

Reforging Ockham's Razor: An enquiry into the ontology of parsimony arguments

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Plagiarism declaration

I know what plagiarism is and have not perpetrated it in this thesis nor in any of the parts of this thesis.

Fichmont

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Abstract

Nearly every philosopher in English-speaking world has heard of Ockham's Razor, which is given in one of two ways, *don't multiply entities beyond necessity* and *all things being equal choose the simpler explanation*. Yet it is unclear from the scholarship whether the use of Ockham's Razor is justified in science and philosophy. However, if it can be shown to 'get' us truth, it would gain an unequivocal justification, as disputes that are continued after the parties to the substantive truth of one or the other are defined as frivolous. Alternatively, one may contend that explanation could have other criteria of success. The implication of a direct connection between the razor and truth comes with ontological commitments, namely a commitment to realism (about universals) and philosophical theism. This is contrary to the razor's use as a tool of nominalism and naturalism. I argue in this thesis that the only possible non-circular justification for Ockham's Razor is truth and that therefore certain philosophical positions are excluded from using the razor to animate their positions. There is an additional, second criteria for the success of our inquiry, namely the justification must in some way be consistent with the razor, which means the chosen explanation for the razor, must be simpler than any of its rivals and not have superfluous entities, otherwise our justification would be contrary to the advice of the razor.

We are presented with a Scylla and Charybdis type problem, we avoid a circularity on the one hand and on the other we must not contradict the razor itself, these are contrary intellectual impulses. So firstly I will look at disciplines outside philosophy for some initial inspiration. If we could answer this question in a 'non' philosophical way, the problem would have solved itself in a way that require little change of practice. If lawyers or scientist can account for the razor properly, there is not really a problem of justification, at least not a philosophical one. Second, I consider the realist and theist positions, namely an argument of Aristotle's in the *Posterior Analytics* and part of Aquinas' *On the Divine Simplicity*. Further, I consider the work of Ockham as a nominalist. Lastly, I consider modern and contemporary philosophy, in the form of Hume, Quine and Sober (a modern writer on the razor). The aim here is to 'stress test'

the philosophical resources of the various systems and analyse the results to see if they can produce a non-circular result.

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Reforging Ockham's Razor: An inquiry into the ontology of parsimony arguments

Summative Introduction

It is possible that nearly everyone in philosophy departments of the English-speaking world has heard of Ockham's Razor, given usually in either of two ways, *don't multiply entities beyond necessity* and *all things being equal choose the simpler explanation*. It is unclear whether Ockham's Razor gets us to truth or what justifies its use in science and philosophy. However, if it were to 'get' us truth, it would gain an unequivocal justification. However, the implication of a direct connection to the truth comes with ontological commitments, namely a commitment to realism (about universals) and philosophical theism. This stands *contra* its contemporary use as a tool in philosophical nominalism and naturalism, which deny the existence of universals and the God of the Philosophers respectively. I argue in this thesis that the only possible non-circular justification for Ockham's Razor is truth and that therefore these philosophical positions are excluded from the use of the razor to animate their position.

Nominalism and naturalism's use of the razor are circular in the sense that they presuppose the use of Ockham's Razor to establish their position *ab initio*. This is what will be demonstrated in the subsequent chapters of this thesis. By contrast, the realist and philosophical theist have the razor 'fall out' naturally of their prior ontological commitments. The methodological principle that is the razor emerges readily from the ontological commitments of the realist, whereas the ontology of the naturalist is suggested by the razor. Therefore, to ask why we ought to believe in naturalism, we are entreated to use Ockham's Razor. Yet when we ask why we ought to believe in the validity of Ockham's Razor, the answers become vaguer.

In Chapter I, I give a sketch of the problem and give some 'non' philosophical approaches to solving it. In Chapter II, I refer to Aristotle and Aquinas. I find that the justification for the razor is found in the fact that the addition premise(s) is both prior and not prior to

its own conclusion if we assume the truth of both demonstrations. Prior in this sense means cause, and this in turn commits us to an ontology of essences (or natures) which ground the necessary connection between cause and effect.

Similarly, the ontology of divine simplicity and necessary being expounded by Aquinas defines God as the act of pure being, His essence (the what it is) is to exist and thus he has no composition whatsoever in Him, He is absolutely simple. Thus, to be simpler is to draw the being of something closer to its essence. The essence is meant to be intelligible to us. Therefore, if the purpose of explanation is to make something that was unintelligible intelligible, it follows then that the simpler explanation is superior to its counterpart. These considerations are drawn out in the context of a parsimony argument concerning the existence of God, if the foregoing is accepted then it is impossible for the naturalist (or the atheist) to employ Ockham's Razor without being in contradiction with their own conclusion. In a similar way, the nominalist must forego the razor when arguing, since if we accept the interpretation of Aristotle that I give, the conclusions of the nominalist are in conflict with the razor.

It would be remiss to not countenance the possibility that the nominalist and the naturalist can meet this challenge. In fact it seems that they would have a *prima facie* advantage in that they would have less objects in their ontologies, and thus would be superior according to the principle itself. In chapter IV we assess some of Ockham, who was himself a nominalist. His aim was to eliminate all universals. He did this on the basis of a very strict understanding of the law of non-contradiction, under which the only meaningful kind of distinction is a real distinction, which in turn means a thing either exists or it does not, like night and day. However, we find that this presupposes the razor in getting rid of universals from our ontology.

In Chapter V, we assess some modern empirical approaches to this problem. As Aristotle informed the scholastics, like Ockham and Aquinas, so Hume informed the empiricists that we assess here, namely, Sober and Quine. A similar issue arises in connection with the razor, we need to parse away any entity that could ground an inference of necessary causation. However, when we then turn to ask what justifies the razor, we find that we are already using the razor to get there. Thus, we are compelled to renounce any idea that

nature or the Universe is itself simple. Both Quine and Sober accept this but think that simplicity is still a theoretical virtue. Whether this is in fact sustainable is assessed in this thesis.

Chapter I: Introduction and other disciplines

The purpose of this thesis is to investigate and argue for an ontological foundation for Ockham's Razor, the principle that states *that all things being equal* we should choose the simpler solution. This first chapter will present the problem as a sketch, then show some 'non -philosophical' approaches in the literature that have been given, most interestingly statistics. I then propose to analyse more directly philosophical approaches, namely those of Aristotle, Aquinas, Ockham, Hume, Quine and Elliott Sober, a philosopher who focusses on the razor. I do this project this way because the razor is a methodological principle that has ontological resonance, most obviously in its other expression, *do not to multiply entities beyond necessity*, but also in the proposed connection between simplicity and good explanation. It seems to me then that we need to know the relation between these two distinct aspects of the issue, namely the methodological and the ontological, even though it is true that philosophers' ontological commitments can beget their methodological ones or vice versa. It seems then that if we take each philosophical position and find either an application of the razor, a direct commentary on its justification and/or use or a discussion of simplicity, we should be able to find a solution to the problem of what justifies this inference.

The reasons I chose these writers are somewhat diverse, as the writers' own positions. Aristotle has an argument for the razor that has not been assessed, as far as I can see. Aquinas has an argument *against* the existence of God which employs the razor. This argument has great ontological significance. The existence of God, of the God of Aquinas would imply that the world is rational. Ockham gave his name to the razor, so there ought to be a good reason for that. Sober invoked both Quine and Hume in his writings (Sober, 1981, p.155). The aim here is to use the resources supplied by the author to investigate a grounding for the application of the principle, particularly in cases of ontological significance. The principal criterion is to find some way of grounding the principle that is not circular, nor in some way leaves one with an ontology that seems to contradict the principle of parsimony¹.

¹ The principle of parsimony is another name for Ockham's Razor.

Nominalism is one such position in the constellation of philosophical positions. It is ontological commitment espoused by Ockham (Maurer, 1978, p. 247). Its content is that there exist no real universals, with the implication that reality consists solely of individuals. So ‘man’ outside of the set of individual men and women does not exist except perhaps in our minds. Some radical versions of nominalism even hold that there is no ‘humanity’ or ‘human-ness’ and what we think this is purely a matter of our construction. Put differently, the content of such a term as ‘human’ is arbitrary. Thus, there are no essential natures or necessary connections or universals. Even further, we may think that ‘red’, outside of cherries, barns and roses, does not exist either. This latter position was Quine’s (Sober, 1981, p.150). This is opposed to the realism of Aristotle and Aquinas, which involves saying that there exists something real in common between you, me and Socrates, which is usually referred to as an essence, form or nature and in this case is “man” or humanity.

On the face of it we can see how the nominalist gets his case off the ground against the realist; he shows that we can account for something without reference to some universal predicate. So, humanity exists simply as a collection established by a kind of successive addition¹ whereby we add together all our experiences of humans² and through this compose a linguistic term which we in English call ‘humanity’. This ‘humanity’ need not exist outside us. In this way, nominalism and philosophical empiricism, the view that all knowledge comes through experience, are aligned projects. There is no need at any point in these two projects for ‘humanity’ to exist independently of the individual experiences or instances, and so by applying Ockham’s razor we can dispense with the claim that this distinct universal exists.

The razor is associated with Ockham since he is interpreted, not as its inventor or advocate, but because of his widespread and implicit use of it in his assault on the realist scholastic metaphysics of his day (Feser, 2008, p.180. But also see Thorburn *the Myth of Occam’s Razor* (Thorburn, 1918 p.345)¹. He traces the expression (i.e., Ockham’s Razor) back to a scholar by the name of Hamilton, the logician (not to be confused with American Founding Father). It is also a kind of common cause in the scholarship that

² This is by no means a complete or the only nominalism possible. It is a mere illustration

Ockham rarely if ever explicitly stated some maxim of parsimony. It seems rather that Ockham simply had this principle lurking in the back of his mind as he was working through various theological and philosophical problems of the 14th century. Be that as it may, Ockham wrote substantive contributions to logic as well. The last point that I want to raise in connection with Thorburn is that he cites Mill with approval as saying that (Thorburn, 1918, p.352),

“The Law of Parcimony . . . is a purely- logical precept ". It is folly, to complicate research by multiplying- the objects of inquiry; but we know too little of the ultimate constitution of the Universe, to assume that it cannot be far more complex than it seems, or than we have any actual reason to suppose. The value of this warning has just now received signal illustration from the very recent discovery of Chemical Isotopes,- which has proved (e.g.), that what had previously been simply- called "lead" is infinitely complex in its composition.' This discovery ought to operate as a salutary check upon dogmatism, and the tendency to turn logical rules into ontological principles.”

This quote suggests that somehow a logical principle can stand on its own, without any deeper justification. In evidence of the notion set forward, Mill brings the then newly discovered isotopes which constitute lead, which presumably we are to interpret as evidence that the world/nature is complex. How are we supposed to know this; why should the fact (assuming Mill's physics) that lead has isotopes lead us to the conclusion that nature *is* complex and that therefore the principle known as Ockham's Razor is a merely logical precept? Which 'side' does the razor favour as an explanation, the isotopes, which are the parts of the lead and so therefore simpler than the lead, or the lead itself, which is its own thing, with properties that *possibly* might not find full expression in the isotopes? One cannot solve that conundrum about the razor without making some serious ontological claims, for instance about mereology and priority. To baldly assert that the principle is simply logical, because of this particular experiment, is in fact to make an ontological claim, namely that the isotopes, which can be said to be parts, are in fact generative of the lead.

Whatever one's view of Mill or what the value of the discovery of isotopes is to ontology, I have already made the point that the position of this thesis is one of disagreement with

the sentiments expressed by Mill. This principle commonly allows us to adjudicate between two explanations or (if we assume these two expressions of the razor are the same) to parse away some entities from our ontology. It allows us to make a judgement call, to break a tie when otherwise things could go either way, and parse entities away from our ontology. This presupposes that something undergirds this inference, whether it is ‘global’ (i.e., can be applied in all cases), and occurs even outside ontological investigations. A philosopher might want to ask the following questions, “What does ‘entity’ mean?” “What do we mean by necessity?”, and “What does it mean for something to be simpler than another, especially with regard to explanation?” But we can at least give some preliminary answers to the philosopher right now, even just for the sake of argument.

Necessity relates most properly to that which is possible and impossible and inferences that connect things necessarily cannot be otherwise. Most commonly necessity is connected with questions concerning causation. A cause necessarily begets its effect. *Entities* are things which exist, which can serve to explain or be explained. *Explanation* is an account of an entity or phenomenon however this is done. *Ontology* is the account of entities or existent things. For all things to be equal between two explanations they must both be able to account for the thing or event equally well which basically means that they must leave nothing out. *Simplicity*³ or being simpler would be not having any or at least having less parts, that is to say less composed, in the way that we might say that a composite bow is made from several parts of wood, whereas a longbow is hewn from one piece of yew, yet both are one thing. Both Aquinas (ST I-I QIII Pro.)⁴ and Hume (Hume, 1970, p.30)⁵ have statements that support this definition of simplicity, so at least as a provisional definition it should suffice. Hume thinks that it is simpler to bring many particulars under one concept, to reduce the number of principles, while Aquinas

³ It is controversial to define simplicity, as Quine says, since what it is seems to be relative to your *conceptual scheme* (Quine, 1953, p.103)

⁴ I have used an online version of the *Summa Theologica* found here www.newadvent.org/summa/1002.htm The text is divided into parts which in turn are divided into parts, which is what “I-I” refers to. These parts are in turn divided into ‘questions’ which are in turn divided into ‘articles’ hence the abbreviations. ‘Pr’ in this case refers to the prologue of the article.

⁵ See section 30 of the *Enquiry*. My copy is particular in its page numbers. Giving the section in the footnotes will hopefully assist the reader.

defines it in relation to God; God is absolutely simple, His essence is to exist, He has no parts and nothing in Him can be said to be 'joined'. Both share a common concern for uniformity, away from a disparate collection to a kind of order. Hume and Aquinas share sharp disagreements, so this is an unreflective and provisional community we have put them in.

Returning to the central question, one might object, "Since a complex explanation (involving many things) might be true and perhaps truer, than simpler and more-catchy slogan of an explanation, why do we think a simpler explanation is a better one at all?" To put it differently; let's posit two explanations x and y, in the case let's assume that x is simpler than y. Is there no reason to suppose that there could be another, simpler explanation (let's call it 'z'), of the same thing or event, which we would then be compelled as razor compliant individuals to accept? The connection then between any criterion for better explanations (like truth) and the razor is therefore accidental, since we can posit an explanation with no parts as the best. This explanation would posit absolutely nothing, which is absurd. Also, wouldn't it be simpler to simply track the relative truthfulness (or whatever criterion) of z, rather than superfluously search using a relative heuristic of simplicity? Even if there is an identity relation between the simplest explanation and the best, would it not follow that we could dispense with 'simplicity' as a criterion, and track the other criteria (like truth)? Similarly, one might object to the other formulation of the razor "*do not multiply entities beyond necessity*".

What I mean is, I believe we have two competing intellectual instincts: one suggests that any story or explanation that has too many things 'going on' is usually dubious, whereas the other suggests that we are also inclined to think that an explanation may take a variety of forms, and this may indeed involve complexity. We don't simply count the number of entities posited by two explanations (whether things are equal or not) and choose the one with the lowest number. Someone should be able in principle here to delete everything since nought is the lowest possible numerical value that we can give, but this would be to say that nothing explains everything, which is absurd. Nor does the lack of something's having a place in an explanation immediately suggest that we may assume

that that thing does not exist — much of the evidence for *horse* could also be evidence for *unicorn*, but we cannot move necessarily from that all evidence for horses necessarily excludes the possibility of evidence for unicorns. All we possess is evidence of horses, but we cannot therefore necessarily infer that *any* evidence for unicorns is actually evidence for horses, to do so would be circular and exclude the possibility of making a discovery.⁶ The two objections refer to the two expressions of the razor. They problematise an irrebuttable presumption of the connection between the simpler explanation and the best.

Ockham's Razor and the Law

A common-sense example may be illustrative of this problem I am trying to raise. According to Helmholz' survey of the uses (and abuses) of the razor in American law (Helmholz, 2006, p.122), in the case of *Justiss Oil Co. v. Kerr-McGee Refining Corp*, the plaintiff had lost three workers to an explosion that seems to have obliterated all possible evidence of what caused it. The presiding judge considered a range of explanations, but on the basis that it was the simplest explanation and thus the most consistent with Ockham's Razor, found that the workers of the plaintiff caused the explosion. Now, I would imagine that this is repugnant to the reader's intuitions about how such inquiries are to be conducted. We would like there to be some kind of evidence before we assent to a judgement of that gravity. Indeed on appeal the superior court issued a cautionary rule that Ockham's Razor could only be used after a careful analysis of the facts had taken place (Helmholtz, 2006, p. 122). The point that I'm trying to raise is essentially two-fold: on the one hand either the judge in this case was correct and the principle permits one to make judgements in the absence of evidence or we are to agree with the superior court and only use the razor *after* we have done "after a careful and proper weighing" of the evidence.

This would seem to put us in a quandary, since after we've weighed all the evidence in our inquiry, what use can we have for a principle like Ockham's Razor? In what way

⁶ Think what would happen if you told Aristotle about germ theory.

does the appeal to simplicity give us grounds for accepting an explanation, once I (or a court) has assessed all the evidence for one or the other explanation, why should I even consider the number of premises or the simplicity of an explanation? How do these considerations, the number of premises or entities or simplicity, which are abstract from any explanation we have at hand, play an assistive role in our determinations? Surely, once I have weighed all my evidence, for and against some claim, whether in law or elsewhere, I would assume the best explanation should presumably be evident, whether that has anything to do with truth or not. But this would leave us in a strange paradox, since it would suggest that the razor is *superfluous* to our reasoning, and then the razor would itself suggest that we dispense with it. The paradox consists in our having to use the razor to rid ourselves of the razor. This implies that the razor is necessarily ensconced in our thinking (if at all) and so our account of why it is indispensable will be essential to understanding what its role is in explanation. However, this leaves us with our first judge, who chose an explanation in terms of the razor in the absence of substantive evidence connecting the workers to the cause of the explosion, outside of the circumstantial evidence that they were there and therefore could have caused it. This would suggest a kind of *probabilistic* interpretation of the razor. Indeed, the legal phrasing being “on a balance of probabilities” in civil cases such as this one makes the very point. What I imagine is that we think that justice requires more connective evidence linking the workers to the explosion, even in cases determined on a balance of probabilities, perhaps say an established history of negligence on part of the workers.

