of the same. I am not bothered by any of this: I take it for granted that all *Homo sapiens* can in principle communicate with each other. What I am concerned with is the case of radically different rational animals. And here is where a more interesting objection comes into play, namely that whereas communication between *Homo sapiens* is possible precisely because of our identical body plan – the *animal* part of our natures – this will not be the case with a radically different rational animal. Moreover, we can ignore sceptical worries about how our fellow *Homo sapiens* experience the world since we make sound inferences to the best explanation of how they function in terms of how their bodies causally interact with their surroundings.

So consider a mythical rational animal, Glog. He/she – better *it* – has three heads full of liquid hydrogen, seventeen sensory organs, and twelve tentacles of varying lengths placed strategically around a spherical

body of thixotropic clay. For nutrition it sucks in helium through a glass tube, expels xenon as waste, reproduces by shaking itself into liquid pools that reassemble into similar bodies, and gets about by magnetic levitation. Clearly we can make no (obvious) inferences about how it experiences the world from its causal interaction with the environment. I would still call Glog a human being, but isn't that simply incredible? Not if you remember that Glog is rational. Glog will, as I argued, attempt to communicate with us *Homo sapiens*, barring lack of interest or some other contingent environmental factor. If its alien language is untranslatable, that will only be for technical reasons, not reasons of principle. We might not be smart enough to decipher what Glog is saying. We might not have the sensory organs for receiving its mode of communication. A host of reasons such as these might prevent uptake. But why should they prevent us from counting Glog as one of us? What reason of *principle* is there for saying that we could never communicate with each other? Suppose we could. Glog speaks via microwave pulses, so we use a microwave pulse detector to pick up the signals. Where we see trees, Glog sees vibrating atoms; so we tool up some appropriate scanning tunnelling microscopy for seeing what Glog sees. If we notice Glog acting as though in distress in a helium-deficient environment such as a chamber filled with xenon, we might think about adding some

helium and taking out some xenon. And so on. Presumably Glog will try to thank us! Might it thank us by trying to exterminate us? If you think that a possibility, then you haven't understood what it means to express gratitude. If Glog is rational, and it wants to thank us, it won't try to kill us. If it is rational, grateful and *evil* it might, but that's a different matter.

All of this is fun speculation, the stuff of which careers in science fiction are made. The philosophical point is that, being rational, Glog has the characteristics I listed earlier. Glog will have a life plan; it will be able to order priorities and objectives; it will worry and wonder about things, try to solve its deepest problems, consider its mortality,[42] contemplate the world and its own mind, and when it encounters us *Homo sapiens*, wonder about just what *we* are like, having a mirror image of the concerns we have about it. Technical problems aside, once we get some basic communication going, what more is there to add if we are to count Glog as one of us – a *human*, i.e. a rational animal? The word 'human' is what creates so much of the roadblock to thinking in this way about exotic rational animals. We take it to be a term whose extension is exclusively biologically determined, but where 'biological' has a narrow sense encompassing only genetics, phylogenetics, and the study of

[42] I take physical immortality not to be an option if the laws of nature are as we think they are.

vegetative (and to some extent sensory) function. Here already we go astray since, being an animal, Glog *does* have the same vegetative and sensory functions as us at the appropriate level of generality.[43] Having additional sensory modalities, whilst perhaps blocking the ability to communicate about some aspect of reality, does not obstruct all communication; nor does having the same modalities but using them in a different way. Glog still picks up particular sensory information, processes it, forms concepts and composes them into judgments and inferences. If there were some other way for a bodily creature to know about the world, it would be interesting to learn what it was.

We go wrong more significantly in conceiving of biology in an unduly restrictive way. When biologists, as they usually do in describing *Homo sapiens*, refer to the manifestations of rationality, not just animality, are they doing biology? In the narrow sense, no: they should stick to genetics and descent. In the broad sense, of course they are: to do biology in *this* sense you have to do psychology as well. Indeed, it is the Aristotelian's lament that psychology, which used to mean 'the science of life' (*psūche* = life principle), has, in relatively recent history, become the

[43] For a view in agreement with this and with my overall position, though without the detail, see P. Toner, 'Hylemorphic Animalism', *Philosophical Studies* 155 (2011): 65-81, at pp.78-9.

science of the mind, with biology narrowly conceived being split off into a different discipline – as though you could study rationality without ipso facto studying animality, and vice versa.

