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THE PRIMORDIAL EXISTENCE QUESTION AND OCKHAM'S RAZOR

DANIEL KING

Abstract
In this paper I examine Grünbaum's criticisms of the 'Primordial Existence Question', which he articulates as 'Why is there something contingent at all, rather than nothing contingent?'. I argue that from Grünbaum's point of view one of the most telling criticisms of the PEQ would be that its proponents, in arguing that the existence of a state of nothingness would be simpler and thus more plausible than the existence of the universe, have applied Ockham's Razor, an epistemological principle, as though it were an ontological one. I go on to claim that whether one accepts this criticism as valid depends on a number of considerations, such as whether epistemological aspects are always absolutely separable from ontological.

1. *Introduction*

In papers such as 'The Poverty of Theistic Cosmology', Grünbaum discusses Leibniz's 'Primordial Existence Question' ('PEQ'), which he articulates as 'Why is there something contingent at all, rather than just nothing contingent?' (Grünbaum, 2004, 561). Grünbaum identifies two major presuppositions for the PEQ: 1) A state of affairs where nothing contingent exists — he calls this 'the Null Possibility'; its instantiation is 'the Null World' — is genuinely possible, the notion of nothingness being both intelligible and free from contradiction; and 2) not only *should* there be nothing contingent at all, but also there *would* be nothing contingent at all, in the absence of some external cause or reason (such as God), because a state of nothingness is more 'natural' than the existence of the universe. He refers to this idea as the 'Spontaneity of Nothingness' ('SoN'). Grünbaum's position is that those, such as Leibniz, who have felt PEQ to be a justifiable question to ask have in fact not subjected these presuppositions to proper scrutiny. Grünbaum's critique is long and detailed, and I devote the first section of the present paper to a consideration of a number of its salient points; but from the point

of view of the paper, the essence of his position can be seen to be: 1) even if the Null Possibility were to turn out to be demonstrably logically robust (he argues that it is not), it is nevertheless not incumbent upon us to explain why the Null Possibility is not actualized in the Null World; and 2) not only does Leibniz's *a priori* defence of SoN fail but also there is no empirical warrant for it either. Consequently, the PEQ is a non-starter. My stance is that Grünbaum's arguments are right; but in that which follows my concern is more with *why* proponents of the PEQ have been led to ask the question. One of my conclusions is that Leibniz and others have taken an *epistemological* principle, Ockham's Razor,[1] and used it (perhaps) unjustifiably as though it were an *ontological* principle, in order to defend the hypothesis that a state of nothingness, which Leibniz perceives to be simpler than the universe, is therefore more probable than the existence of the universe.[2] As may be imagined, a defence of my use of the word 'perhaps' in the preceding sentence will also occupy a proportion of this essay. My strategy will be first to present the promised discussion of Grünbaum's ideas with regard to PEQ. I shall follow this section with a discussion of simplicity and Ockham's Razor. The next section will deal with Grünbaum's criticism of Swinburne's ideas concerning simplicity of theories and truth. Aspects of the discussion of Ockham's Razor *qua* epistemological principle will lead me, finally, to offer some comments not only with regard to the separability of epistemology from ontology, but also with regard to whether, under certain specific circumstances, ontological appeals to Ockham's Razor may be justified after all.

2. *Grünbaum and the PEQ*

Grünbaum has discussed the Primordial Existence Question in a number of essays. As his 'The Poverty of Theistic Cosmology', however, is a very detailed paper, I shall concentrate on it — at least in this section. (His paper 'Is Simplicity Evidence of Truth?' will prove similarly useful in the section dealing with simplicity and truth.)

[1] Smart (1984, 128) suggests the Anglo-Saxon spelling 'Ockham' is to be preferred to the Latinized 'Occam'; in this essay I follow Smart's recommendation.

[2] Note that I am not necessarily arguing that (for example) Leibniz was familiar with Ockham's Razor as a *named principle* — although he could have been. I am simply saying — without expressing a commitment as to whether Ockham's Razor operates *a priori* (more on this later) — that it is a human tendency to associate simplicity with truth, and that this has guided philosophers and scientists from the beginning to today.

As indicated in the Introduction, one of Grünbaum's first points is that the viability of the PEQ depends on two presuppositions: the Null Possibility and the Spontaneity of Nothingness. With regard to the definition of the Null Possibility — a state of affairs where nothing contingent is both meaningful and free from contradiction (Grünbaum 2004, 563) — it may be wondered here why the PEQ has been phrased to include the word 'contingent'. That is, it may be asked, why is the question not simply: 'Why is there something rather than nothing?'. The answer is that Leibniz believes God to be a necessary being; hence, as Grünbaum points out:

> ... it would clearly *trivialize* Leibniz's cardinal PEQ, if it were asked concerning a 'something' comprising one or more entities whose existence is logically or metaphysically *necessary*. (Grünbaum 2004, 563)

Thus, Grünbaum goes on to indicate of Leibniz's conception, "something' in his PEQ must be... *restricted* to entities whose existence is logically *contingent*. And similarly for the scope of the term 'nothing'.' (Grünbaum 2004, 563). It would perhaps be a valuable philosophical exercise to see to what extent one could frame a PEQ independent of Leibnizian thought — where there is no necessary being and no need to bring in the word 'contingent' — but apart from a few comments, which I shall make shortly, such a project is beyond the scope of the present essay.