On the other hand, the idea that it is the most *probable* explanation and the *simplest* is plain to see, given what evidence the judge had. In the absence of any evidence to the contrary, which is more likely, (a) that workers working on a dangerous oil rig caused the explosion that killed them, or (b) that some other, unspecified intervening event occurred? In this instance the razor gives us the truth on the probabilities. In the circumstances of this evidential vacuum, the judgement proceeds from the simplest explanation that connects the surviving evidence with the phenomenon to be explained. It is the best explanation of what happened given what was present but was also an inadequate one in that there was inadequate evidence for it. So, we have an instance of Ockham’s Razor bringing us as close to the truth as is possible. That there should have

been deeper inquiries is also obvious, but is that the fault of the razor? Why it seems to bring us closer to the truth, so is of interest to us here. If it doesn't, then we must account for the razor in terms of something akin to a brute fact, that the razor is nothing more than a product of our ape brain's inability to understand a complex world, or some variation on that theme. This is a repugnant contention since it leaves us in essence with no account of why we chose the simpler explanation, disconnecting our theory choice from what we intuitively think of when choosing between explanations.

The claim that the razor has nothing to do with the truth (or any other explanatory value) can be put in argumentative form:

1. Explanation is about or tends towards truth⁷ (or probability, or some criterion).

2. Using Ockham's razor (OR) in principle brings us closer to the better explanation, on the grounds that that explanation has less premises or is simpler.

3. **Therefore**, OR must have a connection to the truth (or some explanatory criterion), that is the result of using OR properly understood must be the best explanation in all cases.

4. Some true or good explanations are highly complex, even as opposed to their simpler rivals.

5. **Therefore**, truth, probability (or any criterion for explanation) do not follow simplicity, or if they do simplicity is secondary, and so simplicity is not a useful criterion (we ought rather to look at other criteria, like truth directly)

⁷ Let truth stand for any meaningful criterion for the choice of explanation, at least for now.

Premise 4, seems to be true. There can be no disputing that sometimes complex explanations are superior to their simpler rivals. A common-sense linguistic example of this is how we designate 'childish' explanations synonymously with 'simplistic' and therefore as a form of rebuke. We might even want to say that simplistic explanation and crudity are one and the same. So, sometimes we must content ourselves with complicated explanations. Further, political populism often is given as a term of derision, usually as the politics of the ignorant, since it is itself associated with simple explanations, if any real explanations are given at all. We can think of the judge in *Justiss Oil Co*, who simply asserted that his explanation was the best, with circumstantial evidence. One only has to imagine if the workers had survived, that a far superior explanation would have been possible. So, it would seem it cannot be that in all cases the simpler explanation is the best possible.

Further, a *reductio* of the razor is possible, if we were to imagine a religious zealot or advocate of scientism someone who reduces all explanation and inquiry down to either the will of God (perhaps as expressed in the holy book) or to some sort of crude materialism that would give answers that amounted to the same thing (You ought to believe p since p is true. P is true since it comes from the only source of true propositions, q). These two may use the razor like our judge, assert that their explanations are the simpler or the simplest possible and that therefore we are bound by the razor into choosing their interpretation of the holy book or science. We may remember also that these explanations have only one entity (or only one explanatory entity), either God or matter. In this way it seems as if the razor, far from being a tool of inquiry, is actually a tool for muffling inquiry. Naturally, we recoil at this suggestion, since posting one and the same explanation for *everything* is extremely simplistic.

But this means that 4 is true, at least for now. We can see that 3 must be true, if we are to maintain premise 1, since the alternative is to give up on the usefulness of the razor and say that only sometimes is the simpler explanation true, which is to say that sometimes the complex explanations are true. This is useless and so we might as well dispense with the principle. We can't give up on 2 without ending up in a similar situation than when we diluted the strength of the razor, since it can do nothing then. The

conclusion follows, so it means that a principle that states that only simple explanations are true or are universally preferable is misguided. The principle will still be misguided even if the qualification is given that all things must be equal, since sometimes, even after the careful and proper weighing is done, we can find that the highly complex explanation indeed is true. Either way we need to know why we should choose the explanation the razor commends. Earlier, I raised the twin spectres of religious zealotry and materialistic scientism. These caricatures of philosophical positions, however, usually lean on older and more erudite forms to lend credibility to their cause. I mean to suggest no analogy; the realist and the nominalist or empiricist would no doubt like to address this problem in terms of their position. I can safely say none of the authors chosen chose one of these repugnant positions, presumably by justifying why on their ontology this venerable principle has justified use and place. Presumably, however to some extent the razor justifies positions that one may come to in becoming a nominalist or a realist. This may beget a circularity in appealing to one's ontology to justify the razor, but without relying on one's ontology how does one justify one's appeal to the razor?

Putting aside for a moment the questions we have raised; I would like to take a moment to consider what the razor has been taken to mean in disciplines outside philosophy. Since the razor is a widely used, but perhaps poorly understood notion, as has been shown by the legal example. It is used in physics and in Bayesian statistics but also in many others; or there are claims to that effect in published work. I will focus on the first two, for reasons of brevity. I'd like to show how the razor has 'played out' in some more scientific literature. The reason for this is that the intellectual authority of science is well established in our culture and as stated the principle is used in science⁸. If a 'scientific' account of the razor can give us licence for the preference for simpler solutions from an authority we already accept, the inquiry I have proposed is at an end. As we have noted in the legal text that served as an illustration, there seems to be a problem in saying why simplicity or parsimony serves to improve an explanation, without articulating what that means and presupposing the principle to be proved, since it seems that the principle

⁸ The advocate of scientism (a scientologist perhaps?) would (or should) endorse any deference to science in any intellectual inquiry.

could be redundant, if we could show that it could only be applied in cases where we had done the relevant inquiries, making its results moot. The razor is in some way indispensable to thought, since if it is redundant, we should apply the razor to get rid of that which is redundant. But in this case the razor is the object of the parsimonious mind's ire. Therefore, razor is already being embedded in thought from the beginning, by a kind of necessity of logic. This suggests that it is 'in us', but is it in the world too?

Both the scientific accounts of the razor are in one way in agreement with the nominalist or empiricist attempts to understand the razor, in that they suggest that we don't need to assume that the universe is simple. This would be a metaphysical assumption. Yet it seems that it converse (that it is complex) has an easier time giving cogent grounds for the assumption that simpler explanation are superior to their opposites. Why? Because that's the way the world is silly, it's all really simple. Be that as it may, it could be that those metaphysical assumptions are unnecessary to understanding the razor. If we were to assume that nature was in some way simple, it would push against nominalism as a philosophical position, since nature having simplicity embedded in it, rather merely in *us*, would imply that some form of realism is true, since the uniformity of nature, that is the relation of particulars to universal would not only be a mental reality but also in the individuals themselves. Nominalism would imply that nature is complex since it has many individuals, each of which are as real as the other, whereas there being an actual simplicity in the Universe would imply a necessary connection. This shows more deeply how the approach to Ockham's Razor and one's ontology would be interconnected questions.

Bayesian Statistics and the methodological approach

One way to approach this is to use the tools of disciplines and methods outside of philosophy. Here we need not assume anything about whether or not nature is simple or about the particular existence of 'x' or 'y'; for if statistics or physics can account for the razor we need not make any metaphysical assumptions in our account of the razor. Let's call this approach *methodological*. This was in part the aim with the legal example: if courtroom common sense can lead the way in analysing the 'how to' of the razor, we

don't need philosophical analysis to take us to justification; there is no *metaphysical* problem. However, Helmholtz does not solve this problem, but rather concurs with appellate court in *Justiss* oil and also identifies the razor with a desire for simplicity, which leaves the principle unexplained (Helmholtz,2006, p.123).

Another approach, the 'statistical' approach, to analysing the razor has been proposed by statisticians of the Bayesian tradition in the form of two papers given by Jeffreys and Berger. I will focus on the 'younger' paper, since the contents are essentially the same, and so we can therefore assume that the latter paper to some extent better represents the views of the authors (Jeffreys & Berger, 1992, p. 64). The papers suggest that Ockham's Razor has Bayesian justification, in that a Bayesian analysis can show how the razor is not some *ad hoc* principle but is useful in discovering the superior explanation (Jeffreys & Berger, 1992, p.72). It does so on two grounds, first Bayesian analysis can show that in choosing the prior probabilities, we can quantify the scientific judgment that the simplest solution is more likely to be true, meaning that we can know the probabilities of a theory's being true prior to our experiments. Secondly, the simpler explanations have enhanced posterior probability, given their 'sharpness', which is to say a greater falsifiability, which is they are easier to prove wrong.⁹

Furthermore, according to the writers, these considerations agree with our '*intuitions*' concerning what makes a powerful explanation. I think this last point, that the considerations accord with our intuitions about explanation, makes an implicit assumption about the teleology of explanation, since a teleology reflects the purpose of a thing, if the purpose is fulfilled, then the thing is better, if not then worse. The above considerations reflect on the purpose of what an explanation is. In saying that the considerations reflect our intuitions of a strong explanation, the writers reveal an implicit teleology. Let's delineate these intuitions briefly; an explanation must not be *ad hoc*, that the theory does not have randomly added parameters, as new data is added to our store of knowledge. Second, the theory must account for the data, that is there must be as little as is possible which is unexplained. Thirdly, theories with fewer 'adjustable parameters'

⁹ According to the authors.

(i.e. simpler ones) have an enhanced posterior probability, which refers to probability of a given law or theory, subsequent to the collection of the data. This relates to the criterion of *falsifiability*: theories with less adjustable parameters have greater falsifiability. We must conclude that theories that are good are predictive. Finally, Bayesian analysis gives us tools to quantify theories, which implies that being quantifiable is a mark of a good theory.

If we were to accept the writers' implicit account of the teleology of explanation, we come to see why we might hesitate to accept the judge's decision in *Justiss Oil*, since in that case there was no 'data' (by any metric) to account for it or for it to explain, barring perhaps an absence of data, so the judge's 'explanation' failed to attain even the title of explanation. That is there has to be something (or *entity* to explain), if I assume 'data' is something, in order for there to be an explanation at all, and that explanation must be consistent with that data. If there is *nothing there* isn't anything serious for it to be consistent with, then how can it be an explanation? The question would arise, "what are you explaining if neither the data nor the 'thing' that the data represents even exists?"

Polynomials and six-power laws

Let's return to the two claims, the first of which was that Bayesian statistics can account for what a simpler hypothesis actually means and second that simpler theories have a greater posterior probability on account of their greater posterior probability. The writers give examples from the history of science and mathematics, but some from the day-to-day life. First, they define as *simpler* the use of a polynomial equations to chart Galileo's experiments regarding gravity, as opposed to six power laws. A polynomial is a mathematical equation from which one can plot a graph, whereas six-power laws give the data points in succession (Jeffreys & Berger, 1992, p. 65). Second, they consider the hypothesis that your friend is cheating in a coin tossing contest, if he has a reputation for such, as the simpler hypothesis. Thirdly, they discuss some of the statistics behind catching cheaters and plagiarisers. Finally, they discuss an interesting case in the rise of Einsteinian physics, that of Mercury's perihelion.

Jeffreys and Berger use Bayesian analysis to show that quantifying simplicity (in Bayesian terms) allows us to say that the simpler hypothesis is clearer, in their terms. The simpler theory divides the observable data into two sets, one of which is small but highly probable, while the other is large but low in probability. Theories with a higher number of adjustable parameters (i.e., more complex theories) distribute the probabilities more evenly among the possible data. The simpler theory will be consistent with the small but highly probable data set and therefore is more falsifiable.

In the coin-tossing example we are asked to imagine that we have a friend with a reputation for being a prankster. This friend comes to you with a proposal: let's toss a coin to see who does the washing up — if heads you lose. Imagine losing over eight or ten times in a row! Now, Jeffreys and Berger claim that in this case (where our friend has a reputation as a prankster), it is simpler to assume that the coin is a trick, two-headed coin, even at the outset *before* we have any results from the use of our coin (Jeffreys & Berger, 1992). However, even though we have our suspicions, we don't have sufficient evidence to deny his *bona fides*. It would take only one tails to come up to refute our doubts that the coin is legitimate. Therefore, the theory that it is not legitimate is superior to the theory that he's using a legitimate coin. Only one case of tails falsifies the entire hypothesis that he's using a crooked coin and given his reputation we might add all of that together to say that before we join the game, we think that the hypothesis that our friend might play a trick on us is both simpler and more probable. It also explains, in the event that it is vindicated, exactly why it has been vindicated, whereas the more complex theory leaves us with a 'just so' explanation that is also consistent with a crooked coin as well.

The point then is that the simpler theory is consistent with one set of observable data (e.g., all heads), while the competing complex theory tends to simply fit the same data because of its broad parameters. A similar point is made by the authors in terms of the cheaters (in multiple choice tests) and plagiarists (of computational tables of data) examples (Jeffreys & Berger, 1992, p. 65). The most substantive difference that is involved in these examples is that the mathematics involved becomes more complex and so quantifying the judgement involves more intricacies, as far as I can see. Another key

point of commonality between these three examples is that of falsity. True answers on multiple choice tests are hopefully to be expected, whereas if two candidates produce the *same* false results (given that there are a vast number of variations, including the completely true submission), one is given to infer that they cheated. Again, when two computational tables are the same, even where the original author has deliberately interfered with the data precisely to catch a cheater by changing the fives to either noughts or nines, the chances that they created the table *bona fide*, is miniscule. The authors argue that in cases such as these Bayesian statistics can quantify the chances of the simpler theory, so we can know that the simpler theory has higher probability, given it has less adjustable parameters (Jeffreys & Berger, 1992 p.67).

The authors maintain that use of quadratic equations as opposed to ‘six power’ laws to express theories is also an example of simplicity although, strictly speaking, the six power laws are more *accurate* to the data they represent. They do not get used by physicists purely in virtue of their excessive complexity (Jeffreys & Berger, 1992, p. 65). This suggests the ‘not *ad hoc*’ criterion of simplicity and for theory of explanation. The example given is of Galileo’s account of gravity, which can be represented by both kinds of equations. However, while the curve of a polynomial equation captures the seven data points of Galileo’s experiment less well than the six-power law, the polynomial extrapolates far better (Jeffreys & Berger, 1992, p. 66). This would seem to create a tension: on the one hand, the six-power equation makes exact prediction in terms of known data albeit retroactively and so seems to account for posterior probability better than polynomial equations, while the polynomial allows us to account for ‘later’ data better, without adjusting the theory or the curve in an *ad hoc* way. The authors claim physicists universally choose polynomial equations over their more complex cousins. This could be for reasons of practicality, which was a conclusion regarding the role Bayesian analysis can play in understanding Ockham’s Razor in the earlier paper’s conclusions (Jeffreys & Berger, 1992, p. 72), but has been omitted here, even though it adds a potential fifth criterion to the theory (teleology) of explanation in use, namely that it be practicable.

The tension that I am alluding to is this: that it is *either* the case that the simpler theory is more falsifiable because its predictions are sharp, and thus simpler and therefore preferable *or* that the theory that is simpler (as a polynomial) allows us to account for the data that comes (perhaps a bit more roughly) than a six-power law and in a less *ad hoc* but also less precise way. In short it seems as if what animates the choice of the polynomial is less to do with its simplicity *per se*, but more to do with its predictive powers in relation to a wider data set. This would put the choice of polynomials as the equation type of choice by physicists as being predictive, but not necessarily simpler in the same sense as is suggested by the authors in connection with its falsifiability.

The fact that simpler theories, theories with less adjustable variables, make one or fewer predictions that could be consistent with the data, while complex theories make more and vaguer predictions, which are if anything more likely, precisely because they are consistent with a wider variety of the outcomes, and thus are preferable to their rivals is most accurately accounted for in terms of considerations relating to the teleology of explanation, since it tells us exactly what to *expect* (according to the intuitions delineated above) and if not, then we must dispense with the theory. Such a theory has clear advantage over its vaguer rival, precisely as an explanation. In fact, one could contend that the polynomial is merely predictive, it simply assimilates more data under a certain description that is broad enough to capture it. This generates a tension between falsifiability of simpler theories, the generality of theory making and the predictive of theories that the writers praise. Further, we see the six-power law as purely descriptive or representational of the data and as unproductive. It posits no rule connecting point A to point B, yet the polynomial also only describes that rule. All it gives us is a rule which happens to predict the pattern the data will conform to, the connection between that equation and ‘gravity’ is passed over in silence. What I am suggesting is that there is a deeper connection, perhaps a necessary one, that is the true purpose of explanation, what Aristotle may have termed a *cause*.

Tentatively, I would suggest that the simplicity is therefore embedded in the act of making hypotheses, theories and explanations. Therefore, Bayesian statistics serves only as a possible description (perhaps a good one) of why simple theories are superior, since

it allows us to quantify various aspects of our explanations, such as the impact of adjustable variables. We would need to presuppose that being quantifiable is also a mark of explanatory superiority and in quantifying we presumably would use Bayesian methods. There would be a kind of circularity in asserting that Bayesian statistics can justify our inference that Bayesian statistics are the correct account of what makes our explanations better or worse.

Another point is that the notion of simplicity employed by Jeffreys and Berger, which amounts to having less adjustable parameters, implies non-statistical or non-probabilistic entities as constitutive of simplicity. An exact meaning or definition of an ‘adjustable parameter’ is not given by the authors. It is suggested by the examples. The example of coin tossing involves a clear difference between the two competing theories, namely the one theory that our friend is cheating us or what can be most accurately called a cause, the cause of the fact that all the coin tosses give ‘heads’ as their results, whereas the other theory is actually open to almost any explanatory possibility. However, there is a necessary connection between the fact of whether we have a succession of five heads in a row and the possibility of a two-headed coin and the possibility that such an event is explicable in terms of a normal coin. In the case of cheating, the cause is the guile of one or both of the parties, and the claim is falsified if any of their answers are not shared (or by another explanation), whereas the claim that they did not cheat is consistent with any data set because it is consistent with a ‘just so’ explanation for why the two students share the same answers.

Similarly, in the case the change of our understanding of gravity, from what is apparently called a ‘fudged Newtonian’ theory and Einsteinian relativity, there was a necessary connection between certain parts of the theory and the predictions. In the middle of the nineteenth century, when Newton’s theories were still dominant, a particular observation was made: there was a scientifically relevant discrepancy of 43 seconds per century in the prediction of Mercury’s perihelion. Predictions must be sharp. The writers point to three theories of the ‘fudge Newtonian’ variety, the first of which suggested another planet, named ‘Vulcan’, which had *sufficient* mass to make Mercury veer off the course that Newtonian physics predicted. A second theory suggested that the constant of gravity

was not 2, but 2^{+n} , where '2' represented the constant of gravity in Newton's terms and in essence n was a variable that allowed to fit the data. Lastly there was a theory that suggested space debris was to blame for the variegation of Mercury's perihelion. All these theories had an adjustable parameter that varied according to this problem. However, this is not the case with Einstein's theory of relativity, which predicts the perihelion far more accurately than Newton did and not in terms of arbitrarily adjustable parameters. Rather the prediction is a necessary consequence of the theory (Jeffreys & Berger, 1992, p. 69). It could therefore have been falsified had that discrepancy not been the case or the necessary implication of Einstein's theory excluded that possibility.