To think correctly about the issue before us, we should either force ourselves to think of the term 'human' in more broadly biological terms, or else abandon it pro tem and just use the term 'rational animal'. This will enable us to put methodological bias to one side and consider simply the metaphysics of the matter. Metaphysically, Glog is one of us in all that counts.

Finally, before putting Glog to rest, we should note the following. There is, of course, a very important sense in which Glog is *not* one of us, any more than a Great Dane is one of the Chihuahuas. Glog is not a distinct species from us under the genus *rational animal*. Rather, it is a distinct *variety* from us under the infima species *rational animal*. That we and Glog could not interbreed is, as we know, not a defeater for being of the same species even in the narrow biological sense (let alone the broader one): ring species, such as the Ensatina salamander (*Ensatina eschscholtzii*) in California and the Greenish Warbler (*Phylloscopus trochiloides*) in the Himalayas both contain extreme varieties that cannot

interbreed.[44] This does not mean that, taxonomically, we should put Glog and *Homo sapiens* on the same level as, say, Asians and Africans or men and women. Biology, especially botany, has and continues correctly to maintain various infraspecific ranks employed to register morphological and other differences between members of the same species. Speaking fairly loosely, I would put Glog at the level of *Homo sapiens* as varieties or subspecies of rational animal (note: a subspecies is *not* a species any more than a rubber duck is a duck), male and female as subvarieties of *Homo sapiens* (if Glog has a gender, do the same), and the different races as different forms of each of the two subvarieties (where 'form' is not used in the overarching Aristotelian sense but in a sense more akin to botany).

5. Superhumans

Exotic rational animals of the type exemplified by Glog are decidedly *not* what transhumanists have in mind when they speak, as they sometimes do, of a new posthuman species. What they are thinking of is an animal that is bigger, better, brainier than us poor *Homo sapiens*, enhanced by

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[44] For these examples and more, and a discussion of ring species in general, see M.A. Patten, 'Evolution and Historical Biogeography of a Song Sparrow Ring in Western North America', in P. Pontarotti (ed.) *Evolutionary Biology: Concepts, Molecular and Morphological Evolution* (Heidelberg: Springer, 2010): ch.20.

technology. So why bring exotic creatures into the picture? The reason is that if we can make the case for a Glog-like being to be one of us, a human in the metaphysical sense, then we can surely make the case for the superhuman of transhumanist fantasy.

We cannot take the easy way out by arguing that since what transhumanists have in mind is a *superhuman*, all they are really speaking of is a human being with enhanced powers, and so a fortiori a human being. Nor, contrarily, can we argue that since what they have in mind is something like Superman, they mean a distinct species of human-looking creature, human on the outside but all special powers beyond human ken on the inside. What we have to do is to think about the sort of exotic case I have outlined: if such a creature were indeed one of us, why wouldn't the same apply a fortiori to any creature engineered on this earth according to the laws of nature prevailing here, using pre-existing human material (distasteful though this terminology may be)? Such a being could only be *more* like *Homo sapiens* in appearance, structure, and function, than any exotic being we could dream of.

At this point I want to advance an a priori argument, wholly general in nature, that in my view guarantees the falsity of the extreme transhumanist claim that we could engineer a new species. In considering Glog-like cases, I had in mind only the question of *horizontal* species

difference, by which I mean the question of whether there could be a non-human rational animal that, although extremely different from us in many ways, was not necessarily more *capable* than us of doing anything in particular – not stronger, smarter, possessed of extraordinary powers we could only wish we had, and so on. The transhumanist, by contrast, thinks a new species would be an example of *vertical* difference – a species made distinct precisely by its superhuman powers of cognition, strength, speed, agility, extended lifespan, resistance to damage, capacity to heal itself, and the like. Would *these* sorts of transcendent powers make for a new species?