So far as this paper is concerned, arguably the next important move that Grünbaum makes in his essay concerns the Null Possibility. This move is important because it suggests that an attempt to characterize the simplicity of the Null World may actually result in horrendous complexity:

> ... note... that Leibniz couched his original 1697 statement of PEQ in terms of 'worlds' when he demanded a 'full reason why there should be any world rather than none'. ... This formulation suggests that, conceptually, the very notion of the Null World may well range — by *negation* or *exclusion* — over all of the contingent worlds or objects other than itself which are *not* being actualized in it. But this collection of unrealized, non-instantiated contingent worlds is *super-denumerably infinite* and is of such staggering complexity that it boggles the mind! (Grünbaum 2004, 572)

This is, of course, a telling blow to the simplicity claim concerning the Null World — and, derivatively, to the PEQ, as it is framed by Leibniz. One could

respond that if Grünbaum's conclusion indeed follows from Leibniz's premisses — and, of course, it does — the need for a framing of the PEQ independent of Leibnizian philosophy becomes even more desirable. Otherwise, Leibniz's expression of the PEQ could be seen to be too much of a strawman version of such a less philosophically 'cluttered' (and more robust) PEQ. It is not difficult to imagine what sort of characteristics this PEQ would have: apart from lacking, as part of its ontological baggage, the already-mentioned 'necessary being', it would also lack a commitment to any kind of interpretation in terms of non-instantiated 'worlds' — much as it is possible, mathematically, to characterize the empty set without needing to specify all the sets that the empty set is not. On the other hand, one can hardly blame Grünbaum for addressing himself to the most comprehensive version of the PEQ that we have. Grünbaum's comments in the just-quoted paragraph are also useful in that they point to a link between simplicity and number: Leibniz's collection of negated or excluded worlds is not simple, because there is a huge *number* of them.

Given what I have just indicated, at this point there would clearly be justification for considering the notion of simplicity in more detail. But in order to clear the way for the later discussion of simplicity and the related topic of Ockham's Razor, it is helpful to examine first some of the reasons other than simplicity that may be behind many philosophers' need to ask the PEQ.

The case of Leibniz is illustrative. Grünbaum stresses that after Leibniz formulated his PEQ, he sought to justify it by relying on two premises, one of which is his Principle of Sufficient Reason ('PSR'), while the other is an '*a priori* argument from simplicity for the presupposition SoN inherent in PEQ' (Grünbaum 2004, 573). Naive inquirers into the origin of the universe tend to employ the PSR in a much less sophisticated way than does Leibniz: they note that commonly-observed events in the universe have a sufficient reason and infer from this that the universe itself must have a sufficient reason. Those who reason along these lines of course make a category mistake (the universe is not an event but an object[3]); but Grünbaum points to problems with the PSR itself. For example, according to current theory quantum events require no sufficient reason in order to occur.[4] Grünbaum

[3] I say this even though it would be difficult to produce a definition of 'object' that would suit the universe. (Owing to relativity, for example, we cannot consider parts of the universe all to exist 'at the same time'; and an object tends to be thought of as something the parts of which all exist in this way). But as Wittgenstein points out, we do not have to be able to define words in order to use them adequately.

[4] According to the Many Worlds interpretation of quantum theory, of course, there *is* sufficient reason for each quantum event: the apparent randomness of quantum events is merely a perspectival illusion arising from our 'Preferred Basis'. But then one could object that this move merely *relocates* the randomness; for there is no (known) sufficient reason for our Preferred Basis.

shows, however, that even if this problem with the PSR is overlooked, other problems emerge if one appeals to the PSR in order to answer the PEQ. For example, the explanatory demand for the existence of the universe is ambiguous, and can be interpreted in three different ways ('U_0' refers to our universe):

> (Q_1): 'Why does U_0 exist, rather than not?'
> (Q_2): 'Why does U_0 exist, rather than just nothing contingent?'
> (Q_3): 'Why does U_0 exist, featuring certain laws L_0, rather [than] some different sort of universe U_n, featuring logically possible different laws of nature L_1?' (Grünbaum 2004, 576)

Given this, one can only agree with Grünbaum that the PSR fails 'to underwrite the particular question Q_1 'Why does U_0 exist, rather than not?'' (Grünbaum 2004, 578)

Grünbaum devotes a whole section to 'hypothetical psychological sources of PEQ'. Perhaps the most obvious such reason why the PEQ is asked — at least, in the years since the Big Bang theory was proposed — is that the farther back in time cosmology looks the smaller the universe is thought to be, reaching a limit of zero ("nothingness") at the Big Bang itself. However, the *density* of the universe as this limit is neared approaches *infinity* — so that the idea that there is nothingness at the Big Bang is obviously erroneous.