In the 'complex' cases of the 'fudged Newtonian' theory, the adjustable parameter is in one sense a kind of unknown, it simply adjusts to the data, and makes the theory consistent with it. Perhaps the point could be more specifically put this way: the adjustable parameter would be unknown prior to the data. The Jeffreys and Berger paper says as much in their conclusions, that the prior probabilities are those that are *before* experimentation. These probabilities describe the plausibility of a given hypothesis, so before we receive our data, the theory with less adjustable parameters would have one or more less 'unknowns' in it. So would be superior to its competitor as its parameters are better known beforehand. On the other hand, the complex theory fails to predict in advance of the data, which is to say it fails to predict at all.

So what I am suggesting is that the claim that Ockham's Razor can be justified as a form of Bayesian inference is actually circular, as a method it, accounts for probabilities and describes them. Bayesian methods are strictly speaking limited to the quantification of probabilities, which cannot tell us why one theory is superior to another, which would meander into the teleology of explanation. Without embedding the ideas beforehand, since they are not so much a part of the Bayesian analysis, but rather the theory of explanation. Furthermore, there are concepts such as *cause* and *effect*, prior to and better known that resist a purely Bayesian analysis but are part of what makes the inference to a simpler explanation plausible. These points are not disconnected. The teleology of explanation must be connected to the concept of cause and effect, indeed that concept is

central to the falsifiability of simpler theories which was the central feature of their superiority in Bayesian terms, according to the authors' own account.

The Bayesian is compelled to accept certain concepts, such as cause and effect, prior to and knowability. These are already embedded in the act of explaining something, even if one is doing so in Bayesian terms, these concepts cannot be reduced to the probabilities. A cause is necessarily the cause of its effect, something is either prior to something else or it is not, and likewise with being known, therefore these cannot be translated into a term of probability. The Bayesian analysis involves tools specifically developed for probabilities. Further, we might say that teleology of explanation and these concepts that lie behind the analysis of the probabilities are not themselves disconnected points. Rather, in discussing simplicity's role in explanation, we are bound to discuss the teleology of explanation. We might say that the teleology of explanation is to give us the cause, since that is what is involved in the falsifiability criterion. It follows then that the inference to a simpler explanation is not to be justified in purely Bayesian terms, but rather is accounted for in an analysis of these terms that have been enumerated above. I think, however, that these considerations are going to present insurmountable challenges to any form of 'methodological' approach to justifying the razor. This is not because of some privilege that I have arbitrarily given to statistics as a science, although it is a good candidate for such an approach since statistical methods pervade much of science, given its generality.

Physics

As we have said, science holds high degree of intellectual authority in our culture. Prominent among the sciences is physics. Several exciting developments have occurred in the relatively new area of quantum mechanics. The physicist Gerd Krizek has written a paper about the use of Ockham's Razor in quantum mechanics (Krizek, 2017, pp 1-2). It would be interesting to investigate what he has to say for those reasons.

The Copenhagen Interpretation of quantum mechanics is that the physical world is essentially probabilistic. Some have supported this interpretation on grounds of it being more parsimonious. Krizek's view is essentially that the Razor is justified as a form of

the economy of thought, without a real connection to the truth. This would squarely ground the razor as a kind of methodological common sense. Indeed, this seems to be the content of Krizek's argument, which is given as a kind of argument from dissensus, since a wide variety of interpretations, from 'many-worlds' theory to Copenhagen Interpretation, each assert that their theories are more parsimonious, citing Ockham's razor as the trump card which therefore favours their interpretation of quantum mechanics. They all do this while making wildly diverse and contradictory claims. This would imply that the razor is a methodological maxim, since it can be used by everyone in a given area or practice, but to justify differing positions, therefore it cannot be derived from features of the world or nature itself, such as that nature is itself simple. Therefore, the question is what methodological preference can we give that grounds our use? Krizek answers that it is a kind of economy of thought (Krizek, 2017, p. 12). The razor dictates that we don't multiple entities beyond necessity, that having less postulates in one's theories is more economical than having more and therefore we should choose the more parsimonious theory. If economy of thought is the principle that justifies the use of less entities, then the razor is a kind of 'wishful thinking'; it doesn't help us get to a true explanation, but only better one, in that it is more efficient in the sense of more economical to use. This is repugnant since the disputants in the field of quantum mechanics are being asked to abandon what they presumably sincerely believe on the grounds that it would be convenient to do so. What is convenient to my interlocutor in a disputation is entirely unpersuasive to me, therefore the razor has no *persuasive force*, except for the person who invokes it.

Now that a purely methodological approach to the solution of this problem has to some extent been removed, I think it would be germane to lay out how I propose to solve the problem using ontological resource. As was stated earlier, nominalism, empiricism and naturalism seem to enjoy the use of the razor. Indeed, Ockham was himself a nominalist. There is a lacuna here, as Aristotle has an argument for Ockham's razor in chapter 25 of his *Posterior Analytics* (*Posterior Analytics* I 25, 86^a 32-35)¹⁰. It does not seem to have

¹⁰ Like Aquinas, Aristotle has an 'internal' referencing system, known as Bekker number, in this case 86^a. These will be more useful to the reader as there are a number of translations and editions of translations. I have used Mure's translation for the *Posterior Analytics*.

been addressed nor analysed as such an argument but has been identified merely as a statement of Ockham's Razor. An Aristotelian formulation presumably involves some commitment to the metaphysics of Aristotle, which includes essences and forms, which is to say universals. As an account this would make it unamenable to nominalism, since certain features of the justificatory ontology would clash with the conclusion, namely that only individuals exist. As I said this lacuna of the potential connection between Aristotle's ontology and the razor has not been filled.

Writing in the Aristotelian tradition, in Question II Article III of the *Summa Theologica*, Aquinas argues *contra* his own position (as to God's existence) that since we could reduce everything to either human will (or reason) or nature and it is superfluous to do with more what can be done with less, we should not posit God that exist (ST I-I QII AIII Obj.2). For Aquinas, we can refute this claim by showing that both human reason and nature are imperfect, they would have to be perfect to razor away everything else. However, that need not concern us directly here What's interesting for us is the deployment of Ockham's Razor. The razor is clearly being used to dispense with something from our ontology. What's even more interesting is that, for Aquinas, God is divinely simple and if we assume that both renderings are the same,¹¹, then this principle that of OR must gets its justification from is the First Principle is ultimately, God. Therefore it cannot be used to rid our ontology of God.

Ockham himself was closer in time to Aquinas, but he was an early proponent of the *via moderna*. Bertrand Russell thought that Ockham taught that we could get rid of essences and substances. In fact, taught that essences and the individual substances (i.e. you and me) of the they were predicated (i.e. humans) such were one and the same (Boehner, 1959, p.93). Therefore, Ockham's picture is inspired by his understanding of the law of non-contradiction and the razor (Maurer, 1978, p. 440). I want to investigate the interconnection between these principles of his.

¹¹ "All things being equal, chose the simpler explanation" and "Do not multiply entities beyond necessity."

Similarly, Quine, a modern philosopher, cast in the nominalist mould wrote a terse paper on simplicity. Likewise, Sober is a philosopher of science who has written extensively on Ockham's Razor, including a book on the subject, *Ockham's Razor: a User's Manual* (Sober, 2015). Hume is a preeminent philosopher in the empiricist tradition. His *Enquiry* aims to resolve all truths that we can possess into either relations of ideas or matters of fact and ultimately experience. This too is a project in simplicity and the application of the razor.

So this is what I propose to do; approach this material 'experimentally', looking to see if any of these philosophers can solve the central problem proposed here that the relation between the razor and the ontology that justifies it. The problem is made complicated by the fact that the principle justifies results in ontology as well, giving rise to the threat of a circularity, as it seems that ontology could be posterior to the razor. Any serious solution to the problem, indeed any philosopher who claims (or does) use the razor to justify their ontology will need to overcome this problem.

Chapter II: Aristotle and Ockham's Razor

Bridging Introduction

The previous chapter laid out a fairly serious problem for the philosophy of science: how is it possible to justify, in a non-circular way, the principle of parsimony, if it is at all? I lay out some arguments which hopefully show why this is a problem, namely that it seems arbitrary to count the number of entities in relation to an explanation and simplicity does 'track' the best explanation, if the simpler explanation can only be used after careful waying of the options anyway? We assessed the Bayesian approach, which identified simplicity with a kind of falsification and disambiguation or clarity of hypothesis, which was thought to have a higher prior probability. While useful to think about, they were inadequate since they could not account for generality without compromising on clarity or the falsification criterion. This was because the falsification principle presupposed a form of *necessity*, which grounded our ability to say that, for example, the coin was *not* false since it came up tails. This necessity implied a causal picture that the probabilistic frame of Bayesianism could not account for. Krizek's account could not show why the *other* party ought to be convinced by the razor.

We now turn to our first 'proper' philosopher, Aristotle. Here I present an argument found in his *Posterior Analytics*. This argument is found in the context of a wider discussion of why affirmative rather than negative demonstrations (i.e., arguments with a negative premise) are superior. The argument (for Ockham's Razor) is in fact presupposed by the argument for why affirmative demonstration is superior since Aristotle claims that the negative demonstration presupposes two premises as opposed say to the affirmative's one (and so on). The negative demonstration must always contain a negative and an affirmative premise. His claim as to why the parsimonious argument is superior is grounded in his claim that it gets us to knowledge faster. This argument is however ensconced in Aristotelian ontology; In fact, I will try to show here that two relevant terms, *prior to* and *better known* necessarily contain certain ontological commitments, namely that of essence (as a universal) and cause and effect. Using these resources I hope in the conclusion to show how Aristotle's 'way' can at least tell us why

it is better not to multiply entities beyond necessity, thus showing why it is not arbitrary to ‘count’ the premises.

Aristotle

Aristotle’s name was once praised throughout the educated world, among Muslim and Christian theologians and philosophers, such as al-Farabi, Aquinas and Ockham, being referred to as ‘the First Teacher’ or simply ‘the Philosopher’. However, the scholasticism of the Middle Ages perhaps represents the high noon of peripateticism’s influence and Aristotle has been somewhat eclipsed since the dawn of Hume, Locke and Descartes. So whereas once he was an unquestioned authority on science and logic, he has been relegated to the dusty corner of ‘historical interest’ rather than a source of genuine inspiration for a modern mind. This perhaps explains why it is that although he is cited as having a version of Ockham’s Razor in his *Organon* (his logic) (*Posterior Analytics* I 25, 86^a 32-35), I can see no serious treatment of his justification for it (Baker, 2016). These citations are only a kind of ‘historical’ treatment of Ockham’s Razor, contextualising the razor historically as not ‘really’ Ockham’s invention, but as a widely used tool that pre-dates him (Baker, 2016) (Thorburn, 1918, p. 348). Thorburn says that there are statements of the principle in Aristotle’s *Metaphysics* and *Physics*. I would prefer to focus on the justification given in the *Posterior Analytics* since it seems to have been ignored in this connection, yet the passage in which it is found contains an argument for the justification for the principle that is the subject of this thesis.

Here is what I propose to do, I discuss the statement of Ockham’s Razor in the *Posterior Analytics*, in particular the meaning of the terms in light of the argument which Aristotle thinks justifies the claim, which in turn will give us an account of what is necessarily implied in the application of this principle. As has been said, Aristotle’s statement of the razor is found in chapter 25 of the *Posterior Analytics*, the purpose of which was to demonstrate the superiority not of parsimonious arguments but rather of affirmative demonstrations as opposed to negative ones. The parsimony of affirmative demonstration only assumes one postulate whereas the negative demonstration must assume both that something does and that another does not. Thus, the argument that

shows that affirmative demonstrations are superior implicitly relies on the argument that parsimonious explanations are superior. Let's turn to this argument:

We may assume superiority *ceteris paribus* of the demonstration which derives from fewer postulates or hypotheses- in short fewer premisses; for, given that all these are equally well known, where they are fewer knowledge will be more speedily acquired, and that is a desideratum (*Posterior Analytics* I 25 86^a 33-35).

Most obviously this invokes the expression of the razor that concerns itself with the number of entities, with a general preference for less complex explanations and with which Aristotle agrees. But I think we can also see something a little bit more exciting than that, namely in that it is reminiscent of the other common expression, i.e., the one privileging of simpler explanations over their complex rivals, since it contains the *ceteris paribus* condition. This is more to do with what and how we name the razor, has nothing to do with its application, use, meaning or justification, which are far more important to our inquiry. It means that we might be able to 'read' the common statements as essentially one principle.

Now at first glance this can be read as saying that we should choose the explanation with fewer premises because of a quickness of gaining knowledge, which seems to be somewhat of a mercenary motivation for a philosopher of Aristotle's calibre. It seems reminiscent of Krizek economy of thought justification given in Chapter I. But if we need to know each of the premises, if the demonstration proceeds from two or four premises or whatever, we need to know each of those premises already, we already possess knowledge of the premises, we haven't saved any time or work at all. This is so because one of the conditions for an Aristotelian syllogism is that the premises be *better known* than the conclusion (*Posterior Analytics* I 2 72^a 1-5). Perhaps what Aristotle means may become clearer if we examine the argument for *why* this is the case. Thankfully it is found in the same chapter.

For his justificatory argument, Aristotle posits two demonstrations (we might term them arguments) which have the *same* conclusion. I think this forms part of the *ceteris paribus* condition that Aristotle has in mind, in his example the conclusion 'A-E' (as an example)

must be proven by both arguments. This seems strange given that more often than not we don't think of dispute in cases where the parties share the conclusion, but it seems that Aristotle's (Ockham's) Razor, you'd need to look at how the competing arguments must have the *same* conclusion. Further, how does this work when there are disagreements at a metaphysical level? If the reader recalls, some invoke the razor as justification for their metaphysical views. For example, the atheist would argue that the assumption of God as a hypothesis is more complicated or unnecessary given the 'world' or the 'Universe' as it is. This of course presupposes that we could come to agree about what the contents of the 'world' or 'Universe' were. It seems that implicit in the *ceteris paribus* condition that there necessarily be the possibility of two demonstrations or explanations being simultaneously *ad idem* as to the conclusion. What is in dispute then is the principle or *cause*.

Let's use a less charged example: Socrates' mortality.

1. All men are mortal
2. Socrates is a man

Therefore, Socrates is mortal¹²

Now, one could get to the same conclusion through some other means (Aristotle uses the term 'middle terms') (*Posterior Analytics* I 2 721^a 10-15). All it needs is to bring Socrates 'closer' to 'mortality' (not in the sense of hemlock!) so that there are less postulates.¹³ We know there is an intrinsic connection between being human and mortality, so we don't need to put anything else as the reason. Therefore, middle terms ground the inference as a necessary connection. Now if we have a more and less intricate demonstration, the more intricate one will have a premise that is *prior to* and *better known* than the conclusion (whether it be 'A-E' or 'Socrates is mortal')¹³, whereas it will be at the same 'level', that is *not* prior to or better known than the *same* conclusion, when

¹² Aristotle's 'example' is that of bronze triangle. The question is asked how it is that the triangle is three sided, is it *qua* it being isosceles or is it *qua* being bronze.

¹³ Even more so with being three sided and triangular.

¹³ This is true of all demonstrations.

we remember that we must assume the truth of both demonstrations, since the shorter one will ‘end’ before the longer one.

I think that the implication here is that one and the same premise will simultaneously both be and not be *prior to* and *better known*. This would make the premise a contradiction, which, Aristotle defines as, “...opposition which of its own nature excludes a *middle*.” (*Posterior Analytics* I 2 72^a 12-15). That is if we can assume that *prior to* and *better known than* are somehow constitutive of a premise, in the sense that predicating these terms of a premise articulates some reality of the premise itself. This will give us an insight into why we must *therefore* arrest the longer demonstration. This in turn should give us a justificatory basis for Ockham’s Razor, since even if we assume the truth of every part of the longer demonstration, it still has this defect. I think that this is not an innocent fact, i.e., I think that it involves wider commitment to metaphysical entities. We cannot simply use the principle in isolation from its justificatory frame. There may be other ways of justifying the principle of parsimony but that is not the concern here. This kind of justification comes with a concomitant ontology.

Returning to the analysis of the argument, let’s lay it out:

1. A demonstration proceeds from premises that are *prior to* and *better known than* the conclusion and are assumed to be true.
2. If there are two demonstrations of the same claim and one is longer (i.e., has more premises), one of the premises must both be and not be a premise in the relation stipulated in (1).

Therefore, we may assume *ceteris paribus* the superiority of the demonstration that proceeds from fewer premises, since the longer demonstration has a defect even if you were to assume its truth.

As was pointed to above, there is possibly a premise in the longer argument which is both *prior to* and not *prior to* its own conclusion. In the argument these terms are then connected to the concept of a *middle*. In fact, in this connection the assumption is that *that* which is *prior to* is also simultaneously *better known than* the conclusion. What are

middle terms for Aristotle? In this passage, middles are seemingly equated with premises, postulates, or hypotheses. The earliest mention of this phrase ‘middle term’ is in the first chapter (*Posterior Analytics* I 1 71^a 20-22), which no doubt gives some indication of its importance to Aristotle, where he gives “For some things (viz. the singulars finally reached which are *not predicable* of anything else as subject) are only learnt in this way, i.e., there is here no recognition through a middle of a minor term as subject to a major.”¹⁴ The context of this quote is the recognition by a student of an instance of a triangle, the student has some pre-existent knowledge, e.g. that triangles have three sides prior to this recognition. The middle then plays the role of connecting an instance to a universal. The second occasion that the phrase ‘middle term’ occurs, is in chapter 2 of Book I where Aristotle defines contradiction (see above). It would seem then that we can know two facts, first that the middle is essential to coming to know the connection between the premises and the conclusion, further that by its nature ‘it’ has no contradictions ‘in’ it, so it must have something to do with a kind of ‘oneness’ or ‘unity’. I take that as a given since if there is no contradiction, there must be a oneness of a sort that stands in relation to this term. We saw earlier that involved in the middles is the notion of priority and this apparently implies being better known *as well*. These two are given in chapter II of *Posterior Analytics* as well, being discussed in connection with each other (*Posterior Analytics* I 2 72^a 1-5). Priority is for Aristotle in the sense of *cause*, with a cause being prior and an effect being posterior. A premise must be prior to its conclusion, obviously enough. Yet prior and *better known* have an ambiguity in them, since a thing may be known *better to us humans* or in the *order of being*, suggesting that we come to know things first through our senses, but there is also a form of knowledge which relates to the ‘order of being’. This implies that one could know things in at least one of two ways. Aristotle thinks that the *prior to* in the order of being is further from sense and more universal, while the latter, *prior to* us is nearer to sense. I think it might be possible that this gives us an insight into how it is that the rogue premise in the longer demonstration becomes simultaneously prior and not prior, since these are ambiguous terms themselves to Aristotle.