My answer is the old Aristotelian-Scholastic maxim: *plus vel minus non mutat speciem*. No difference of degree could ever change the species. Knowing more, living longer, being stronger…none of these could ever turn a human into a non-human, or be that in virtue of which one being was human and another not. All would be rational animals, humans in the true metaphysical sense regardless of how we classified them based on narrow biology alone. Here is the a priori argument in full. A superhuman in the transhumanist sense either has more rationality or more animality. (For example, if it knows more it has more rationality; if it is stronger it has more animality. This is a deliberately forced way of speaking, but I cannot think of a preferable way of making the point.) No

difference of degree can make for a difference of species. So the superhuman would still be of the same species, namely a rational animal. How, then, *could* a new but superior non-human species be brought into existence? In one of only two ways. First, it could be a being with rationality but without animality.[45] It would, in other words, have to be a

[45] It might be objected that a rational being that lacked animality would not have to be a disembodied mind/spirit. It could be an 'upload', as the transhumanist terminology has it – a person transferred from their original body to an inorganic substrate of silicon and circuitry or whatever materials were necessary for such a process. (For a nice overview, see Bostrom, 'The Transhumanist FAQ', sec. 2.6.) Even by the standards of transhumanist thought experiments, 'uploading' scenarios make enormous presuppositions both about what is physically and/or metaphysically possible and about personal identity. But even if we grant that some futuristic technology could preserve a person's identity via 'uploading', the person would not have turned into a new species of embodied (or at least spatio-temporally located) rational being that was not at the same time an animal. For the person to be remotely capable of functioning, she would need some kind of body to enable her to interact with the world and with other persons. She would need perceptual organs, without which she would not be able to take in the data required for even basic mental operations. If the 'upload' really were a person, she would have to be capable of sensory, affective and volitional behaviour. The sort of body able to make that possible would have to possess the basic features of any animal body, no matter the specific differences from a typical human body made of biological material. I can see

disembodied rational creature – a spirit or, as traditional theists hold, an angel. Secondly, it could be something even more extreme – a being without rationality *or* animality in the senses in which I have characterized them, yet superior to us humans.[46] Such an entity would, quite simply, be God. God is not an animal in the sense of having a body that carries out the vegetative and sensory functions. Nevertheless, on the traditional conception God perceives and acts, and is considered (analogically) to be a living being. Nor is God rational in the sense of composing and dividing concepts, making judgments and drawing inferences. Yet in another sense God is supremely rational because He is omniscient. An omniscient being does not need to put two and two together to get four, as it were: there is nothing to be composed or divided, no judgments to be made or inferences drawn, no reasoning to carry out, because an omniscient being already *knows* all the connections between everything without exception. We can, by analogy, still call this a kind of rationality.

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no more reason for denying that such a person were one of us than for denying it of our mythical exotic alien.

[46] It could not have animality without rationality and still be *superior*, so that option is ruled out.

So where does that leave us? The only way a rational animal could become something greater and distinct in species is by losing its animality or its rationality in the way just described. It would have to become an angel or God (or a god, if that makes sense).[47] And the only way an entity could exist that was both superior to and distinct from rational animals is by being either an angel or God (or a god). It is obvious that no human being can be God (or a god), or of the same species as God (or a god).[48] But humans would not be of the same species as any angel either since, being disembodied, angels have a wholly different means of cognition: at no level of generality can they be said to

[47] On the traditional scholastic view, God is not a member of any species. So I am really speaking of God as a being of a wholly different order to the species *rational animal*. Angels, on the other hand, are argued by St Thomas Aquinas to be all singleton members of distinct species: see *Summa Theologica* I, q.50, a.4 on the angels (Eng. trans. by the Fathers of the English Dominican Province, vol. 3, London: Burns Oates and Washbourne, 1922: 13-14); on God as not being a member of a species, see *ST* I, q.3, a.5 (vol. 1, London: R. and. T. Washbourne, 1911: 37-9).

[48] Not just because God is not a member of any species. Even if He were, he would not be of the same species as human beings.

know things in the same way that humans know them.[49] I can see how, to borrow a phrase from Wyndham Lewis, transhumanists might seek to be the apes of God, but I hope I do not have to argue for the proposition that no application of reason could ever produce or turn something *into* God or a spirit.

6. Conclusion – an ethical implication

If what I have argued is correct, it is no more than an exemplification of the thesis that there is and can be nothing in between humans and angels. If there is an ontological hierarchy, as I believe, then from God we descend to spirits and then human beings. There is no space between the rational animals and the disembodied spirits, metaphysically speaking.