Oddly, Grünbaum's subject matter in this section often seems more concerned with cultural issues — something that rather jars with the logically precise emphasis of the rest of the paper. Perhaps one example from the section will suffice. Grünbaum cites a passage by Schopenhauer to suggest that one psychological source of the PEQ may be our knowledge of death:

> If our life were without end and free from pain, it would possibly not occur to anyone to ask why the world exists, and why it does so in precisely this way, but everything would be taken purely as a matter of course. (Grünbaum 2004, 593)

This is unconvincing: presumably even human beings in the conjectured state of beatitude would, so long as they had any kind of empirical interaction with the world and any kind of philosophical curiosity, still be liable to make the kind of category mistake referred to earlier — that is, they would (fallaciously) be able to observe that all macroscopic events have a sufficient reason, and from this speculate as to the sufficient reason for the universe itself. But perhaps a world free from pain would exclude the philosophically naive. Fortunately, Grünbaum himself appears not to take Schopenhauer's idea too seriously, opining that the SoN is a 'distinctly Christian doctrine'

(Grünbaum 2004, 594), and that thinkers in other cultures who did not ask the PEQ were presumably just as conscious of death. But such loose speculations do little to advance Grünbaum's argument.

At this point in Grünbaum's essay I was expecting him to suggest that Ockham's Razor, misinterpreted as an ontological principle rather than an epistemological one, may be one of the motivations for asking the PEQ. Grünbaum does have much to say about simplicity (in his paper 'Is Simplicity Evidence of Truth?', which, again, I shall consider shortly), but nothing explicitly related to Ockham's Razor — an inexplicable oversight, especially given the thinness of his discussion of the 'psychological' motivations mentioned above, to which, paradoxically, he devotes a disproportionate amount of space. The closest Grünbaum comes to a consideration of Ockham's Razor is in the following passage, where he provides a criticism of what *amounts* to an ontological invocation of Ockham's Razor:

> But let us assume, just for the sake of argument, that Leibniz and Swinburne could warrant a priori the maximum conceptual and ontological simplicity of the Null World, as avowed by Leibniz, when he declared... "nothingness' is simpler and easier than 'something". It is of *decisive importance*, I contend, that *even if the supposed maximum ontological simplicity of the Null World were warranted a priori, that presumed simplicity would not mandate the claim of SoN that de jure the thus simplest world must be spontaneously realized ontologically in the absence of an overriding cause*. Yet, to my knowledge, neither Leibniz nor Swinburne nor any other author has offered any cogent reason at all to posit such an ontological imperative. (Grünbaum 2004, 573)

Given the above, I turn now to a consideration of Ockham's Razor and what various philosophers have had to say about it.

3. *Ockham's Razor and Simplicity*

The first point to make about Ockham's Razor is that there is no evidence that Ockham had a principle of precisely the form popularly attributed to him today. Thorburn, in 'The Myth of Occam's Razor', comments:

> From the middle of the Nineteenth Century, nearly every modern book on Logic has contained the words: *Entia non sunt multiplicanda, præter necessitatem*: quoted as if they were the words of William of Ockham. But nobody gives a particular reference to any

> work of the Singular and Invincible Doctor. ... (Thorburn 1918, 345).

Thorburn in fact argues that the principle was invented in 1639 by John Ponce of Cork, and given a precise modern wording in 1654 by John Clauberg of Groningen; the term 'Ockham's Razor' was coined in 1853 by Sir William Hamilton. Of course, given the concerns of the present paper, such questions of authorship are of only passing interest. The question that most needs to be asked is: what are the implications of invoking 'Ockham's Razor' in scientific and other discourse?

As might be expected from my first comments in this section, one problem that manifests itself almost immediately is that many writers invoke Ockham's Razor in a variety of different phrasings,[5] not all of which have the same meaning. Consequently, it is not surprising that in the interests of precision much of the most insightful criticism in this area focuses not on 'Ockham's Razor' but on the closely-related question of to what extent considerations of simplicity should (and can) be appealed to in scientific and other discourse. One could observe in passing that it is a pity that the caution implicit in such a stance is not manifest in the arguments of those who pose the PEQ. Ockham's Razor, however, is arguably so entrenched in the scientific mindset that it is perhaps not easy for the proponents of the PEQ to recognize it when it is a hidden assumption in their approach.

Among those who have discussed the philosophy of simplicity, few names loom as large as that of Elliott Sober. In his 'What is the Problem of Simplicity', he starts by taking a very broad view, a view to which it would be difficult to object: that simplicity involves *minimizing* something. But as he quickly observes, the 'problem is to figure out what to count' (Sober 2002, 3). He provides the following illustration (it is worth quoting him at length):

> Theory X may seem simpler than theory Y when the counting is done one way, but the opposite conclusion may be reached if the counting is done differently. Consider, for example, the longstanding dispute in psychology and the social sciences about psychological egoism. Egoism claims that all of our ultimate motives are focused on some benefit to self. The rival of egoism is motivational pluralism, which allows that some of our ultimate motives are egoistic, but maintains that other ultimate motives are focused on the welfare of others. ... It may seem, at first glance, that egoism is simpler

[5] Right at the start of 'Ockham's Razor', Smart draws attention to these alternative phrasings, citing, in particular, Ockham's own '*Frustra fit per plura quod potest fieri per pauciora*' (Smart 1984, 118).