¹⁴ My emphasis.

I have tried to limit myself to the discussion of the terms discussed above in relation to the razor. However, is it not possible that could we simply agree that these are in some sense distinctions that apply to us, that being better known than the conclusion is not something that is in the conclusion, but relates to us in our position? Are these not just *our*, or more precisely *Aristotle's* way of describing or labelling premises? So, to think even if it is true that we ought to label these premises in this way, we cannot infer anything about which of the explanations is true or better. Also, how is it possible that demonstrations produce knowledge and their premises be necessarily connected to their conclusions, that the one be better known than the other? Finally, is there some distinction between *a premise* that is prior to and one that is better known? Do I need both distinctions, and if I don't need both distinctions, is it alright if occasionally a premise isn't better known or prior to?

If any of the answers to those three questions is 'yes' we may be compelled to admit that the Aristotelian justification for Ockham's Razor is inadequate, since I would think the number of premises being 'too high' is not a serious objection, like the Holy Roman Emperor saying to a famous eighteenth-century composer, "Too many notes, Mozart!". I'd also like to briefly recapitulate what we have already done and restate some salient features of the *prior to* and *better known*. First, we dealt with the statement of Ockham's Razor found in Aristotle's *Posterior Analytics*. Second, we moved towards understanding the *ceteris paribus* condition through the necessity of the conclusions being the same. We then moved on to the consideration of middle terms and the relation between them and the terms prior and better known. Out of this discussion it was found, I submit, that the basis for the principle of parsimony requires a solid foundation in metaphysics, in terms of cause and effect and essence. This has in turn led to our current juncture. Now, I would like briefly to pause to note that Aristotle is specifically discussing here what he terms 'scientific' knowledge. Our notion of science has changed, as was noted briefly in the introduction. What Aristotle has in mind as the paradigmatic case of a science is geometry, since object of scientific knowledge cannot be other than it is (*Posterior Analytics*, I 2 71^b 9-10). Aristotle's very strict definition of scientific knowledge as knowledge of causes is part of this distinction between *prior to us* and in terms of the *order of being*. The 'scientist' for Aristotle possesses knowledge of the

cause, which as we said cannot be otherwise, so it is the necessary cause. That which is *prior* to something else in terms of the *order of being*, not just say chronologically antecedent, must necessarily be the cause of that thing.

But this brings us to the statement of the Law of Non-Contradiction, brought up in chapter 1 of the text. The statement of this venerable principle lay in connection to the two kinds of *antecedent* knowledge requisite on Aristotle's account for us to acquire knowledge through argument: here is the understanding of the *meaning* of terms or the *existence* of the *fact*, and sometimes both are requisite. We are asked, "assume that every predicate can be truly affirmed or truly denied," (*Posterior Analytics*, I 1 71^a 12-15).¹⁵ A mathematician works with both definitions (or meanings) and assumes the existence thereof in some way, shape or form, since no one inquires into what does not exist. If we can assume that something that the definition of something exists, then presumably one way in which it does is in the thing of which it is the definition.

What is more important for purposes with regard to our inquiry into the meaning of *priority* and *better known* as predicates of premises (as a description of them), is that the antecedent knowledge is designated here as an instance of the dual assumption, that is that this *priority means* we assume the premise (or cause) is in some way *prior* in existence *and* meaning to the conclusion of the demonstration. This seems to be a far cry from any kind of inference purely based on sensory experience. Therefore, I would say that the scientific demonstration in the Aristotelian sense (*apodeixis*) proceeds from premises that are metaphysically *prior* to their conclusions and are similarly better *known*, since it is impossible that someone should learn a conclusion and come to knowledge in the sense given above, without knowing the premises beforehand, since I cannot know that 'p' is *caused* by 'q' unless I know that 'q causes p'.

Now let's turn to the questions I raised earlier. The idea behind this is relatively simple: if we can show that the predications of '*prior to*' and '*better known*' are in some way dispensable, we can show that the argument of Aristotle's in chapter 25 of Book I of the *Posterior Analytics* is bogus and reject the razor on Aristotle's terms. I will start with the

¹⁵ The example of 'meaning' is of a triangle being three-sided, 'unit' is the double assumption, unit being quantitatively indivisible, i.e. there is such a thing as being quantitatively indivisible.

objection and attempt to explain why it should in principle ‘destroy’ Aristotle’s position. Perhaps, however, it would be better first to refresh the reader’s memory of the argument.

1. A demonstration proceeds from premises that are prior to and better known (and are assumed to be true).
2. If there are two demonstrations of the same claim (that is the conclusion) and one is longer (i.e., has more premises), one of the premises must both be and not be a premise as stipulated in (1).

Therefore, we may assume *ceteris paribus* the superiority of the demonstration that proceeds from fewer premises.¹⁶

A relativity argument

The first argument (or question) is that if it were possible to say that the terms ‘*prior* to’ and ‘better *known*’ could be designated ‘labels’ or ‘boxes’. While these terms may be truly predicated of the premise, say that ‘premise x is *prior*’ is a true statement, it does not in fact mean that if it should be found that a premise is both *prior* to and not *prior* to the conclusion, we ought to choose the less encumbered demonstration, since the premise also fits into other ‘boxes’. In the same way, being *better known* or *prior to* are just some of the many labels we can designate of premises and it is absurd to say these two somehow being confused legitimates dismissal of an argument. All that we need is for something to be *known to us*.

In response to this, we might say something that is *better known to us* (and closer to sense and the particular) as a matter of redundancy, is indeed better *known to us*, therefore it cannot be the case, even epistemically speaking (as opposed to metaphysically speaking), that the same premise be at the same time better *known to us* and not. The ‘objection’ is, however, similar to that found in Quine’s *Simple Theories of a Complex World* (See Chapter V)¹⁷, particularly the relativity in which qualities we ‘weight’ more ‘heavily’ is

¹⁶ Middle terms should be present.

¹⁷ Quine’s argument will be given a fuller treatment in chapter 5, but for now let the reader be satisfied with the following brief account. As I read it Quine thinks that simplicity has a predictive power only insofar as it is the prediction made are already relative to our explanatory scheme.

essentially arbitrary (Quine, 1963, p. 103). However, if we assume that something exists then it is not arbitrary to say of it that it does. In fact, saying that it exists is the least arbitrary fact about it. So then, something may exist as that which is *prior to us*, as a particular. Yet this *prior to us* by its very nature implies *prior in order of being*, especially since every particular is an instance of something, a universal of some kind.

Argument from solipsism

The second argument: There is only one kind of knowledge, human knowledge, since knowledge, or at least the only knowledge that we can really talk about, is our own, it follows that the distinction between *better known* and *better known to us* is a redundant distinction or inappropriate, since everything we actually know is *known to us* and it is illegitimate to attempt to discuss what is *unknown to us*, at least to the extent that it is *unknown to us*, since I cannot truly predicate anything of anything I do not know (since by definition I cannot posit a reason for my claim). It follows then that everything is either *known to us* or not *known to us* and there is no further kind of knowing that we can seriously discuss. This means that a premise is either known or unknown, so either the premises of the argument are either *known* or not *known* to the student, thus it is impossible that the student should make a mistake as to whether the premise is *better known to us* or in the *order of being*, since it is either *known* or not *known*. Therefore, it is impossible that there should be a premise of the ‘ambiguous’ kind suggested by Aristotle in chapter 25, if we assume that the premises are all known, which is a criterion of the principle. If that is conceded, then the question falls, not as to whether the argument has ‘too many’ premises, but rather as to whether they are true or not. A similar argument can be supplied in relation to the notion of *priority*, since we have assumed that the conclusion is true, and that the premises are true, it is superfluous to discuss whether one or the other premises is *prior* in the *order of being* or ‘*to us*’. It follows then that the longer demonstration might be preferable, since it doesn’t matter if one of its premises is ‘both *prior*’ to and ‘not *prior* to’ or ‘*better known*’ or ‘not *better known*’, whether in the ‘*order of being*’, ‘*to us*’ or to an ass. Therefore, we can always choose the longer demonstration if we want to.

To respond, leaving aside questions as to the learning and knowledge of animals, which is a debate unto itself, and God, His foreknowledge and human freedom, which are also debates unto themselves, it becomes immediately debatable that we are the only things of which it is true to say ‘has knowledge’. Furthermore, it seems that there is *some possible* empirical evidence that animals learn, namely Pavlov’s dogs and circus animals. Whether that’s learning or not or knowledge or not, depends on one’s criteria. So, I will leave that alone, since to some extent it lies outside the parameters of my question. But the point is this either the parties genuinely disagree or they are equivocating about terms.

However, the possibility of disagreement with the person who avers that animals learn and acquire knowledge, I would suggest, implies Aristotle’s distinction of *prior* and *better known to us* and *prior* and *better known* in the *order of being*; firstly since what we would actually be arguing is what the animal has done is in *fact* an *instance* of learning — we have some universal or common definition with which we assume the other agrees (i.e., we share a conclusion) and dispute in accordance with that, regarding that which we wish to say the animal has done. It cannot be that the parties to dispute about whether Pavlov’s dogs have learned or acquired knowledge, agree about both the nature what of the Pavlov’s dogs experiment says and simultaneously agree about the nature of knowledge and learning, since there can be nothing left to dispute on that question. In short, the nature of learning, what learning is, must be agreed *before* we could argue as to whether the dogs have learned. In order that the parties be *ad idem* concerning what learning is, it must exist *prior to* any instance of learning, on pain of the dispute being circular.

The second option is that both parties are equivocating in this dispute. If the parties are equivocating, then the distinction holds, since it is impossible to equivocate without there being two senses of the same meaningful word. It is presumably possible to truly predicate either of the senses of that word(s), learning and knowledge in our example, of their *appropriate* object, otherwise one of them is just babbling. Aristotle defines an equivocation as “though they have a common name, definition corresponding with the name differs for each (*Categories* I 11a 13). An example of this distinction between a man (in the real world) and the ‘a man’ in a painting, both being in some sense a man,

but not in the same way, although they do share enough similarity *in appearances* (to our senses) for both to be called a ‘man’, they are sufficiently different to be thought and talked about in different ways, because there is an essential difference between the two. In fact, the one is *prior* to and the cause of the other and is better *known to us*, we encounter the man both chronologically and ontologically before someone can come up with a painting of one. In the same way, whatever learning animals do, on the account that denies that there is any knowledge that we as humans may discuss apart from human knowledge, must necessarily deny that that the learning or knowing that animals ‘do’ is ‘really’ that. The person who avers that the police dogs have ‘learned’ is at best speaking idiomatically, at worst nonsensically. But this presupposes the distinction between *prior to* and better *known to us* as opposed to in the *order of being*.

It may indeed be the case that the premise in the longer demonstration is equivocal rather than contradictory, which is why it is a stumbling block to knowledge since we cannot accept a demonstration with an equivocal premise anyway. From this perspective, it seems then that Ockham’s Razor is *prior* and *better known to us*, since it is only equivocal in what sense we are talking, thus the ‘rogue’ premise, that is the extra one, is merely equivocal. But, again, this fails to recognise that the premise that makes the syllogism longer will be both *prior* and posterior to the *conclusion*, which must be agreed to beforehand (recall the discussion of *ceteris paribus*)¹⁸, in the *order of being*, because it must add what is not *necessary* to get from the premise to the conclusion. I want to return to this later¹⁹, for now it seems that we have maintained the distinction between *prior to* and better *known* and *prior to* and better *known to us*.

An argument from modality

How is it possible that demonstrations produce knowledge and their premises be necessarily connected to their conclusions, that the one be better *known* than the other? So, if the demonstrations produce knowledge, and the premises imply the conclusion, then how is it that the conclusion is ‘less’ well *known* than the premise? Likewise, if the

¹⁸ see pg 24 of Chapter II.

¹⁹ see the ‘Conclusion’ section of this chapter.

premise is *prior* to the conclusion, but is necessarily connected to it, then it would be redundant to see the two as two things, one might as well see them as one, but then one cannot be *prior* to the other, so one and the same premise cannot be both *prior* and posterior or ‘not *prior*’ at one and the same time, so we can never say that this longer demonstration possesses such a premise. It follows then that such a premise is not either a contradiction or an equivocation, so we may always choose the longer demonstration, even if all things are equal.

This is to deny the possibility of something being a premise to a conclusion, that relations of *priority* and posteriority do not obtain. The conclusion and the premise need merely be accepted as true. This is to affirm that there needn’t be a connection between the two, in Aristotle’s terminology a *middle* term, sometimes also given as ‘middle’. In his paper *The Metaphysics of the Syllogism*, Halper argued that the position of the middle in the demonstration is essential to it being a demonstration of what Aristotle would term *scientific* knowledge (Halper, 2018, p.37) The positioning of the middle term is what distinguishes the scientific syllogism from what is termed in Aristotelian logic the syllogism of the fact, which merely connects some predicate to a subject (such ‘not twinkling’ and therefore being near) and a syllogism of the reasoned fact, which is what a scientific syllogism is, which would connect ‘being near’ and ‘not twinkling’(Halper, 2018,p.38). This middle plays the same ‘causal’ role, in the example employed: Socrates is mortal precisely because he is a *man*, and *not* the other way round, or because he has a beard or is bald or wears socks with his sandals. I know that all men are mortal, all I need now is to be led on to see that Socrates is a man and I *should* (perhaps provided I am a reasonably intelligent student) be able to see that *he* is mortal.

I think that this is the reason Aristotle says that the universal has the particular in it *potentially*, for the student, while in fact that particular is necessarily part of the universal, like Socrates is necessarily a human being, and *therefore* a mortal. This again ‘reinforces’ the distinction between that which is *prior* and better *known* and that which is *prior* and better *known to us*, since this *potentiality* (i.e., possibly being or not being the case, coming to be) implies the universals *priority* and being better known than the particular. We need the universal to know the particular. To wind back to where we

should be, the argument against Aristotle attempted to persuade us that the premise and conclusion were the identical since they were necessarily connected. This I think was shown to be false on the grounds that the necessary connection was in the thing and in us, but only comes to be *known* in us through demonstration (if you recall the premise had also to be better *known*, in both senses), so there *is* a distinction between the premise and the conclusion, and also between *prior* and posterior.

Finally, I wanted to raise whether the terms *prior* to and *better known* could be dispensed with, either one or the other, since any premise that was better *known* would also have to be *prior*, presumably in either sense, so it should follow that we need only one. In fact, it seems that both distinctions resolve themselves into the distinction between ‘*to us*’ and ‘*in the order of being*’. Since I need only this distinction and the other two have been dissolved, follows then that it is impossible that one and the same premise should at one and the same time be *prior* and posterior to and better and not better *known*, since these are meaningless distinctions. Therefore, there is no problem with choosing the longer demonstration.

This argument attempts to persuade us that the distinction between *prior* to and better *known* is (and not so) is meaningless, since it is superfluous to posit such terms. My first instinct is to point out that the conclusion of Aristotle’s argument that we’ve been discussing up until now, is presupposed by the critic, who is seeking to destroy it and say that we can always choose the longer demonstration. They presuppose it in that they aver here that if ‘x’ say is superfluous, as they argue that ‘*prior*’ and ‘*better known*’ are since we can do all the ‘work’ of these terms without assuming their reality, we may assume the explanation that does not do so is superior. But we do need to assume their reality in order to show that the principle that is the conclusion is true, without merely asserting it or presupposing it in a circle. So far then, so good, since I think I have shown the reader that Aristotle’s argument is ‘water-tight’, since the objection to the idea that one of the premises will say be both *prior* and *posterior* and thus a contradiction, either presupposes the possibility of such a thing ‘occurring’ in a demonstration, in virtue of the distinctions (which the critic denies) being involved in the critics own argument or that they presuppose the conclusion of the argument in their refutation of it.

There is one further objection which may be a nasty fly in an otherwise decent ointment. We may be asked, “Why is knowledge the *end* or purpose of demonstration or explanation?” Aristotle implies as much, saying that saying as much, the shorter demonstration gets us knowledge faster which is a desideratum. This implies that the teleology of demonstration is knowledge. In favour of this view that disjoins demonstration from knowledge, is Aristotle in the *Rhetoric*, where he designates an *enthymeme* a kind of demonstration and also a kind of syllogism (*Rhetoric* I 1135^a 5-10). We do not immediately think of rhetoric as supplying us with knowledge, in fact the opposite is more likely. Therefore, since not all syllogisms are productive of knowledge, it is improper to designate the teleology of the syllogism as knowledge, on Aristotle’s own terms.

On the face of it, one is tempted to dismiss the person who wishes to argue that demonstrations are not teleologically connected to knowledge, i.e., that their end is in knowledge, as being contrary to common sense and self-defeating, since they would use an argument, which would demonstrate that it isn’t so, which would produce some knowledge in us. But if the ‘end’ of demonstration isn’t knowledge, it would behove our interlocutor, who is arguing against Aristotle, more precisely the interpretation I have given, to say why demonstration did not need an end, since they would have *to use* Ockham’s Razor to argue for that conclusion and Ockham’s Razor works on the assumption that knowledge is the end of demonstration, at least in Aristotle’s case.

I would wish to avoid as much as possible here getting into the *Rhetoric* and so will avoid discussing the nature of enthymeme and the ends of rhetoric. But the point of the argument was to show that there was some forms of syllogism that did not necessarily produce knowledge, thus the ends of syllogism are not in knowledge. I will deal with this obliquely. Here we have been discussing Aristotle’s argument for Ockham’s Razor. In doing so, we have come to discuss some of the elements of his syllogism, particularly his treatment of premises and their relationship to the conclusion. If some kinds of syllogism, say enthymeme, don’t produce knowledge, it doesn’t matter since the premises of enthymeme do not have the same prerequisites. It follows then that even if there are syllogisms like enthymeme which don’t produce knowledge or don’t have to,

we have not been discussing them. Besides it is not even true that enthymemes are divorced from the truth on Aristotle's account, the truth and just being easier to prove (with enthymeme) than their opposites, and the end of rhetoric is to prove the facts as they are, which is to say that he think those enthymemes based on true premises are more likely to be persuasive, all things being equal (*Rhetoric* I 1 1355^a 5-10). Aristotle's account of syllogism in this case precluded the notion that there could be a syllogism which did not have its end in knowledge.

Implications

There were three terms which related to the premises for the principle of parsimony to work in Aristotle's terms and explain why it is that the longer demonstration takes longer to get to knowledge, since it has a premise that both is and is not *better known* than its conclusion. At least I hope that is what I have shown. One consequence of as has been repeatedly illustrated above is that this implies that there exist causes and effects. This is for us moderns perhaps difficult to accept. For instance, for Hume, gravity is a principle which we derive from the observation of air-suspended objects to take a downward trajectory (Hume, 1970, p. 30)²⁰. So, we observe this happening many times over and infer an idea (in Hume's terms) which in English is called 'gravity'. But this is not taken to be the *cause*. Rather what happens here is an explanation of the many by means of one. For Hume (as I read him), we cannot really know whether gravity exists or not. It simply explains what's going on.