Superhumans, therefore, will always be one of us no matter how different they seem. At which many will wonder – who cares? What difference does it make whether we correctly call a posthuman or superhuman a member of our species or a member of a distinct species? One might, in other words, wonder whether the issue is more than a verbal one. Suppose the transhumanist concedes the metaphysical point: a superhuman would not belong to a new species distinct from human

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[49] Angels are traditionally held to know things by a kind of intellectual apprehension, a direct knowledge unmediated by sensory impulses. For Aquinas on angelic knowledge, see *ST* I, qq.54-58 (vol. 3: 41-94).

beings; both it and we would all belong to the rational animal kind. Nevertheless, the superhuman would be a superior 'variety', so to speak, of rational animal. As the Mastiff is to the Poodle in strength; as the German Shepherd is to the Afghan Hound in intelligence, and so on; so the superhuman would be to the ordinary human, multiplied by much larger factors. The facts that matter – that are of any practical interest – would be the same, whatever the species allocation.

I propose, however, at least one rather interesting and surprising ethical implication that does make this more than an abstruse metaphysical question – contra Harris's thought mentioned earlier that species allocation is of no ethical consequence. One of the issues transhumanists worry about is whether a future posthuman class would inevitably dominate and enslave the existing human population.[50] I tend to side with the more pessimistic view, but what interests me is the nature of any such conflict assuming the correctness of what I have argued. It is an old truth that civil wars are usually nastier, bloodier, and more traumatic than those fought against an outside enemy. If our posthuman class were indeed of a different species – if we did not recognize them as one of us – any purported domination of us by them would parallel the invasion of one nation by another, and our self-defence would be

[50] See, for example, Bostrom, 'The Transhumanist FAQ', sec. 3.9.

something like collective resistance against an external aggressor. Such wars generate much internal unity and cohesion in the face of the outside threat. Differences are put aside and people rally together to defeat the common foe.

By contrast, civil wars are messy and shocking affairs in a more

unpleasant way. Brother fights brother, neighbours and relatives can find

themselves in arms against each other, the common land is laid waste and

everyone suffers. The scar on the national psyche is long lasting, whoever wins. Now, if the transhuman class really were one of us, any attempt by it to subjugate the 'unenhanced' humans, coupled with our resistance to their threatened domination, would result in a civil war. True, we would have to *recognize* the transhuman class as one of us, and as I indicated earlier, people have sometimes made mistakes about whether other humans belong to their species. So it is contingent whether a de facto civil war would be seen as such, with all the psychic and emotional consequences. But we should now be thinking not of the far-fetched, Glog-like case, which I used to make a metaphysical point about species membership even at the extreme end (and about likely mutual recognition), but of the far more realistic scenarios transhumanists have in mind. In these, super-engineered 'posthumans' are far more likely to be recognized as beings of our own species – albeit privileged over the

rest of us to a prodigious degree. One might dispute my claim that even in the exotic case, sufficient interaction across enough dimensions and for a long enough period of time would likely lead to mutual recognition of conspecificity; but on the more plausible scenarios, such recognition seems all but guaranteed.

Now, whether *Homo sapiens* or our transhuman brothers emerged victorious in the war of domination, some humans would have to crush members of their own species; this must have a traumatic psychological effect of a different order from that involved in subjugating a distinct species. (If a lion could speak, the first thing he would express is his shock at our callously easy exploitation of his kind.) Were the transhumans to triumph, the result would not be analogous to the temporary occupation of a foreign land. Rather, it would be the permanent occupation of one's own land by one's own kind – a conspecific boot on the human face forever. Even absent outright conflict, resentment at extreme inequality, leading to a virtually permanent state of unrest, would be guaranteed – just as, again by imperfect analogy, people are naturally far more agitated about there being obscenely and disproportionately rich people in their own country than they are about those in some other land. Unable to transcend our own species, then, pessimistic transhumanism requires the human race to

turn on itself. I for one hope that the limits of 'applied reason' will keep such an awful spectacle forever at possible world's length.[51]

[51] An earlier version of this paper was delivered in 2012 at the Wake Forest University conference on Engineering Human Nature and the Future of Human Values. I am grateful to Kevin Jung, organizer of the conference, for the invitation, and to the audience for their comments. I would also like to thank two anonymous referees for a number of suggestions that have further improved the paper.