> than pluralism, since egoism postulates just one type of ultimate desire, whereas pluralism postulates two. . . . [But complications] arise when one considers other implications that egoism and pluralism have. Egoism says that people want to help others only because they think that helping will benefit themselves. Egoism therefore attributes to people a certain *causal belief*. Motivational pluralism postulates no such belief about the selfish benefits that helping will produce. If the simplicity of the two theories were calculated by counting such causal beliefs, the conclusion would be drawn that motivational pluralism is simpler. Egoism postulates fewer types of ultimate desire, but it postulates a larger number of causal beliefs. (Sober 2002, 3–4)

Not unreasonably, Sober concludes from this that what is necessary is some set of *criteria* according to which simplicity should be measured one way rather than another. As one might expect, Sober fails to produce such criteria. He examines and discards both syntactic and semantic criteria; and his arguments are generally persuasive — except when he appeals to that philosophically-questionable and far-too-often-invoked faculty, 'intuition':

> One reason the problem of measuring simplicity is difficult is that intuitive descriptions of what simplicity means lead to opposite measurement proposals. (Sober 2002, 7)

What do philosophers[6] mean by 'intuition'? When they say 'intuitively true' do they really mean 'obviously true' and are thus committing the appeal to obviousness fallacy? Or are they, on the other hand, revealing a secret desire to say, rather than 'intuitively true', 'true *a priori*'? Sober, indeed, seems to lean towards that which transcends the empirical world when he suggests that 'there might be no single unified justification of simplicity in scientific inference. . . Perhaps simplicity can't be justified in terms of something else' (Sober 2002, 9). That is, the idea is that simplicity — like rationality, Sober goes on to say; we cannot answer the question 'Why be rational?' without circularity — may be foundational. However, it is apparent that he does not really sympathize with this position; for he promptly proceeds to consider scenarios where, he argues, simplicity *can* be justified. One conclusion he reaches in this regard is:

[6] Philosophers of mathematics excepted; 'intuitionism' in the philosophy of mathematics has a precise meaning.

> The more adjustable parameters a family contains, the greater its risk of over-fitting the data, of mistaking noise for signal. ... Simplicity is relevant because complex families often do a bad job of predicting new data, though they can be made to fit the *old* data quite well. (Sober 2002, 26)

It is not at all clear that Sober himself avoids circularity, here; but I shall leave this to one side in order to move to another paper of Sober's — 'The Principle of Parsimony' — where the relationship between simplicity and *induction* is highlighted.

What Sober calls 'the principle of parsimony' is another paraphrase of Ockham's Razor. He observes that, typically, the principle has had an 'agnostic', 'don't know' use, when, properly, it ought to have had a more positive use — a use affirming what does and what does not exist.[7] (A use affirming nonexistence he calls 'atheistic'.) For my purposes, this distinction is significant because it is a move towards a distinction between epistemology and ontology, about which I shall have more to say later in this essay. Sober gives as an example of the 'proper', ontological use of the principle the fact that special relativity didn't merely take a 'don't know' attitude with regard to the existence of the aether; it claimed, rather, that the aether *does not exist*. With such examples in mind, he approves of the following form of the principle of parsimony:

> The principle of parsimony counsels that *we should hypothesize that an entity does not exist*, if its postulation is to no explanatory point. (Sober 1981, 145)

To avoid possible misunderstanding of what I shall claim later, it is worth pointing out now that this phrasing of the principle of parsimony is not *purely* ontological; it does not claim (for example) that 'the universe would be simpler without the aether; therefore the aether does not exist'. On the contrary, it is still largely epistemological in flavour: it bases its (admittedly ontological) recommendations on what physical theory *explains* to us as part and parcel of our scientific knowledge (and, thus, epistemology).

As I foreshadowed, Sober's main concern in this paper is with the relationship between the principle of parsimony and induction. To support his

[7] Philosophers have, of course, posited various other kinds of parsimony. Nolan (1997), for example, draws attention to the distinction between qualitative parsimony and quantitative parsimony.

claim that this relationship exists, he describes how, typically, Ockham's Razor works:

> ... where... two existence claims would each explain P, the one to be rejected is the one which is not needed to explain *any other phenomenon*. If only one of the existence claims is thought to be the explanation of other phenomena, the razor bids us conjecture that this claim is also the explanation of P; where the other existence claim is thought to explain no other phenomenon, the razor says that this claim is not the explanation of P either. The razor is thus nothing more than a principle of induction which focuses on existence claims. (Sober 1981, 151)

In the above, Sober's words are epistemically very tentative — something that, at first sight, seems at odds with the very definite identification of an existence-claim as actually *being* the explanation of P. This disparity is no doubt intended to reflect the fact that, while the induction process is never guaranteed to give us truth, we do have to act as though it does. Of course, rephrasing the problem of Ockham's razor as the problem of induction is hardly a simplification; for it is a commonplace that the problem of induction is one of the 'big' problems of philosophy.[8] The intractability of the problem of induction is perhaps one reason why Sober concedes he cannot actually provide a watertight reduction of Ockham's Razor to a principle of induction:

> The 'inductivist' formulation of the principle of parsimony suggests a conditional vindication: if some principle of induction is rational, so too is the atheistic formulation of the razor. Because I can offer no fully adequate set of inductive principles, no direct argument in favour of the reduction will be provided. (Sober 1981, 152)

Nevertheless, Sober offers 'several considerations' that 'strongly suggest that parsimony is just good induction of a certain kind' (Sober 1981, 152). It is not difficult to see why Sober wishes to reduce parsimony to induction: while the problem of induction may be a problem of surpassing difficulty, at least it is a problem with which everyone is familiar. Contrast this with Ockham's Razor, which to many is nothing but a kind of mantra with a vague behavioural imperative.