But this leaves me in a small terminological problem. I have equated 'explanation' (which is the term favoured in expressing the razor these days) with demonstration in the Aristotelian sense. Demonstration in the Aristotelian sense is an almost entirely distinct notion from the example of Humean explanation. It follows then that I have equivocated in terms, unless we assume that if an explanation explains the thing it explains, it does so successfully, and we can then say in virtue of the successful explanation that it has given us knowledge of the thing or event explained. A similar thing occurs with a successful demonstration in that it gives us knowledge. In fact, an explanation would, if

²⁰ See chapter 26.

it were true, necessarily presuppose a demonstration, since it would require some reason why 'x' explained 'y', rather than say 'q'. Without this, we can always say that the explanation is false. It might be gravity, or gremlins and gravity, or some other thing that explains why objects take a downward direction when dropped.

Presumably, gravity would account for all the instances of objects falling, and all other explanations should be dismissed, as their relation to the phenomenon, is ambiguous. In this way it would seem that it is overly-complex to posit the possibility of gremlins or the wave particle-duality being the explanation for why objects fall, in the first case since we doubt that gremlins exist and even if they did, their impact would be a dubious premise to posit in relation to the way objects, on the whole, tend to fall, since they too would be 'grounded'. Likewise with the wave-particle duality, the connecting laws and such that would join it to objects that we observe falling would be astoundingly long, so that it is far simpler to posit gravity as the explanation for the falling of objects.

I would like to remind the reader that we are here discussing first whether it is equivocal of me to treat explanation and demonstration as the same or even akin terms, in relation to Ockham's Razor. I think I have shown that the person who sought to deny that explanations and demonstrations were interconnected by virtue of a relation of *priority*, i.e., that demonstration in the Aristotelian sense is *prior* to whatever explanation is, must themselves presuppose that the simpler explanation is superior (so the razor, and therefore the terms justify it) or the terms that justify the razor. So on the one hand, if you deny Aristotelian causation, you would be compelled to say that the razor enables you to do so, but the Aristotelian idea of causation undergirds the razor, because the '*prior to*' and '*better known*' distinctions and '*to us*' and in the '*order of being*' distinction are essential to the argument put forward by Aristotle. Without these attributes of the premises (there are others as well) you cannot say how you remove *cause* in the strict Aristotelian sense, since you cannot account for what justifies the razor without it. Put it like this: the reason gremlins (or even dogs or people) don't explain gravity, is that there is no intrinsic or essential connection that exists in the two — if you

posit one you've accepted Aristotle's causal picture of knowledge, if you deny that there is, you must affirm the razor, which is to affirm Aristotle's causal account of knowledge.

Conclusion

The goal we set was some sort of solution to the problem of what justified Ockham's Razor. An analysis of the argument laid out in chapter 25 of the *Posterior Analytics* relied on a particular understanding of the terms premise, middle, *prior to* and better *known*. These terms implied that there needed to be a necessary connection between the premise and conclusion. This in turn implies the existence of causes and essences. If we recall the argument made at the beginning that it seems arbitrary to count the number of premises in relation to the question of which solution we ought to choose, this argument and the ontology it is ensconced in supply us with adequate reason; firstly, the longer demonstration has a defect in one of its premises, if we assume the truth of both arguments. It was simultaneously *prior to* and not *prior* and *better* and not better *known* to the conclusion, that is it both was and was not the cause of the conclusion. This is a contradiction that cannot be sustained. The ontology explains this fact since the essence must be the formal cause of the thing it is the essence of. In short, in a demonstration that proceeds from a longer list of premises, one of its premises must be unnecessary if all things are equal. If we consider our coin tossing example, the coin that is crooked has as its cause an essence such that by definition the crooked coin will always produce a heads result. The 'other' hypothesis will necessarily be increasingly far-fetched (on an analysis of the probabilities) if the data of the results is treated as a conclusion. There will of necessity be either a 'just so' aspect as if the fates aligned to produce this result or increasingly far-fetched tales about why there are no tails in the results, which will themselves require proof to be accepted. Neither of these gets us to our goal, which is to know why there are no tails in the results, as quickly nor as well as the shorter demonstration.

Chapter III: Thomistic Divine simplicity and Ockham's Razor

Bridging Introduction

In his polemic against religion *God is not Great: How Religion Poisons Everything*, Christopher Hitchens argues that Ockham's Razor (indeed Ockham's work itself)²¹, leads inexorably to an atheist conclusion (Hitchens, 2006, p.70). . It is doubtful that Ockham himself would have entirely endorsed this interpretation. However, this argument has a direct analogue in the work of St. Thomas Aquinas. In Aquinas the argument runs that since everything can be reduced to either an act of human will or to nature and it is superfluous to posit more with what can be done with less, we needn't posit the supernatural entity known as God. The following chapter will give a brief overview of Hitchens' argument and show how it is of a kind with Aquinas's own objection to his own position. Next, we will analyse how Aquinas' reply works. This is to isolate what he might understand by the razor. Finally, I want to show the connection between the razor and Thomistic divine simplicity. This last point would show the impossibility of using the razor in the way suggested by Hitchens and company, the purpose here being to show how the problem of justifying the razor and the problem of the connection between ontology and methodology are themselves intertwined.

Hitchens

Hitchens' argument is that we can use Ockham's Razor is not only found in his book but in videos one can find on YouTube as well. I will stick to the one found in the book (Hitchens, 2006, p.119). The argument is given in the context of the book's wider purpose of pitting reason against religion, and specifically where Hitchens is concerned to show that people like Ockham, who were philosophers of quality, were compromised in some way by their religious faith. Hitchens' treatment of Ockham would no doubt be rejected by Ockham since one of his principles is divine omnipotence (Maurer, 1978, p.426), a premise Hitchens as an avowed atheist is bound to reject. Whether Hitchens or

²¹ In the next Chapter, I refer to Ockham and this problem. I don't wish to comment on Hitchens approach to Ockham, I am only using Hitchens use of Ockham. Hitchens was not an Ockham scholar, and so to do so would be unfair. My only purpose is use the arguments he used as he seems to me to have understood them.

Ockham is correct need not concern us here since it is the principle that Ockham gave his name, that of parsimony, that is under scrutiny. Hitchens (and others like him) are entitled to use any principle that can be justified, provided that the principles themselves do not contradict their own terms.

Hitchens' treatment of Ockham runs in two parts, one of which deals with an astronomical example concerning light and the *existence* of the stars²² which is then connected to the razor. Ockham, we are told, was concerned with the stars. God's omnipotence is such that whatever exists, my knowledge thereof need not depend on the existence thereof. The razor is then applied, "Do not multiply entities beyond necessity"²³. We can therefore get rid of the stars, or at least, we can have perfectly working theories without that assumption. Now we need only extrapolate and to think that we need not posit God, since all of our theories about the world work without that assumption. It is for this reason that Hitchens gives Ockham a dubious laudation as a proto-hero of the Enlightenment in preparing our minds for atheism, with his razor (Hitchens, 2006, p.70).

A version of this argument is found in the *Summa Theologica* of St. Thomas Aquinas, which is unsurprising, given his reputation for looking for arguments against his own position. The argument runs that since we could account for everything through principles other than God, such as human reason and/or nature, it follows that it is superfluous to posit His existence (ST I-I QII AIII Obj.2). The main thrust of this objection is this: since everything can be explained without reference to God, we should dispense with the assumption that He does in fact exist. Our theories work without the assumption. This is the substance of Hitchens' argument, and therefore how Aquinas addresses this objection, by extension, addresses Hitchens. The gist of the reply is that both these things, human reason (or will) and nature, trace back to God as their necessary cause since nature(s) do not contain within themselves their own ends nor does human

²² The distinction between existence and simultaneous existence is not made by Hitchens.

²³ In this same connection, Hitchens refers to "whatever can be explained through positing something distinct from the act of understanding, can be explained without positing such a thing."

reason. In essence, the claim is that everything that is defective must still have a necessary and perfect cause (ST I-I QII AIII Rep.II).

Whatever one's attitude to the substance of the reply, I want to discuss the 'Aquinas' razor. I want to do this for a number of reasons, but most obviously that Hitchens or anyone of his position must already simply deny that everything can be traced back to God and can be reduced to one or the other, of nature or reason (or some combination thereof). I want to try a different tack. If in the treatment or understanding of the razor we come to realise that the justificatory ontology necessary for the assumption of such a principle excludes atheism as a matter of principle, Aquinas can mute Hitchens and his ilk on this line of argument in a way which I think has not yet been explored. Indeed, it is quite telling that Aquinas does not (as far as I can see) explore *why* this is a principle at all. One explanation may be that he simply assumes it after having read the *Posterior Analytics*. In its statement it runs like this, "it is superfluous to suppose that what can be accounted for by a few principles has been produced by many." Whatever the literal wording is here, the principle is taken to mean, in the objection that if we find that the positing of something's existence is superfluous, we can say that it does not exist. This is important as it is the sense in which Hitchens (and presumably any atheist) must take the meaning. This is important as neither party can be said to be talking at cross purposes, since they agree what the razor means.

Now I wish to make the 'move' that Aquinas could make to outmanoeuvre Hitchens and at the same time give us an account of the justification of the razor, it must come by one of three ways: a) the razor as a principle is in some way imbedded in our reason and is in that traceable back to God as necessary being, b) in a similar way with regards nature or c) simply and directly from God. The principle then emerges directly out God as being necessary being. If any of these accounts is correct, Hitchens argument has been muted. However, one obvious objection is that this 'move' is that it is in a deep way circular since it builds the conclusion (that of theism) into the justificatory premise: atheism is refuted because the razor it uses presupposes God, which is to say the Thomistic God, which loads the dice in favour of Aquinas's position unfairly.

So, we now have our question, “Is it possible to account for Ockham’s Razor using a Thomistic ontology, while not being circular?” Let’s lay out some parameters with regard to this exercise that both parties should agree to:

1. That the razor permits us to omit objects from our ontology, that is deny their existence.
2. That the razor is justified in a non-circular way.
3. That the razor is, in a sense, *relative* to an explanation (remember Ockham’s astronomy).
4. Consequent to 3 and 1, if we find that a thing has no use in any known explanation, we can deny the existence of that thing.

Now this implies that for Aquinas the act of explaining must be traceable back to God, either as natural things are or human reason is, which he claims (at the end of the Reply to Objection 2) is in either case a result of the fact that anything that is defective or can fail, necessarily presupposes something that is self- necessary and unchangeable (ST I-I QII AII Rep.2), which he claims is what we mean by God. If this is correct then the argument from necessary being may be our doorway to the grounds of Ockham’s Razor, since it connects both nature and human reason.

As I understand it the argument, it has two stages or parts, the first of which moves from the existence of things that are possible, in the sense that they could either exist or not exist, like you and me. There was a time when neither of us existed and there will come a time when the same state of affairs will again pertain. In the interregnum, we will be, but even then we will decay with age, get ill and injure ourselves. All of this points to our not being a necessary feature of the universe. But the same can be said of pretty much everything. For instance, accepting modern physics our own Sun is a star around four billion years old, and was formed in a nebula out of a compound of gasses, namely

helium and hydrogen. It will like us, eventually ‘die’ and could form a black hole, the fates of which we have yet to discover.

Whether or not or to what degree that picture is accurate, if everything is like us and our stars, there should have eventually been a time when there was nothing, since everything will eventually die or be destroyed if it is contingent in the sense supposed here²⁴. Now nothing in this sense is the absolute absence of all. There cannot even be matter or energy to be conserved. So, there could be nothing from which something could be formed. Any attempt to say that something could happen after this state of affairs came to be, would betray a misunderstanding of the desolation we are being asked to hypothesise, since there can be nothing from which the succeeding event that would give evidence for why this latter, post-apocalyptic event took place. The second stage moves from this conclusion; there must therefore be at least some necessity in things. But things may have their necessity *caused* by something else. There cannot be an infinite regress of this process, so something must be ‘self- necessary’. This we call God.

The other four ways are all wonderful and interesting arguments, but this is the most explicit connection between the two ‘things’ to which we may reduce all of reality. The other arguments, particularly teleological arguments, have their own virtues, but for reasons of space we cannot draw the line that accounts for all five of the ways. Returning then, it seems that if the argument from necessary being proves that human reason is always traceable back to God, it would be in this way; since we do make mistakes and our knowledge is limited it may be said that in this sense our reason can fail or is in some ways defective. Yet we can know, despite this imperfection, our reason is traceable back to God in that, when we see the variety of objects which make up our world, we want to know the cause of them, what generated them and likewise our minds like to wonder what may have been the cause of those causes and so on.

We realise that this process cannot be infinite and we come to God, who grounds the necessity of caused things as that which is ‘self-necessary.’ God then grounds my knowledge of the things which have caused necessity as the ground of their necessity, in

²⁴ All that contingent means here is not necessary and not immortal.

fact God as First Cause, cannot be known like anything else, since His nature as First Cause is involved in our ability to reason in the first case, He is involved in the act of us thinking or reasoning, so we could not come to know Him like anything else.

In a similar way God, grounds nature. As we showed earlier, the cause of things finds its grounding in the uncaused necessity of God. But if everything were to be reducible to its nature or Nature as such, there would be no defect in nature. But given that there is defect, this cannot be the case. Therefore, nature does not contain within itself its own necessity, in the strong sense that Aquinas suggests with regard to God as necessary being. The fact that the two, reason and nature, mirror each other allows us to know the world. It also suggests the importance of teleology, since we can know both are in some sense defective, we know they're imperfect because of God's unique perfection.

This all seems very interesting as a possible account for the connection between our minds and the world, but as an account of Ockham's Razor, we seem to have wandered very far off the beaten track. Now if we assume that explanation is a 'product' of our reason, which to say that only that which is of reason could possibly give us an explanation. Therefore, the razor is traceable back to God. That means that since God is the necessary being, we should not posit more entities for what can be done with less? Explanation connects our minds to the world, it is our reason seeking the cause of the connection between things, at least for Aquinas (Maurer, 1951 pp 175).

Now for Aquinas, since only one thing can necessarily be *the* cause of another, in the sense that why does so-and-so have the capacity for reason? Because he is a man, and why did the cat sit on the mat? Because there was a fire nearby and it was warm and warmth is a cause of comfort. That is provided we are correct. Strictly, speaking and depending how exactly we have framed our question and the *kind* of question we are asking, there is one cause for why this or that is the case, whether it is the existence or manner thereof that we are discussing. Concomitantly, whatever explanation we give why something (rather than something else) is the case is measured by giving the cause of it, and in brief that's the end of explanation. An explanation that gave more than one or multiple causes would confuse the issue, since we would be compelled to ask which of the two causes generated the result that was under discussion. This would mean that

there was some possibility in the explanation that indicated that it could be either cause A or cause B or both that generated the reason why. We don't need that kind of confusion in our analysis.

What I am trying to point to is this, if there are multiple causes, assuming that at least one is the cause in the sense of being the necessary cause, the others are *possible* or made possible in relation to the conclusion, which is what we are seeking. Our cat may have chosen to sit on the mat because it thought that the mat or rather the fire was warm, or that both of these were the case. What immediately jumps out to me is that this is almost irrelevant as the cat is seeking warmth. The warmth is what the cat wants.

Now if we are to debate why the mat is warm, we come almost naturally to the conclusion that it is because the mat is near the fire, not that the mat is itself intrinsically warm or that both are necessary. In fact, should we go with the latter explanation, we need a reason as to why the mat has this hitherto unobserved property of generating heat sufficient to attract a cat. Maybe it is electric. However, we have our natural explanation and needn't posit a mysteriously warming mat or electric adaptations, as we already have our cause. We would have to multiply the number of entities here by at least one, say that the mat is electrical and is therefore warm, while simultaneously also conceding that the fire that is nearby is warm. As an explanation of why exactly the mat is warm, both parties will agree that the fire's warmth should be sufficient, the alternative explanation is only possible, unless we *know beforehand* that it is in fact an electric mat *and* it is on. Then we do have multiple causation as regards the warmth of the mat, less so in fact, in the sense that the mat is more properly said to warm because of heating of the element than the fire.

If we accept what has been said, that the cause is necessarily the singular cause of that thing or inherence of some property in a subject and that if we posit multiple causes where less or one will do, that we introduce some degree of *possibility* into explanation where what is sought for is a *necessary* cause. Now if the argument from first cause was accepted, it follows that that which is possible is, but only if it has for its explanation a determinate cause. The introduction of possibility would imply that that the explanation which has more causes, one of which would be both a cause and an effect. If we consider

the cat's mat, if there's no electric mat (that we know of beforehand), then the mat is warm because of the fire is the simplest explanation hands down. We need not posit of any intrinsic features of the mat or that area. If we do, we are adding unnecessarily to the explanation. These additions would come *after* the line of enquiry had captured all the necessary parts that needed to be explained. This would mean that in a sense they're posterior to the event or thing to be explained and in that sense are not an account of the causes of the thing to be explained, but rather caused by the thing or event to be explained. One could think of the lies our cheaters in Bayesian analysis discussed in Chapter 1 could contrive to account for why they had the exact same wrong answers. The lies would have to be so contrived as to fit the relevant circumstances at least *prima facie*, but simple investigation of the facts would no doubt reveal the artificial nature of the statements and purpose of the artifice, to conceal the truth. In that way they could be viewed as an effect of the circumstances, rather than the giving of causes. This would be a contradiction since something cannot both be and not be the cause (as an effect is) of one and the same thing.

Essence and form

One may be wondering where the necessity of the necessary causation comes from, why is it not the case it that only the Necessary Being (Aquinas's God) is really necessary? We assume that the sequence of causation depends on a necessary being which grounds the necessity of the causes of possible things. What is this 'intervening' necessity between us and God as necessary being? We have been assuming this kind of causation, that it exists, so would it not be simpler given that God is the cause of all, not to dispense with the intervening necessary causes? What we are asking for is what is called in scholastic terms an account of essence or form. Essence is the 'what it is' of something; it answers the question as to what defines the thing. It can be contrasted with matter (Taylor, 1979, p. 507). For Aristotle, things are compounds of matter and form (Maurer, 1951, p.165). They are of course what they are, so as a man is a man, but also what they are made up of, their parts, such as a man's foot, the bones, the flesh etc. These latter things comprise the matter. It follows from this then that things like human beings are compounds of matter and form. Aquinas agrees with Aristotle on this.

What is however seemingly problematic is that as form is in actuality and is nature or essence, therefore that form should have matter and by implication, potentiality in it.²⁵ However, if the opposite is true and forms have no potentiality, then God loses His unique status as pure being. If the only necessity we have is divine, then we have what has been termed a ‘modal collapse’, everything becomes a necessary consequence of God’s Will. This would be in some way a very parsimonious theory, everything can be explained (in principle) by reference to one principle, namely God. The problem with this view is that it gets rid of the necessity (the intervening kind) by which we were able to infer necessary causation as the principle of explanation. Since everything might be otherwise, we are left without an account why we need to posit a necessary being. We cannot therefore use Ockham’s Razor to get rid of the necessity which grounds it as an inference.

At least we have grounds now for positing the existence of essences and forms; to deny the existence of universal essences or forms involves, if one wants to use the principle of parsimony to eliminate them, one will need presuppose their existence in order to justify the principle., their existence is in evidence by virtue of the things of which they are the definitions, almost by definition. To deny this would be to deny that a man was evidence for the existence of man. Be that as it may we might want to posit that these things have little reality outside of our ways of naming or thinking, that is they have a strictly mental existence. This particular issue would take us into the controversy around universals, a controversy of the Middle Ages as ink-soaked as the battle fields of Poitiers and Agincourt are with blood. So, to go into it, would be to go beyond the ambit of a thesis concerning Ockham’s Razor and its justificatory ontology. Therefore, I will attempt to confine myself to Aquinas notion and understanding of essence or form and show how it either grounds or could fail to ground the appeal to Ockham’s Razor.

As was said before, the essence is the means by which we say that something is what it is. It is the thing’s nature or definition, making it what it is. Aquinas’ writings on this

²⁵ There is some issues here concerning Aquinas as opposed to Aristotle and Averroes (Ibn Rushd’s) view on essence; Aquinas maintained that he was in fact following Aristotle and Ibn Sina (Avicenna), whereas it seems that he and Aristotle where really at odds. See (Maurer, 1951, p. 165) and (Taylor, 1979, p. 506). However, this dispute is beyond the scope of this thesis. All that is necessary is that the essence ground some necessary connection.

point are vast and to attempt to exhaust the topic is not within the scope of what we are doing. In *Of the Divine Simplicity*, there are some statements that will be illustrative on this point. Article III argues that God's essence is His existence, in the *answering* section, where Aquinas gives his own arguments for his position, and does not state or respond to objections to the thesis claim of the article. The first point that seems relatively obvious is that the essence must be distinct from the thing it is the essence of, since essence only refers to that which is in the definition of species, I am not the definition of man i.e., humanity. Yet what I am is human. Aquinas resolves the impending identity crisis by pointing to the fact that I have matter, individualising matter, which has accidents. My flesh and bones are not your flesh and bones, yet we are simultaneously human, so the essence refers to that which we share as humans as a universal (ST I-I QIII AIII Con.) So, I am not identical with it but am in some sense made by it. Here,

Aquinas identifies the essence with the *formal* part of man, my essence is my form. This has no accidents and so presumably is what it is by necessity. This then gives us our 'intervening' necessity that formed the first part of the argument from necessity. Indeed, if you and I were only 'potentially' as opposed to actually human, it would be possible that we could suddenly cease to exist or turn into attack helicopters and back again. It would be impossible then to say that humanity exists then.

However, no human is necessary of itself, as was illustrated earlier in our discussion of the argument from necessary being. As solipsistic as I am, it does not change the fact that I am not the necessary being. This gives rise to the question in Article 4 on the *Divine Simplicity* where Aquinas deals with the question of whether the existence and the essence of God are the same. Now a substance (a thing with properties) may even have something in addition to its essence by virtue either of the constitutive principles of that essence, as a consequence of those principles in some sense contained within essence itself. The example that Aquinas applies here is of laughter: only human beings laugh²⁶ which is a consequence of our reason, as a sort of necessary accident of the human essence (ST I-I QIII AVI Con.). Secondly, something may be added to a substance in addition to its essence in virtue of some kind of accident. Now this can be seen in the

²⁶ Perhaps God does as well.

case of water being heated by fire. Water does not naturally of itself generate heat but does suffer this as an effect. This can be contrasted with how Aristotle defines the two ways in which something may be *essentially* predicated of a subject, namely when the subject contains the predicate in its definition as when I say, for instance, a triangle contains a line or in a different way as when, for example, *being* curved straight is necessarily predicated of a line, since the attribute contains the subject in its own nature or definition.

The purpose of this rather winding discussion of essence in Aquinas is to ground the discussion of the necessity of essences in the ontological justification of Ockham's Razor. However, there is a further issue regarding the metaphysical status of essences; in what sense can it be said that the essence of natural objects such as human beings contains matter? It would seem that they cannot as they are actuality whereas matter is potentiality yet at the same time most natural objects — contrasted with, say, mathematical objects — are material. Neither of these two issues could be discussed without a working understanding of essence. And yet the two are parallel, since the razor asks the question whether it is necessary to posit something as existing. The things that the razor can razor away, must be understood as things that do not necessarily exist. This means this means that the razor relates specifically two things set a compound of matter and form. So, if we can use the razor in metaphysics then the objects of the ontology that we are dealing with must be also compounds of matter and essence. This is obvious in one, sense that which must absolutely exist i.e., necessarily, not in the 'intervening' sense of essence under discussion here, cannot be razored away. I think we should illustrate this point earlier in the discussion with regard to the argument from necessary being. Yet it seems that if we were possible to include matter in essence, we could razor each particular essence (so man say) until we were, by accretion of annihilation, left with no essences which existed to justify the inference to the simpler explanation! Like Nidhogg at the base of Yggdrasil, gnawing away, the wielder of the razor hoists himself by his own petard.

Now let us turn to the question as to the potentiality in essence, the matter in essence. If it were not for essence as we illustrated earlier, there will be no determinate way of

predicating either an attribute of something, nor could we talk about there being discrete substances such as a distinction between man and dog, since we could always ‘turn’ one into the another. But what does this have to do with Ockham’s Razor? Let’s look at Aquinas’ example since we did look already at an example of accidental predication in the case of the heating of the mat. An example of Aquinas is that laughing is necessarily predicated of man and is appropriate to him. This is because rationality is the cause of being able to have a sense of humour and a sense of humour allows us to laugh, and rationality is essentially predicated of us. I do not want to get bogged down in the details of this point, so I would like to focus on the second kind of essential predication, since it involves some potentiality in what the thing is. If a line is either curved or straight, then there is some potentiality in essential predications. The being of the line that we are talking about, either ‘that’ straight or ‘that’ curved line, is determined by its essence, is to be either straight or curved. We can see immediately I think, but the essence of line contains within it potentiality, while the essence determines what the thing is in reality, its being.

It follows that the essence has potentiality and therefore matter. Aquinas puts it in this way: essence stands in relation to existence as potentiality does to actuality. We only think of humanity as actual *because* it exists (ST I-I QIII AVI Con.). Ockham's razor, at least as Aquinas articulated it, would enjoin us to dispense with superfluous essences or entities, since if the postulated entity lacks a necessary connection as was shown earlier when we were talking about cats and mats, it lacks an essential attribute of essence, namely necessity. That explains why it is indeterminate, and why it is possible rather than actual. Therefore, we can't razor away essence if it means that we can't know why we can razor away.

To recapitulate, we have then two arguments which show why we should remove from our ontologies that which is superfluous. In the first case it is because the ‘additional’ cause in the explanation, would be both a cause and effect which would mean it was self-sufficient in its being. A being of that kind would be a necessary being in the proper sense, since it would be self-sufficient and only one being can answer to that designation,

namely God²⁷. Secondly, as we've shown earlier, essence is necessary because it determines the being of the thing that is under explanation and the things that explain that thing. There's no necessary connection between those two things there's no necessity in positing the thing that has no necessary connection. Using both arguments, if we find that there's something that has no necessary connection to anything else and is always in probability, that is always possible and can be demonstrated to cause nothing (or not be the cause of something) if we consider the nature of nothingness as having the same 'properties'²⁸, we begin to see that the thing that's probably likely in this kind of *global analysis* as Aquinas's as Objection 2 suggests, we might as well say of that thing that it has only the potential to exist, unless it is an outright contradiction.

Genus and teleology

I would like to connect in a more explicit way, the doctrine of divine simplicity as Aquinas saw it to Ockham's Razor. There are still some philosophical gordian knots worth cutting, perhaps with the razor! One of these could be purely verbal, namely that sometimes Ockham's Razor is expressed as, "between two explanations choose the *simpler* one." There seems to be an obvious connection to be made between that expression and the idea that God himself is simple. At first glance this is merely a verbal connection. In fact one might object that is meant by explanatory simplicity and theological or metaphysical simplicity, can be two very different things. I think I've shown in the above how one might be able to connect those two in a less arbitrary manner than a merely verbal connection.

However, the objection is worth investigating. If explanatory simplicity is distinct in such a way that we cannot usefully rely on divine simplicity as a helpful concept in fully understanding explanatory simplicity then we must reject the argument that I have provided. I do not want to argue that the two concepts of the razor are distinct so I will assume that they are the same, but I do want to defend what has been said above, no matter how plausible the objection may sound.

²⁷ If we assume it is not a contradiction.

²⁸ The ellipsis is to emphasise the absurdity of saying that 'nothing' has properties

This is what I intend to do: I'm going to give Aquinas' definition of simplicity. This would enable us to at least be able to connect explanation to divine simplicity. He writes in the prologue of *'Of the Simplicity of God'* (ST I-I QIII Pro.), that the idea of God is strictly simple in that we must deny of Him any type of composition. Composition is here taken to mean an amalgam of two or more elements. Therefore, for Aquinas God is pure being, pure actuality, without any contingency or accident, and these terms may be distinct in their own way for us, but are actually one in God and for God. This is the doctrine of analogy, whereby terms are predicated equivocally of us and God. In the argument that we cited above, objection II in (ST I-I QIII AII), Aquinas gives an argument for atheism, that since it is superfluous to posit the many when what can be accounted for by means of few, we can dispense with God, since everything can be reduced to either an act of will/reason or an essential nature.

The reader should be able to see in either of the two cases that the atheist is arguing for, he is arguing everything in the universe can be reduced to either reason or nature. This reduction is simplification, whereas we would have formerly had many objects in our ontology, including God, now we have less we can 'fit' these things into one of these concepts. This seems to me to imply two things, namely that either of these realities must actually be simple, so reason and or essence are actually simple, and secondly we have moved from a more to a less composed ontology, so whereas before we would have had cats, mats, triangles, God and the like, we now have the 'artefacts' of reason or nature, since all of these things can be reduced, they do not extend beyond either of these two things, that is reason or nature (ST I-I QIII AV), presumably in terms of the accounting for the variety that is found in the universe. So, what I understand this to mean is that everything that a cat has is either an artifact of our reason or will or can be understood entirely in terms of its nature. Both of these things must then be simple and everything else in some way a composite of the potentials emergent from one of those two principles, which must then stand in relation to the objects in question (like cat or man) as actuality to potential, since whatever is in potentiality can only be reduced into actuality only by some being already in actuality (ST I-I QIII AII).

Now it is interesting to note that if either of these cases is true then, it seems as if the things that constitute the universe in some way lose their actuality particularly in the case of where everything is reducible to human reason, since its actuality or existence is generated by me, therefore it is impossible that I should be wrong about it. On the other hand, if it is reducible to its 'essence', it is impossible that it should ever be defective. This explains Aquinas refutation of these two positions, namely that they there cannot be a defect in nature, nor the failure of human will or reason, if there is, then these things are insufficient to account for themselves. Both of these evils occur otherwise it would not be necessary to do any kind of philosophy, education, science or medicine, all of which imply either a defect of ignorance or a defect in the body or soul.

Let's ignore the refutations to focus on the connection that I think I have established, namely that the simplicity of God and the simplicity of the principles of either reason or nature is the same or must be the same for the atheistic intent of the argument to work. In short, the atheist for St. Thomas must assert that reason or nature must exist of its own nature, for this is what the doctrine of divine simplicity means, that God's essence is His existence (ST I-I QIII AVII Con.). Indeed, those principles must be simple in order for them to be grounding principles to which everything else is reducible, since things are not reduced from simple to complex, but rather the other way round. If that can be agreed, then these principles must have a similar structure so to speak as the divine simplicity in that they can in no way admit of any composition. In addition, there can be no higher justificatory or causative entity permissible in the ontology, as that is what it means for everything to be reducible to the principle. Therefore, explanatory simplicity, by which I mean the description of an explanation as simpler than another explanation, must find its justification in terms of the principle we have chosen, either nature or human will/reason.

Nature as essence is not a bad candidate, since each of the essential attributes are necessarily joined to one another, therefore the essence or nature itself does not permit of division, except in a way that is *in us* so to speak, me and my reason are distinct only in the mind, but not in reality. No essence is however necessary of itself, a man requires

flesh and bones to exist and to be joined to his essence in order to exist. Therefore, it cannot really be simple completely in the sense requisite to generate our justification.

If everything is a product of human reason then the self-same thing, namely human reason which is the thing that explains everything, including itself. That is to say the account or explanation of why everything reducible to human reason would emanate from human reason as well. All entities, then, are potentials of human reason, whereas human reason is actual.

None of the 'artefacts' of human reason can be related to each intrinsically as cause is to effect, since both are equally reducible in their existence to human reason. Since all are potential, there cannot be any 'intervening' necessity actually pertaining in relation to the various products of human reason, they do not exist other than as the sequences we analyse in the 'world', so neither can either prior nor posterior, nor really be the cause of the other, thus to say as the razor does, as we showed in both Aristotle and Aquinas, that the razor 'works' because the appendix entity in relation to the explanation is both prior and not prior to the conclusion, and both is and is not the effect of the object of the explanation, it would follow then that the only reason we have for choosing the simpler explanation is that it is 'more like us' which is to say that we have only solipsistic reasons for supposing so or that human reason could somehow come to contradict itself, which is to deny the first law of human reason (presumably), the principle of non-contradiction. Therefore, to affirm that reason is perfectly simple within itself is to deny that reason is perfectly within itself. Therefore, to affirm that all is reducible to reason in terms of the razor, would either involve contradiction or circularity.

Conclusions

In the first chapter, I attempted to lay out the problem that I am attempting here to address and that is the problem of the connection between ontology and the razor and justification for the inference the razor commends. Later I analysed an argument by Aristotle for the razor as best I could. I showed there that the razor depends on certain 'ontological' facts, namely the existence of universal essences outside the mind. This does not exclude the possibility of their existence 'inside' the mind, but that is a different issue. Lastly, we

have treated of Aquinas and his commitment to divine simplicity. I think I have showed a common link between his metaphysics of essences, cause and effect and his use of the razor. God's absolute simplicity for Aquinas is the identity of His essence with His existence, His essence is to exist unconditionally. In us and in the rest of the universe, this union is conditional, we are the union of the act of existence with an essence, as is everything that exists. An explanation joins these two together for us in our minds using our reason. According to Aquinas how we come to know things our reason derives knowledge from the composed thing, we know in a composite way, 'A is E' say for example. The simpler the explanation, then the closer these two are to each other the better, namely the principle that explains and the instance to be explained.

Aquinas and Aristotle shared a common relation not just as student to teacher, respectively, but also as philosophical realists with regard to the existence of universals. I think then that I have shown that these two philosophers can justify the razor well, as it flows precisely out of their ontological commitments. Now we will turn to the other philosophical tradition of nominalism. I have chosen a number of representatives, each to be a kind of 'experiment' to see if we can better solve the problems that I have raised using nominalist tools rather than realist ones. If we can get better or the same results, the nominalist should 'win' I think since the nominalist does technically have a more parsimonious ontology and this accords with the razor. Indeed, if the razor is justified, then it would be justified as a criterion for the justificatory ontology for itself. The first nominalist we will turn to is the namesake of the principle, William of Ockham.

Chapter IV: Ockham and his Razor

Bridging Introduction

The preceding chapters dealt with a potential solution to our central problem; namely how to provide a justification for Ockham's Razor in a non-circular way. The two chapters which preceded this one attempted to show from a realist perspective how this might be done, namely these 'solutions' (if the reader will agree to call them that) which assume the existence of universals, particularly of the kind Aristotle understood. We turn now to consider an alternative view, that of Ockham. Like Aquinas, Ockham lived in a philosophical *milieu* that was excitedly rediscovering Aristotle and working out what his work meant, especially his logic and metaphysics. Aquinas had referred to Aristotle 'the Philosopher', citing him as an authority. Ockham was somewhat ambiguous saying. "Indeed 'the Philosopher' has made, with God's help many great discoveries, he has nevertheless, being human, mingled error with the truth" (Boehner, 1959, p. 2)²⁹. Indeed, it this critique of Aristotle and the scholastic interpretations of him that explain his placement in this work.

What was Ockham's attitude toward the principle that bears his name, how did he use it and what did he use to justify it, if at all. One of the most cited papers in the literature on this topic, *Myth of Ockham's Razor*, by Thorburn, claims that the principle is really not Ockham's own and that it predates him by a long way (Thorburn, 1918, p. 346). I think I have shown that this is at least true of Aristotle and Aquinas, whether one wishes to endorse Thorburn's particular scholarship, which was historically exhaustive.

I hope I established in the mind of the reader some grounds of disagreement with those sentiments in the earlier chapters, particularly those which treated of Aristotle and Aquinas. In the former, I hope I showed that Aristotle's position was this: Since the premises of a demonstration are prior to and better known than the conclusion, the longer demonstration would have an 'appendix' premise, the appendix premise would have to

²⁹ Ockham seems at once to respect Aristotle, but simultaneously does shy away from disagreement, albeit he cloaks his disagreement as appropriate interpretation in light of Aristotle's own principles (see the cited passage).

be both prior and not prior to the conclusion, and thus better and not better known, which is obviously a contradiction. In a similar way I showed that for Aquinas, an additional entity would be both the cause and effect of the conclusion for which it was posited (which was essentially the same as what Aristotle had said). Such things being contradictions, they cannot exist and so must be dispensed with. I think I also showed that these arguments for ‘Ockham’s’ Razor depended on a certain ontology that accepted the existence of universal essences, causes and effects and priority and necessity as modalities and also a certain understanding of those terms.

Ockham proper

I wish to turn to the namesake of the principle. I don’t think anybody could think turning to one of philosophy’s most famous names, especially one so closely associated with the principle, could be a bad thing, if we want to understand the principle. Ockham scholar Armand Maurer wrote that the razor can be understood as part of Ockham’s method (Maurer, 1978, p. 426) and as (for Ockham’s understanding of the razor) dialectic (Maurer, 1996, p. 50). What I mean is that Maurer claims two things, namely that the razor is part of the methodology that shapes the content of Ockham’s philosophy and that Ockham understands the razor as dialectical. What the connection is between these two claims will be the focus of the succeeding arguments.