[8] See my paper 'Induction, and Cantor's Second Principle of Generation'.

And there are other, explanatory advantages, which again Sober articulates:

> Our 'inductivist' formulation of the principle of parsimony explains why appeals to parsimony are often thought to be less than decisive. An inductive extrapolation from a sample to a conjecture about the containing population will typically *not* explain *why* the total population has the postulated characteristic. In just the same way,[9] the parsimonious assumption that new phenomena will obey old mechanisms leaves unexplained *why* new phenomena may be expected to do so. (Sober 1981, 153)

I don't want to get too sidetracked by the problem of induction,[10] so I shall now simply summarize the few conclusions pertaining to simplicity and Ockham's Razor that have arisen in this section, and then turn to a consideration of Swinburne's *Simplicity as Evidence of Truth*, together with Grünbaum's criticisms of it. (These two papers have a section to themselves because they are explicitly concerned with the relationship between simplicity and truth; and the notion of 'truth', related intimately as it is to semantics and ontology, will provide a convenient springboard into the concluding discussion of this paper, where it will be argued that while Ockham's is properly an epistemological principle, under certain specific circumstances ontological appeals to Ockham's Razor may be justified after all. Briefly, then, the consensus in the literature seems to be 1) that science needs to appeal to simplicity/Ockham's Razor, but can no more provide a rigorous justification for doing so than it can for employing induction; 2) that with regard to measuring simplicity, the notion of minimizing something is important (although

[9] One could object that here Sober is invoking the fallacy of the undistributed middle term: he is suggesting that just because parsimony and induction have some features in common, they have all features in common. One might just as well claim cats are squirrels because both like to climb trees. On the other hand, induction itself resembles the fallacy of the undistributed middle term, in that both postulate equivalence based on resemblance.

[10] In 'Ockham's Razor', Smart also discusses induction:

> I have been tempted to... say that just as induction, the principle that the future will be like the past, can neither be validated nor vindicated... and yet must be accepted if we are to believe anything at all about the universe, so the principle of simplicity must be accepted, even though it cannot be validated or vindicated either. (Smart 1984, 122)

As the use of the word 'tempted' might suggest, however, Smart does not believe this, citing Clendinnen's attempts to vindicate induction as being 'pretty close' to success.

what is to be minimized — and according to what criteria — is the subject of ongoing and probably irresolvable debate); 3) that Ockham's Razor may (or may not) be an *a priori* principle, but in its scientific use, at least, it is a predominantly epistemological one.

4. *Simplicity as Evidence of Truth*

Swinburne's *Simplicity as Evidence of Truth* does not mention Ockham's Razor as such (although, as will be seen, in the context of a discussion of God he defends what amounts to an ontological version of the principle — a position attacked vigorously by Grünbaum). Helpfully, Swinburne provides a clear and brief summary of what he wishes to demonstrate with regard to simplicity:

> I seek in this essay to show that — other things being equal — the simplest hypothesis proposed as an explanation of phenomena is more likely to be the true one than is any other available hypothesis, that its predictions are more likely to be true than are those of any other available hypothesis, and that it is an ultimate *a priori* epistemic principle that simplicity is evidence of truth. (Swinburne 1997, 1)

Perhaps the most important point to make with regard to the above passage is that when Swinburne says 'other things being equal' he is suggesting that for two theories to be comparable with regard to simplicity they must be of equal 'scope'. 'Scope', in turn, is related to the 'content' of a theory. One of the first of Swinburne's arguments is that the greater the content[11] of an hypothesis, the less likely it is to be true, because the greater the number of claims one makes, the more likely it is that some of them will be erroneous. This seems a very promising step towards Swinburne's just-stated goal, especially as he is quick to point out that he does not subscribe to the view (he attributes it to Popper) that the simplicity of a theory is to be understood in terms of its having more content. Swinburne believes that the issue is actually more complex than this: there are a number of different '*facets*' that have to be taken into account. One facet is, indeed, 'just a matter of number of things postulated' (Swinburne 1997, 24); but other facets include number of *kinds* of thing; number of laws in the corresponding theories; number of variables; and simplicity of the mathematics used to express the theories

[11] As it stands, of course, 'content' is vague; see my later presentation of Grünbaum's discussion of it.

(Swinburne proposes rules to determine which mathematical expression is simpler than another).

An obvious problem with this idea of facets is: how does one weigh up the importance of each facet? If no answer to this is clear, we shall still have no way of knowing whether one theory is more likely to be true than another. Swinburne appreciates this problem, but suggests that 'consensus' will save the day:

> ... although the criteria for comparing facets of simplicity are in no way clear, there is, I suggest plenty of consensus over a range of cases about how to weigh greater simplicity in one respect against less in another, although I do not think that any general formula can be produced for calculating this which would command any widespread agreement. (Swinburne 1997, 30)

What are we to make of this 'consensus'? At worst, the bandwagon fallacy has been committed; at best, Swinburne may merely have made a move towards the view that we are guided *a priori* in questions of simplicity. Indeed, he quickly proceeds to give his argument that the principle of simplicity is an *a priori* truth:

> The fact — however unwelcome to many — is that, if the principle of simplicity is true, it is a fundamental *a priori* truth. If data ever render one theory or one prediction more probable than another, that can only be because there are *a priori* criteria for extrapolating from the data in one direction rather than another. Yet there is no truth of logic with a consequence about which direction of extrapolation yields probable truth. So — if any proposition which is not analytic is synthetic — it is both synthetic and *a priori* that (other things being equal) a simpler theory is more probably true than a complex one. If simplicity could be justified further, it would derive that justification from some higher *a priori* criterion, and that one would be fundamental. (Swinburne 1997, 50–51)

There is much that is *prima facie* persuasive in the above. But I have mentioned that Grünbaum's 'Is Simplicity Evidence of Truth?' devotes itself to examining Swinburne's position; consequently it is necessary to turn now to what Grünbaum has to say.

Grünbaum has, in fact, a number of major criticisms to make of Swinburne's stance. The first concerns Swinburne's notion of incompatible theories' being of equal scope. In a passage cited by Grünbaum, Swinburne claims that of a number of theories equal in scope it is the simplest that

is most likely to be true. Grünbaum begins by looking at what Swinburne means by the 'scope' of a theory:

> In his 2001 account, he oddly does not give any characterization of his notion of the 'scope' of a theory... but in his Aquinas Lecture... he had recourse to the received cognate notion of the logical 'content' of a theory. The logician Alfred Tarski introduced the concept of 'the consequence class of a statement S' as the set of *all* the deductive consequences of S. This consequence class has also been denominated the logical 'content' $LC(S)$ of S. (Grünbaum 2008, 179–180)

Unfortunately, it is here that problems arise; for as Grünbaum points out, two incompatible theories T_1 and T_2 must have different content (as defined above) — and therefore *cannot* be equal in scope! Moreover, Grünbaum later asks (and it is perhaps his main point), if the contents of two theories are incomparable, how can simplicity possibly be used as a 'tie-breaker' to decide between them?

Grünbaum furthers this discussion with a consideration of the specific example of Newtonian dynamics and Einstein's theory of gravitation, observing that these theories 'likewise seem to be poor specimens for *overall comparative* ratings of simplicity' (Grünbaum 2008, 184). He endorses Swinburne's observation that when assessing the relative simplicity of theories it is essential to specify the aspects with respect to which one theory is held to be simpler than another. But he takes issue with Swinburne's argument for the *a priori* justification of simplicity:

> ... an *explanatory unification* of previously disparate theoretical elements of a prior theory, when achieved by a *new* theory, could be taken as a mark of its *greater simplicity vis à vis its predecessor*, even though the two theories might exhibit an *inverse* simplicity-ordering in some *other* respect. In this vein, the [General Theory of Relativity] effected a *simplifying unification* of the description of the physical geometry with a theory of gravitation, which had been *quite distinct* in its Newtonian predecessor. ... But observe incidentally that this simplifying unification does *not* owe its *warrant* at all to some greater *a priori* simplicity; instead it derives its *justification* from such empirical promptings as the equivalence of gravitational and inertial mass. ... (Grünbaum 2008, 184)

Grünbaum is clearly right, here. The only way Swinburne could save his argument would be to find a way by means of which theories different in

content could still be compared as to simplicity.[12] *Then*, in reply to Grünbaum's criticism that the simplifying unification owes its warrant to empirical promptings rather than to *a priori* simplicity, he could say, 'yes; the unification does owe its justification to empirical results: but it is the fact that this unification turns out to be — or can be seen to be — an overall *simplifying* unification that illustrates guiding *a priori* criteria are at work'. On the other hand, Grünbaum points to the vastly less simple mathematical formalism of General Relativity as compared with that of Newtonian theory as an indication that the whole idea of *overall simplicity of theories* may be questionable.

I have already mentioned that in the context of a discussion of God Swinburne defends what amounts to an ontological version of Ockham's Razor: his concern is to show that, because it is simpler, the hypothesis that God exists in point of brute fact is more likely to be true than the claim that the ultimate laws of nature are brute facts. Grünbaum quotes the passage concerned:

> ... if there is to exist something, it seems impossible to conceive of anything simpler (and therefore *a priori* more probable) than the existence of God. (Grünbaum 2008, 188)

But this argument for the simplicity of the hypothesis that God exists is at best an under-substantiated claim and at worst an example of the appeal to ignorance fallacy. And again, it is also an ontological appeal to Ockham's Razor in everything but name. Grünbaum, granting for the sake of argument that the hypothesis that God exists is actually simpler, criticizes Swinburne's position by pointing out that we still cannot come to any conclusion as to whether the existence of God is more likely than the alternative; for by the argument already given, Swinburne can use simplicity as a tie-breaker only with regard to theories of equal content. Arguably, however, the situation is even worse than Grünbaum implies; for as I hope this paper has demonstrated, beyond the notion of minimizing something, it is still not clear what 'simplicity' actually means.