Let us go to each part of this claim in turn and then see how they are actually connected (if at all). Maurer’s aim in *Method in Ockham’s Nominalism* is to show that three of Ockham’s methodological assumptions are necessary to understanding his nominalist metaphysics, as the philosophical form that leads to the content of his nominalism, which banishes the real universal and replaces it with a radical individualism (Maurer, 1978, p. 36). The purpose for Maurer is to illuminate Ockham’s system, not simply a sequence of dead propositions, recounted and argued for and against, but rather as a ‘living’ system (Maurer, 1978, p. 426). Nominalism is defined here as the view that all terms, when correctly analysed, a corresponding existent entity is superfluous and that the nature of

reality is radically individual, which is to say that in no sense is it common or universal.³⁰ Nominalism is opposed then to realism about universals, which is the view that over and above the individuals that exist there is also that which is *predicated* of many real things, namely a universal. These two parts of the definition are connected in that one cannot really hold to a view that there are real existing universal in things while simultaneously denying their existence!

Maurer gives three methodological principles of Ockham's, which he uses to derive the core of the Ockhamist nominalism. These are (a) the razor, (b) the principle of non-contradiction and (c) conceptual analysis, although the omnipotence of God is a methodological principle of Ockham's that arguably can feature in this list (Maurer, 1978, p.426). The razor is employed throughout his works, albeit often implicitly. It underwent something of a development in his *oeuvre*, in that it went from "Don't posit plurality beyond necessity," to "if something may be *verified* by means of two things, it is superfluous to posit three" (Maurer, 1978, p.428). An example supplied by Maurer is of Ockham's attack on the Thomist doctrine of immaterial or intentional likeness (i.e., cause). Aquinas held that these intentional likenesses held a mediating role in the act of knowing. This is 'intentional likeness' is what is *intended* aside from individualising matter (see Chapter II), thus this is what it means for the thing to be that thing.

The Argument

Ockham's argument is that we neither see these 'intentional likenesses', which are held to exist both in the knower and in the object known, nor can we posit their existence as being self-evident or derived from things which are. Nor are they held to exist by an author who cannot err, namely someone who has had a divine revelation. 'Intentional likenesses' have none of these authorities to support the positing of their existence. Therefore, we can quietly put them in the philosophical bin.

³⁰ This is Maurer's brief definition of nominalism as Ockham would see it

Immediately, one can see that Ockham's verification-style razor includes a type of non-inductive reasoning, although it also includes experience. So, if something is not verified by self-evident principles, sense experience or an inerrant authority, we should dispense with it altogether. Alternatively, if either of these principles produces some evidence of the existence of 'intentional likenesses', so let's say the razor could be verified by divine revelation it is superfluous to seek a second verification in the principle in self-evidence or experience. A similar point can be raised if we were say to discover that the principle had justification in a self-evident principle say the Principle of Non-Contradiction, it is then superfluous to seek for a further verifying argument for intentional likenesses. The appeal of this is reasonably obvious, it limits immediately the ambit of work necessary to demonstrate the existence of something³¹. This would imply that the principle of parsimony is justified by either of these three means. Straight off the bat, the last, divine revelation, does not support the belief that simpler solutions are superior. Nor does this seem to be the unambiguous voice of experience, as we often find that the exact number of entities a poor guide to which explanation is superior, and so it doesn't always turn out that the simpler explanation is the better one. This leaves self-evident principles, like the principle of non-contradiction. Ockham had his own take on the principle of non-contradiction (PNC) and it was intimately connected to his methodological principle of conceptual analysis, item (c) mentioned above.

The principle of non-contradiction for him was stark — a thing either is or is not. Maurer points to this cleaving principle in the discussion of Ockham's dispute with Duns Scotus (a scholastic philosopher between Aquinas and Ockham chronologically) in the matter of the Scotist appeal to four kinds of distinction (Maurer, 1978, p.432). Here Ockham also combines the principle of noncontradiction with his razor, Ockham holds that we do not need four kinds of distinction. Things are distinct if one of two things exist and the other does not, so then they are distinct. As Maurer put it (Maurer, 1978, p.433),

It is correct to argue: A is, B is not, therefore A is not B. Again, This thing is A, that thing is not A, therefore this thing is not that thing. If one were to deny the validity of

³¹ This is not to suggest Ockham endorses the view given by Krizek (see Chapter I: Physics).

these syllogisms and affirm that absolutely one and the same predicate can be truly affirmed and denied of the same thing, it would be impossible to show that there is any distinction between things.”

The point then is this, that Ockham’s *reduction* of the number of kinds of distinction, while neat means that there is only one distinction, namely the *real* distinction, which is why for him things either exist or do not, which is to give a statement of the principle of non-contradiction. Ockham then held that the principle of non-contradiction meant a thing either is or is not. This applies also to what is said about things, so Socrates is either a man or he is not. He is not both man and not man, since then he could be an ass as well (Boehner, 1959, p.14)³². therefore, Socrates’ essence is identifiable with his individual existence (Boehner, 1959, p.93)³³. It follows then that there cannot be ‘man’ as such (i.e., in the sense of universal that is also true in the same way of me and you), only Socrates *and* such-and-such man and so on. Therefore ‘man’ is a *mere* concept rather than a real thing. As a concept it does not have necessary attributes of essence. It does not even ‘contain’ the attributes within it. Therefore, the universal *man* exists in the mind only. For Ockham, essence and existence are the same in everything, my essence and yours are *not* the same, because your existence and mine are distinct, for you can exist without me and *vice versa*. This is seemingly a neat and clean picture. Our ontologies have been stripped of their baroque frivolity and given a laconic austerity.

The picture would work if were not for the fact that the razor it presupposes can only be sustained by assuming certain features of the picture beforehand, resulting in a circularity. This may be part of the reason that Ockham (according to Maurer) conceived of the razor as *dialectical*. Maurer says that Ockham, following Aristotle, contrasted dialectical with *scientific* syllogisms (Maurer, 1996, p. 50). The term *scientific* in this instance must be differentiated from the modern understandings of that word. For Aristotle a scientific syllogism is derived from principles that are *necessary* to a conclusion that is also necessary (see Chapter I). Ockham maintains that scientific knowledge of ‘A’ and error about ‘A’ are formally incompatible (Boehner, 1959, p. 90).

³² *Prologue to the Expositio super viii libros Physicorum* or ‘The Notion of Knowledge or Science.’

³³ *Utrum esse rei et essential sint duo distincta in re* or ‘The distinction between existence and essence’

This gives an idea of the high standard implicit in the Aristotelian notion of scientific knowledge that Ockham is still ‘helping himself’ to. Dialectical syllogisms by contrast take their ‘material’ from the opinions that many or all or the wise hold. Again, the dialectical syllogism is contrasted with its scientific counterpart in virtue of its necessity and truth. I do not want to get into the complex issues of the exact nature of Ockham’s attitude to dialectic, nor its development in medieval philosophy away from that of Aristotle, I wish rather to discuss the impact this has on the attitude to the razor, its status and justification. It is of import since scientific syllogisms are held to be demonstrative and to produce knowledge of the high standard requisite of the Aristotelian science. This would naturally presuppose the Aristotelian frame (the metaphysics and ontology etc.) that ‘makes’ such knowledge possible. Yet the razor was for Ockham, according to Maurer, merely persuasive and ‘probable’ as opposed to necessary. This is a result of the placing of the principle as a dialectical in providence, for several reasons, one of which would be its applicability across domains of enquiry. If this is the case then we have a possible problem with using the razor in metaphysics.

However, that would mean that the razor would be a kind of necessity, perhaps sufficiently so for use in ‘scientific’ metaphysics, which Ockham was engaged in by removing universal essences from the Western mind. We can put the point like this: the razor has either got a self-evident justification or not; if not it must be derived from self-evident principles, according to Ockham’s own standard. However, it could be justified by the so-called dialectical approach, but then its results are probable and unfit for use in metaphysical analyses, because on this account, the razor is simply based on the authority of the wise. This can be resolved by blurring the distinction between dialectic and metaphysics, which is apparently what happened during the Middle Ages (Maurer, 1996, p.52). But this necessity must still come from somewhere, for Ockham, either the absolute necessity and omnipotence of God, or conceptual necessity, since he has ‘gotten rid’ of real existent universals in things which ground necessity in Aristotle and Aquinas. There are no grounds for Ockham’s Razor in the absolute omnipotence of God (even as necessary being who’s essence is to exist), since Ockham concedes that this being could have made the world other than He did. In fact, the razor, like the principle of non-contradiction, does not apply to God. This latter point would be especially true of

Ockham who as a Catholic theologian³⁴ has trinitarian commitments. Therefore, it must be self-evident or derived from principles that are, and thus must be incapable of being otherwise, yet this is not the case for Ockham, since God, according to Ockham, is not bound by it (Maurer, 1996, p.59). Therefore, the razor has the conditional necessity of dialectical syllogisms. But then we are left with the same problem as to the source of the necessity in the inferences in the use of the razor, which leaves us with Ockham's conceptual analysis. However, we arrived at concepts in virtue of eliminating the existence of universal essences outside the mind. We did so using the razor. So, we either start with the assumption of the razor or that there are no such thing as universals, and that all that we need, so to speak, are concepts.

This would suggest a circularity: either concepts are preferable ontologically to universal essence because the principle of parsimony would suggest it, or concepts of their own nature suggest that we choose the razor. In the first instance we need an account of why the razor is a valid principle and suggests, along with other principles, the superiority of the universal as concepts to the universal as essence, i.e., the universal being in the mind only. On the other hand, Ockham could think the other way, that concepts suggest the razor and are themselves suggested by a higher or more sound principle, like the principle of non-contradiction. One of these two approaches has the prospect of escaping this circularity. Failing this we are left with the problem of how to justify the inferences that the razor suggests on Ockham's own terms. If we recall, it seemed that Ockham's own attitude was this: that the inference to concepts is justified on the basis of the razor, so that if something can be 'verified' by means of two things it is superfluous to posit a third (presumably 'and so on'). However, it is possible that the opposite could work just as well for his position, namely we can start with the concepts and then demonstrate from them the viability of the razor.

Ockham's notion of the Principle of Non-Contradiction had Aristotelian pedigree, which is unsurprising given the Philosopher's standing among the scholastics. However, Ockham's dispute is more directly with Scotus, who has a variety of distinctions, which

³⁴ Albeit of some unorthodox opinions for which he was declared a heretic and has been admired by the likes of Martin Luther.

were alluded to earlier. In Ockham's view, the Scotist concept of a *formal* distinction was redundant as all that was needed was a *real* distinction, i.e., the thing either exists or it doesn't, which applies to qualities and everything that has being, which just means *everything*. The reader may remember that the Scotist would have said, "If things are capable of independent existence, then they are different," and this was how distinctions were *verified* (Maurer, 1978, p.433). If all that is necessary to demonstrate a distinction between things is to demonstrate their capacity for separate *existence*, then we have Ockham's Principle of Non-Contradiction, the "Is/Is-not" kind. But we can see that this idea of the Principle of Non-Contradiction involves the razor in its origination as the implied preference for concepts over universals that undergirds this conception. It relies on the razor for its persuasive force, since we get concepts out of deleting the existence of the universal in the thing known. The concept, which Ockham substitutes, can only be or not be in the way that the Ockhamist Principle of Non-Contradiction suggests, and what can be a concept is limited only by reason, that is by absolute contradiction, that the thing both exist and not exist. The principle of parsimony must be like the Principle of Non-Contradiction and of the same status as it, in the sense of being self-evident. Yet it cannot be, the principle of non-contradiction is an assumption prior to that of parsimony, since it is employed in the argument for parsimony.

In essence the argument is this; on Ockham's ontology, which dissolves universal essences by virtue of the razor, leaves the razor without a justification, since there seems to be no way to generate a connection between the ontology and the necessity that is requisite for the razors functioning the way that Ockham would have it. The alternative was to think of the razor as being a self-evident principle, like the Principle of Non-Contradiction. However, if there are two equally self-evident principles, as in this case the principle of non-contradiction and Ockham's Razor, then it would be impossible to say which one came first, which is absurd, since that would imply that it is impossible to deny the principle (like the Principle of Non-Contradiction) on the basis of the razor. However, one would invoke the Principle of Non-Contradiction in affirming this 'move', so the Principle Non-Contradiction is prior to the principle of parsimony. But Ockham's notion of the Principle Non-Contradiction does not imply the principle of parsimony, for

it is rather the other way round since concepts replaced universal essences in the objects as the means of our knowing.

Conclusions concerning Ockham

I think I have shown that Ockham's account (or at least as it seems Maurer takes him), leaves a gap in the connection between the ontological assumptions we must make in order that the razor not be a simple asserting of some mere wishful thinking. I think that this comes out of the nominalist metaphysics that Ockham espouses. If only individuals exist, then the world and our ontology is radically complicated (at least in one way). One could think of Mill and his isotopes. It seems arbitrary, to my mind anyway, to aver as an ontological preference that the simpler explanation should be preferred in a radically nominalist ontology, since in then there are two simplicities, one which is in the individual and another, which exist merely in us and refers to our rule or concepts.

Chapter V: Modern approach

Introduction to Chapter V

Quoting Quine, a modern nominalist philosopher, Elliot Sober says that the razor is a preference for ‘clear skies and desert landscapes’ and a taste for ‘old-mechanisms’. Sober is a modern philosopher of science, who specializes in the razor. Indeed, he wrote a *User’s Manual* for the razor (Sober, 2015) and also a number of other papers. Quine also has a terse account of simplicity (Quine, 1963), so we will examine it and contrast it with Sober’s as given here, especially in connection with their justification. In addition, we will also look at Hume, given that Sober connected the razor to induction and stated, “If this is right, then the principle of parsimony is as problematic, and as unproblematic, as induction itself. Whether this vindicates the atheistic version of the razor, or shows that it is in deep trouble indeed, depends on one's attitude towards induction.” (Sober, 1981, p.155). This invocation of induction and its problems is suggestive of Hume, in fact Sober invokes Hume. It would be wrong not to see if Hume could account for the principle of parsimony.

The Quinean position

In his paper ‘On simple theories of a complex world’ (Quine, 1963, p.103), Quine presented a problem with simplicity, namely how is it possible to think of a theory as true on account of its simplicity, when the *basics concepts* of each *conceptual scheme* are mutually derivable, each from the other. Quine terms the razor ‘the maxim of the simplicity of nature’ and gives it in the following way, “If two theories conform equally to past observations, the simpler of the two is seen as standing the better chance of confirmation in future observations.” (Quine, 1963, p.103). So, to reinterpret Quine’s problem, we can say that since basic concepts from one schema can be derived from those of another, we have what might be termed absolute ontological egalitarianism. Since, neither could be more fundamental than the other, how is it that we can say that the simpler theory has any claim to being more predictive?

Quine gives roughly four possible reasons why simple theories are more probable than their more complex counterparts; wishful thinking, a perceptual mechanism that favours simplicity, perceptual bias and the way records are kept. Before we regard these, however, we must look at a concept Quine regards as intimately involved in the problem of simplicity, namely uniformity, giving a ‘maxim of the uniformity’ of nature, that things that are similar in one respect, tend to be similar in others. One might think of animals, then of mammals and then of dogs and cats. Yet Quine thinks that similarity is *also* relative to one’s conceptual scheme, since “Any two things, after all, are shared as members by as many classes as any other two things; degrees of similarity depend on which of those classes we weigh as the more basic or natural.” If we take what was said before, we can see that this commitment would ‘emerge’ (perhaps an ill-conceived term in the circumstances) from his earlier commitment, expressed in the mutual derivability of basic concepts in varying conceptual schemes. If we take that commitment seriously, it would seem that we are obligated to say that which class we weigh more than another is ultimately arbitrary.

The first possible cause Quine gives for thinking that the simpler is more persuasive is that we wish it so. Quine does not really address this since it cannot really be regarded as a reason, at least not in serious scientific discussions. That said, he does mention that simplicity and beauty ‘track’ each other, yet Quine is neither a Thomist nor a Platonist, so he cannot ‘help himself’ *as it were* to the Unity of Beauty, Simplicity and Truth. In fact, if anything, his paper is an attack on just such an idea as fanciful.

There are two other arguments which are similar in that they revolve around Quinean terms the ‘perceptual mechanism’, which places simplicity firmly in the realm of ‘subjective selectivity’. The first comes by way of comparison of the *preference* for simplicity to the noticing of *streamers* in printing. What this is, is that printers notice that mechanical printing techniques produced either straight or gently curved lines also known as streamers in the text, which would be gotten rid of by way of making them crooked (Quine, 1963, p. 104). The lines are not embedded in the ‘reality’ of the text in which they are perceived, neither the author nor the printer intends them. Next is the design of experimental criteria, Quine’s example being that of dogs’ responses, where

the objection to an experiment runs that the parameters of the experiment, say the measuring of aggression in a dog, could induce the results captured. Imagine antagonising a pit bull by putting it in contact with a three-year-old around the dog's food. The way we would respond, Quine says, is to change the order of experiments, with a different dog. Now either we get confirmation or nothing; we could not get any evidence that the dogs are different, we only get evidence that they are uniform or nothing at all (Quine, 1963, p. 104).

Two points suggest themselves to me on reflection of these 'middle' two arguments for why on Quinean terms we prefer the simpler explanation. First is that Quine designates these cases as a product of 'subjective selectivity'. One can see what this means: it is a product not so much of the things or objects under discussion, but rather a result of how and what *we look for* that we come to see these things such that we can talk of the uniformity of the results. The streamers in texts don't have an intrinsic meaning, for they are merely generated by a series of accidents. The fact that we don't see them in the wild so to speak is more interesting, than that some people do. Their existence is an accident generated by our 'perceptual mechanisms'. A text with streamers would have exactly the same meaning as one that does not, the difference between them is therefore in one sense arbitrary, it depends what we are looking for, which in a way says more about us than the text which are talking about. Concomitantly, these cases are on Quine's account more properly to be instances of uniformity, we haven't been given here what can strictly be defined as instances of simplicity. Uniformity is for Quine only a species of simplicity. This is to be expected, for Quine simplicity is difficult to define. Therefore, we must see these as examples of simplicity operating as part of theory selection, through their being an example of uniformity.

Finally, Quine suggests, there might be a bias towards simplicity in our ways of keeping records in scientific inquiry. What this means is that rather than go further than (say) the second decimal place in one's recording, one rounds off either up or down, with the result that data is not comprised, but is more likely to be confirmed, presumably because the more precise the record, the more likely a deviant second result will be viewed as refutation rather than confirmation. Quine's example is that of a recording of 5.21, with

a second result of 5.23. This latter result deviates and so is looked on as refutation of the claim that was based on a result of 5.21 (Quine, 1963, p.105). If the scientist had recorded his results as 5.2 instead, his second result is more likely to be viewed as confirmation of the first value. It should not escape the readers notice that we seem finally to have married uniformity and simplicity, which is what is being sought after in this somewhat fudged way of keeping the data, at least the tail end of the maxim, which called for confirmation of theories. We still do not have an explicit definition given, unless we were to say that this less precise form of data presentation was a form of simplicity since there are less digits in our representation of the data.