[12] And this is not an unreasonable goal; scientific praxis consists, after all, in our comparing and choosing among theories. The difficulty arises in coming up with a precise procedure or algorithm telling us exactly how we should go about it. Maybe no such algorithm is possible, only various heuristics.

5. *Conclusion: Ockham's Razor and the Separability of Ontology and Epistemology*

The preceding section has shown that it is difficult, if not impossible, to formalize the relationship between the simplicity of scientific theories and their truth. Nevertheless, it is undeniable that scientific truth does depend in some way or another[13] on simplicity. To paraphrase one of the extreme examples in Nolan's 'Quantitative Parsimony', Pauli and Fermi's theory of Beta-particle decay works just as well if seventeen million quasi-neutrinos[14] are posited instead of just one neutrino, but the simplicity of the theory that posits just one neutrino nevertheless almost forces itself upon us, as a matter of pragmatic, logical economy.[15] As foreshadowed, the preceding section's focus on simplicity has served also to focus attention on Ockham's Razor. May we in fact conclude that philosophers such as Leibniz, who, in asking the PEQ, are maintaining that a universe where there is nothing contingent is simpler and therefore more likely than the existing universe, have misapplied an epistemological tool, Ockham's Razor, as though it were an ontological tool?

Before I suggest an answer, it is worthwhile providing an illustration of just how ontological appeals to the Razor go wrong. The following example is due to Smart:

> The locomotive mechanism involved in walking is far more complex than is that of a vehicle on wheels. Nevertheless, this consideration does not tell against the principle of simplicity. If an explorer discovers a new animal, he does not expect it to run on wheels.

[13] Beyond appealing to the idea of Sober's, already mentioned, that *something* must be minimized, even if we can say what only heuristically, on a case-by-case basis, it is impossible to be more precise here.

[14] Particles the combined effect of which is equivalent to that of one neutrino.

[15] Smart observes: 'It is not that we prefer simpler theories because they are more congenial and easy for our intellects' (Smart 1984, 120). My reply here is: sometimes we *do* prefer simpler theories for this reason. This is not to say that we may not prefer, in other scenarios, simpler theories for different reasons. But to expect to be able to come up with *one* 'why-we-prefer' algorithm governing *all* theories and *all* situations (as opposed to many heuristics, determined on a case-by-case basis), as Smart appears to want to do, is both naive and utopian. Each theory varies as to number and type of facets (in Swinburne's sense), any one of which may be more or less important depending on situation, experimental context, etc, making futile the attempt to subsume everything under one rule. I note in passing that the attempt to produce simple algorithms that are nevertheless applicable in widely diverse and complicated areas is a mistake that bedevils a vast proportion of analytic philosophy, particularly the philosophy of language.

> There is no simple or even remotely plausible explanation of how locomotion on wheels would fit into the palaeontological story of animal evolution. Motion on legs may be more complex than motion on wheels, but a theory of how animal motion on legs might have evolved may be much more simple than a theory of how animal evolution on wheels might have evolved. (Smart 1984, 120)

In other words, an *ontological* invocation of Ockham's Razor would lead us (wrongly) to expect the existence of wheeled organisms, whereas an *epistemological* invocation of Ockham's Razor would lead us (correctly) to expect organisms on legs. Ontological invocations of Ockham's Razor are unreliable precisely because in concentrating on just objects they must overlook important background information and theoretical complexities, consideration of which would provide a more detailed and therefore more accurate picture of the situation. If an ontological appeal to Ockham's Razor happens to lead to a correct result, it will be purely due to luck.

The above criticism of ontological invocations of Ockham's Razor applies to physical objects. But not everything we refer to as an 'object' is a physical object.[16] In some cases, vague though it may sound, *theoretical considerations* can enter into the actual constitution of an object. This will mean that in certain specific situations an ontological application of Ockham's Razor may be justified after all.

One example is provided by the so-called 'delayed-choice' experiments of quantum physics. Typically, these experiments involve splitting and recombining streams of particles, such as photons. If the apparatus is set up one way, photons can travel along only one of the two paths provided; but it turns out that a last moment change of the experimental arrangement — when, one would have thought, the photons are already on their way along one path — can enable one to observe interference fringes, signifying that the photons have taken *both* paths. The theory of the physicist Wheeler, as described in 'Law Without Law', is that *backward causation* is the simplest and therefore most likely explanation of what is producing the interference fringes in such experiments. Other theories, of course, are possible. Another, vastly more complicated one is that a mind-boggingly large number of interfering photons appear spontaneously from elsewhere to produce the fringes. As was the case with regard to Smart's discussion of wheeled organisms, however, there is no simple way to reconcile this possibility with

[16] In the mathematical philosophy of platonism, for example, numbers are considered to be abstract objects.

currently-accepted science.[17] But the point I want to make is that because the simplicity and therefore perceived likelihood of Wheeler's *theory*[18] has as its (simplest and therefore likely) *ontological* concomitant the physical phenomenon 'backward causation'; and because backward causation is thus a partly theoretical entity, we can be ignorant of the background theory and still *justifiably* appeal to Ockham's Razor ontologically with regard to the simplicity and therefore likelihood of the 'thing' backward causation as the entity involved in delayed-choice experiments. Our ignorance of theory will mean that some luck may be required to guide us to backward causation as the phenomenon behind the experimental results; but the fact that backward causation is a *partly theoretical* entity means the explanation of why our choice was successful will be discoverable, should we elect to investigate the theory.

Another example is provided by the butterfly species *Jalmenus Inous*. The taxonomy of this insect is contentious. Specimens share theoretical species-differentiating characteristics such as wing-vein structure and genital structure, and, indeed, this is reflected in the fact that the insects look to be members of one species; but DNA attempts to establish the separateness of the species from another, smaller species, *Jalmenus Icilius*, have (so far) been inconclusive. Nevertheless, the *theory* that the species exists is, given existing evidence, considered to be simpler, as a matter of pragmatic economy, and therefore more likely than that (for example) *Jalmenus Inous* is in the process of differentiating in evolutionary terms from *Jalmenus Icilius*. But if this is so, the close relationship between epistemology and ontology in this case means that it is thus also simpler and more likely that there exists the concomitant abstract *object*, *Jalmenus Inous*. And as in the previous example, we can be ignorant of the background theory yet still justifiably invoke Ockham's Razor ontologically with regard to the simplicity and therefore

[17] On the other hand, see the highly-persuasive discussion in Chapter 2 of Deutsch's *The Fabric of Reality*.

[18] It is worth quoting from Wheeler's essay, because he shows a full familiarity with Leibniz's ideas with regard to the PEQ, and in fact believes a state of nothingness to be more likely than the existence of the universe. Citing Leibniz's maxim *Omnibus ex nihil ducendis sufficit unum*, he says:

> Of all the principles that might meet this requirement of Leibniz nothing stands out more strikingly in this era of the quantum than the necessity to draw a line between the observer-participator and the system under view. ... We take that demarcation as being, if not the central principle, the clue to the central principle in constructing out of nothing something. (Wheeler 1983, 206)

likelihood of the 'thing' *Jalmenus Inous*. Moreover, we shall be right, because theory is built into the object.[19]

The epistemological-ontological blurring I have just described is not to be confused with the well-known idea that it is our observations (our 'knowing') of a quantum system that actually cause a change in its state (its 'being');[20] for while there *is* a blurring of ontology and epistemology in both what I have described and in the well-known idea, only in the former are considerations of simplicity and therefore likelihood of *theory* important — considerations that determine the kind of object (for example, backward causation) expected.

Jalmenus Inous is an *abstract object*[21] and backward causation is a *postulated physical phenomenon*: given the necessity of theory, described above, to posit these things, there seems no way an ontological appeal to Ockham's Razor can be justified with regard to an *actual physical object*. Subsequent physical investigations may reveal that, for example, the postulated physical phenomenon of backward causation is actually a *real* phenomenon; but that would not make any less chancy a use of Ockham's Razor that did not address itself at some stage to theoretical aspects of the object. To return to the topic of this paper: the conclusion seems to be that we cannot justifiably make an ontological appeal to Ockham's Razor with regard to the universe, with a view to examining whether a state of nonexistence is simpler and thus more likely, because to do that we should have to examine the possibility that the universe arose as an ontological concomitant of a theory perceived to be simpler and thus more likely than another; and it is hard to say what

[19] It could be objected that what I have described is still an epistemological invocation of Ockham's Razor — one that merely has ontological implications. But this objection would depend on a very naive view of scientific enquiry: one that always starts with theory, and only then moves to posit the kinds of entity that could be involved. Typically, scientific enquiry proceeds in the opposite direction: some *thing* is observed, directly or indirectly; and it is only subsequently that theory is cobbled together to make sense of the observations. For example, it is easy to imagine (and I am not necessarily suggesting that this is what did in fact happen) that in the case of *Jalmenus Inous* various things that looked to be members of one butterfly species were observed, and only subsequently was it appreciated that theoretical considerations tended to side with this interpretation.

[20] As Quentin Smith reports:

> Heisenberg originally interpreted [the uncertainty] relations epistemically, but Bohr convinced him in private communications to accept a verificationist metaphysics, with its attendant ontological interpretation of the uncertainty relations. (Smith 2002, 137)

[21] The assumption here is that there are such things as abstract objects. I think the concept is useful, but a defence of the point would be beyond the scope of this essay.

this proposition even means. Put simply, the PEQ is *not* a justifiable question to ask.

420 Spencer Road,
Thornlie,
Western Australia 6108
E-mail: drd_king@hotmail.com

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