It seems to me that Quine has placed the value of simplicity squarely outside the realm of truth, which was his problem to begin with. We account for this value by means of its shadow, uniformity, which is necessary to the act of theory formulation, by virtue of the fact that our theories need to predict and to predict is to require some uniformity (i.e., similarity) between past and future states. This uniformity, however, need not have any existence in the object of analysis, be it the behaviours of dogs or the spaces between words on printed pages. They need only predict the outcomes more successfully. So, the more uniform theory is with data the simpler it must by extension be. This, however, points to a problem in the use of simplicity in theory selection; namely how is it to be a trade-off against accuracy. Quine hinted at this issue as a problem of curve-fitting — more beautiful curves may be simpler but they do not always fit all the data perfectly (Quine, 1963, p. 103). Quine's point seems to be that we can only solve this by conceding that the preference for simplicity is not a feature that 'tracks' the world, but is part of our selection bias, we like things to be simple and so construct theories that are simpler in general, until later data upends our expectation, and we begin the process afresh, seeking a way to fit the new data into a uniform pattern, with the simpler theory being, if we take the record keeping point seriously enough, a vaguer theory.

Quine, Jeffreys and Berger

The reader may remember the discussion we had concerning Ockham's Razor and Bayesian statistics (see Chapter I, p.11). There are significant areas where I think Jeffreys and Berger would disapprove of Quine's account of the value of simplicity. I would like to compare the examples that they used to illustrate their respective cases. In Quine's he referred to the case of dogs and Jeffreys and Berger referred to a cheat in a coin toss. As I would understand him, Quine thinks that the theory that our friend is a joker may be simpler, with the claim standing, say, in a similar position as the claim that this kind of dog is more aggressive than another. After the first experiment we will expect the second to confirm it. The Bayesians would call these hypotheses *simpler* on the grounds that it was *clearer*, since it could get either confirmed or denied by the next experiment, like the hypothesis that our friend is a cheat, while not necessarily eliminating the possibility that our friend is not a joker, no matter how many of the coin tosses come up heads and the experiment just throws up an unusual set of results. The same could be said for the aggressive dog: there are an infinite number of potential explanations as to why the 'second' dog behaved aggressively, without presupposing that the quality of aggressiveness existed in the dog. Quine's point on the other hand was to say that there was no way to disprove that such qualities did exist in the dog, no matter how many times one verified the first experiment's results.

This however is where things begin to unravel. The Bayesian thinks that the dog is aggressive or this is the best explanation, much like the coin tossing case, the joker needs be using an illegitimate coin and any instance (particularly in the coin toss example) of deviation from a previous pattern (say of getting tails and heads) refutes the theory, so generally with aggression in dogs. The theory is easily falsified, according to the Bayesian, and is therefore simple, as it makes one claim that is consistent with only one set of data. Quine, I think, could more or less agree to this, on condition that we accept that we cannot prove the existence from stats alone that the coin is suspect or that the dog is aggressive. While we all may agree to that, the problem is that this ceases to be a simplicity of generality (see Chapter I, p. 15), implied by the record keeping example. What we, rather have is simplicity of clarity and precision. This is akin to a problem of

simplicity Sober has discussed, which is termed a problem of curve fitting (Sober, 2002, p.14).

Quine's account, I think focusses on the simplicity of generality. We could call this representational simplicity or in his terms *uniformity* in the data that we read in. We are told that the theories are subsequently simple, on the grounds of the criteria *we chose* for the confirming experiments or instances. Since we either get conformity or nothing, it follows that theories that do not conform to our desire for simplicity are weeded out. Our theories are patchwork quilts of data. This means that the simpler theory is 'clearer', the Bayesian would say its predictions are sharp. This is opposed to the generality of simplicity favoured in the record keeping example. For it seems Quine must get rid of the simplicity of clarity, in the sense that the theory that makes one claim as opposed to a vaguer theory that can be consistent with a variety of claims on data (Quine, 1963, p.105).

What I have proposed now is that there may be two kinds of operative yet seemingly mutually exclusive kinds of simplicity. One relates to the theory's *clarity*, the theory that says exactly what it means is simpler, and we certainly prefer such for their ability to give us more precise information about the thing to be explained. Opposed to this is the *simplicity of generality*, where it is simpler to refer to *one thing*, say aggression as a quality in a dog, than to refer to all the many individual instances or iterations. In essence what I am saying is that the value '5.2' is simpler than 5.21 (or 5.23) must be in some way similar to saying that the results of the two sets of experiments on the two different dogs, which happened in the instance to produce a result of uniformity, despite the permutation. However, the latter form is precise, while the former is simplicity that avoids falsification. This is not necessary my own observation, in that Jeffreys and Berger pointed to the fact that the simpler theory. In their example the claim that our friend is a joker and joking with us in using a joker's coin and the theory that two people are cheating on a test is simpler hypothesis. This is true *if and only if* they have the same false results, which is a more precise claim than the wide variety of explanations that eventuate if one has that same result and assumes that these two candidates did not cheat. Further, Jeffreys and Berger also would have pointed to their examples of mathematical

tables as being problematic for Quine's contention that the simpler theory has less precise numbers. In this case, mathematicians would publish tables with values, but to catch people who plagiarised their work, they take out all the fives, either rounding up to nine or down to nought. The resulting discrepancy did not compromise the value of the data but did mean that if someone had noughts and nines where the other had five, the possibility was vanishingly small that they had not plagiarised and had produced the data legitimately. Both theories (that it was plagiarised or not) account for the data equally well, but the claim it was plagiarised is simpler; there are a wide variety of possible explanations as to why the data is the same, but this posits a single clear explanation. Again, this moves against the idea that the only simplicity is the simplicity in generality or vagueness of data representation given by Quine.

This is not in principle an insoluble contradiction or tension, since it must be possible to reconcile the two kinds of simplicity, provided that one has an ontology which allows them to be united. The alternative is that we are stuck with no way of saying in a clear way that either of two competing theories is simpler in any proper sense than the other, as we have shown above. One common feature of these two kinds of simplicity is unity; the interpretation of the dogs' behaviours as 'aggressive' with the (usual) accompanying inference that the dog possesses that trait is 'generated' after the data was collected and according to Quine is an interpolation and is itself generated by the criteria of experiments itself, so for him the simplicity of clarity emerges subsequently, after the data has emerged. So, the uniformity emerges after the data has been presented. In a similar way, the simplicity of generality, which involves the ability of our theory to subsume the data, in fact it is what allows us to generate the unity of the data (i.e. the theory) after the data has been given to us, because otherwise the data would literally falsify everything that we have, 5.21 not being 5.23.

So, we have a vision of simplicity unifying a wide array of otherwise disparate data, the data being like the various blocks of black spaces between lines of text that comprise the streamers, with even the slightest deviation destroying their unity, undoing the effect. Our theories are in a sense our tendency to see those streamers rather than the chaos that characterises the average text. This is how Quine accounts for our preference for

simplicity: the mutual derivability of base concepts between domains and the arbitrariness of which qualities we weight more and therefore give as grounds for similarity, which means there is a tension between simplicity and truth, which is what we have been alluding to and Quine acknowledges. These commitments are apiece with Quine's claim that the quality that is discovered in the dog has no proof, which in terms of our interpretation of the behaviour thereof would imply the arbitrariness and grant our successive unity that characterises this view. What do I mean? If the reader will recall, Quine argued that even after the second permutation of the experiment for the quality of aggression in dogs, we don't have proof, since the criteria of theory building requires that we find uniformity or nothing. All we get is disproof in the instances that we do. However, I attempted to show that Quine couldn't use this since there is simplicity in asserting that there is such a quality, as with the assertion that the students who have the same (wrong) answers are cheating. The assertion of positive or existent fact was simpler since it was falsifiable. This seemed to be in tension with Quine's claim that simplicity was also understood in terms of generality. However, we thought that it was possible to reconcile the tension by saying that the simplicity of generality is to be privileged, since it makes theory possible in the face of simplicity of clarity, which threatened to destroy all theories by showing them to be false. What we have a kind of uniformity then that is created by a sowing together of various parts of the data, as new data appears we integrate it into the theories we have, without comprising too much on precision. Thus, we create in effect a 'streamer' of the data, which did not exist before in the data. We can, I think, then say that Sober is right to say of Quine that Ockham's Razor is preference for old mechanisms. We sow the quilt of theories with tools inherited. The preference for clear skies is understood metaphorically as well, for it is simpler to call the sky 'blue' than to specify the exact shade of each inch of the sky and differentiate them from the clouds.

However, this was born of a commitment to saying that the degree of similarity depends on which of the classes the thing belongs to we weigh as more basic. This was part of Quine's scepticism about the maxim of the uniformity of nature. It implies, at least to my mind, a kind of *relativity* or *arbitrariness*, since even if we engage in experimentation, we are compelled to confess, if we accept that we never get proof, say, of the existence of canine aggression, that our claims of such in the circumstances are in

one sense arbitrary at least from the perspective of the things themselves. There is or need not be aggression or even canine aggression, since we could not prove it to exist independent of the dog who was subject of the experiment, in same way we might talk of the 'redness' in barns and cherries. Therefore, the class known as 'aggressive dogs', 'cheaters', all that there is, at least from this perspective is.

However, I do think that we must start already in Quine's scepticism about the existence of the quality as a condition for accepting his contention that simplicity can be cashed out as a quiltlike joining of the dots (or spaces) that is a by-product of our criteria for theory formation rather than some real feature of the things. This implies a circularity, since we either start in the scepticism about the uniformity of nature and 'end' with this view of simplicity as a natural consequence, or this view of simplicity permits that view of the relation between classes and the things contained in them as in some sense arbitrary, as we should recall in the discussion of the dogs behavioural pattern, we were reminded that at no point do we get proof of the existence of the quality in the thing.

This is presumably permissible so long as we can retain a real distinction between a dog and an aggressive one. If aggression exists in dogs, then the weight that we give this quality is not arbitrary, for instance it is part of what distinguishes pit bulls from other breeds of dog. If in our assessment of dogs, we discover aggressive behaviour, and we needn't assume that aggression *per se* exists in dogs since we don't seem to get proof of it. Instead, we must content ourselves with assuming that aggression as such needn't exist or simply is nothing other than certain behaviours of certain dogs welded together in our minds. This view has two problems. The first is that it seems to me that we, perhaps in our more naïve moments, would say that dogs, humans and aggression etc., really do exist and we get proof upon certain instances of these various qualities and things' existence given our actual experience, which is like the experiment. However, upon reflection we may see the problem with this view, like the one given by Quine himself, and so we dispense with them on the basis of simplicity of doing so. I would contend that it is simpler to say that the quality of aggression really exists, in a similar that it would be simpler to say that the cheat coin hypothesis is simpler. Second, Quine's justification for saying this is that he can get the same results *without the assumption* in

the sense of being agnostic about it. We may concede that, but I have attempted to show that the simplicity of doing so has already been baked in, so to speak, in the sense that the scepticism of the maxim of the simplicity of nature would presuppose this assumption.

Put this way, first there is the objection that it is simpler to assume that the quality, say, of aggression exists in the thing, it is easily falsified, by canine behaviour and can be confirmed by being in different circumstances. It also comports well with a variety of cases, such as when, for instance, we accept the existence of cheaters and plagiarisers. Quine overcomes this difficulty with his account of uniformity (and falsification) as a product of our experimental criteria, we either get unity or nothing, so to assume the existence thereof is actually a product of our ways of thinking. The second argument purported to show that this move is itself circular, since the scepticism about the uniformity of nature that requires simplicity as it is a species thereof, we rid ourselves of existent qualities. This implies the arbitrariness of our privileging one or the other of the similarities between two things. This also grounds mutual derivability of the basic concepts of any two conceptual schemes; if a quality exists in the subject, then it is not possible to reduce or derive them in an egalitarian way, the one inheres in the other rather and is prior to it.

The view of simplicity requires (on Quine's account) that we put aside the existence of the quality or the thing in our assessment of the data, but this means we must assume that the scepticism(s) of maxims of simplicity and uniformity are themselves justified, the scepticism being justified by its own simplicity. For these reasons, I find this account of simplicity unsatisfactory.

Sober

In his paper '*The Principle of Parsimony*', Eliot Sober argued that simplicity should be cashed out in terms of induction. He specifies that here he is talking about Ockham's Razor as a rule of *deletion*, what he terms an 'atheistic' Ockham's Razor. This is to be contrasted with an 'agnostic' or 'probabilistic' version of the razor. Sober thinks that Ockham's Razor means that we should 'delete' the object from our ontology, such as the

aether, after Einstein's experiments with electromagnetism (Sober, 1981, p.145). He also contrasts the razor with reduction, since according to Sober reduction does not do what the razor does and delete objects from our ontology, rather it gives us an identity relation, the residue of which we may possibly razor away. For instance, the identity theory (about the mind with the brain) requires that there be an identity relation between a mental event or property and a physical event or property. If I am in pain there is a corresponding arrangement of matter in my brain, known as C-fibres firing. However, this presupposes that, say, pain and C-fibres are identical in *every* respect. Sober's point is we can reduce (equate) pain to C-fibres firing, however, we do not necessarily delete pain from our ontology. Indeed, the identity theory tells us that pain ultimately *just is* C-fibres, and it therefore follows that nothing is removed from our ontology — we merely get another way of *referring* to pain. Only when we apply Ockham's Razor can we say that pain (as anything other than C-fibres firing) does not exist.

Sober discusses the above case of the identity theory in terms of the distinction between reduction and the razor, plus an additional two examples that should be illustrative, namely the Rortyan case of witches as hysterical women and demonic possession as mental illness and the Donnellan case of the 'banker on the corner of the street drinking champagne' as opposed to the 'banker on the corner of the street drinking ginger ale'. As sophisticated modern people we don't really think that anything like witches or demons exist, yet that does not mean we don't have to at least try to make sense of more parochial discourses that take witches seriously. So, what we say is that when people of old spoke of witches and demonic possession, there actually is an identity relation between those instances and what we now call mental dispossession. That is what I take Sober to be saying about Rortyan and Donnellan cases.

However, Rorty takes this in an eliminativist direction claiming that the mind-brain identity means that there are no such things as mental entities. So, since the mind is the brain and all witches are *just* hysterical women, we can say that neither mentality nor demonic power exist, thus non-existent is *reducible* to an existent. Sober, as we noted, thinks that the reduction does not imply the non-existence of the object under discussion, rather that this is the work of the razor, since reduction leaves our ontology intact, so there are still witches and mental events ontologically speaking, at least until we razor

them away. I think there are good reasons for this. Even if all witches, empirically speaking, are actually hysterical women, it would be a less than good idea to address them and this issue with a frame of witchcraft, particularly since witchcraft does have distinct connotations that cannot be strictly equated with mental illness. Even if it is more useful or whatever, we cannot say that that there is a reduction to identity.

This then is the work that the Donnellan identity claim is meant to handle, that there is a distinction between a man who stands on the corner of the street drinking champagne and the 'same' man drinking ginger ale and also the witch, as opposed to a mentally ill woman. Yet we presumably think that we can talk about these two people at the same time and make sense to each other, despite one not being really existent. The witch, we hope, does not exist, nor does the man on the corner of the street drinking champagne. The problem is that the conversation which concerned itself with witches or that non-existent man would be utterly meaningless, or valueless, since it might as well have been about the digestive system of a unicorn.

Whether or not one agrees, Sober takes this point to mean that although we may establish (possibly) the identity thesis, it does not follow that we necessarily can move effortlessly from that claim to the claim that there is no such thing as a mental entity. Mental entities are still useful in various areas, such as psychology, where we talk of mental entities such as 'motivations', which can be egoistical or not. Whether these actually are irreducible or not to the physical states of the brain, is not really relevant, for the psychologist these terms still have meaning and we can use them to predict behaviour accurately. We may remember Quine's discussion of the dog; here the psychological attribution of say 'aggression' in dogs may very well have a materialistic description that is perfectly predictive of the brain states of the animal and perhaps its behaviour, but a pet psychologist is still going to have predictive accuracy using 'folk' notions like 'aggression' to describe the behaviour. Therefore, even if an entity is reducible to its physical 'substrate' we cannot thereby infer that it does not exist.

To briefly recapitulate this section, we have essentially been dealing with the distinction between the razor and reduction. We have been thus far discussing the powers of reduction. Reduction, however, requires an idea of identity. Sober seems to be partial to Leibniz's Law, which he gives as, "If two things are identical, then there is no property which one has and the other lacks" (Sober, 1981, p. 149). What is important here is that Sober thinks that this fact implies that reduction reduces to the razor. The Law of Identity is related to the relation reduction and non-existence; a claim of identity is a claim of non-existence, in the sense that the identity of one thing to another implies the residue of the other can be dispensed with. But this would seem to be contrary to what has been said before. On what has just been said, if two things, X and Y, share exactly the same properties, then they are identical (Sober, 1981, p. 149). If x is identical to y, then the statement 'x is y' is true, which if we translate with regard to our examples, then we get "Witches are just mentally dispossessed women," "the mind is the brain," and so on. So what gives?

Enter the Razor

I think the point here is epistemic rather than strictly ontological, even though this has an obvious ontological resonance. What has happened here is that Sober illustrated some of the difficulties in establishing identity relations. We have to observe the connections between the entities or the explanans and explanandum. What Sober does is to situate the justification of the razor squarely within the domain of what we can already be said to know. He asks us to consider two existence claims, the one we are discussing is the one we mean to use the atheistic razor on. if upon a survey of all of our knowledge, we find it explains nothing else, whereas the competing one does, we should use the existence claim that is "older". we could imagine the argument between an exasperated philosopher of science and a sceptically inclined five year old girl over the existence of unicorns or Sober's own example of the aether in the face of the Einsteinian Revolution. However, more interestingly, as the name of this version of the razor suggests, it can rid our ontology of God. Indeed, this is how Hitchens interpreted the powers of the razor, as did Aquinas in Article II of his *Summa Theologica* (see Chapter II). Sober address this particular argument in the final chapter of his *User's Manual*.

Parsimony Argument in the *User's Manual*

The argument that the razor can be used to rid our ontology of God is at least as old as Aquinas (see Chapter III). How Sober uses it is interesting since he combines his parsimony argument with the problem of evil. The problem of evil presents a problem for any theist, since God is thought, by definition, to be simultaneously omnipotent *and* omnibenevolent, yet there is evil in the world. Aquinas actually has a response to this argument in exactly the same place as the parsimony argument for atheism being the preceding objection to the parsimony objection analysed in Chapter II, which tried to show that we could posit atheism if we could show that all was reducible to either human reason or nature. What's interesting is that while Aquinas treats them as separate arguments (or seems to) while Sober combines them, reading the 'problem of evil' argument as a parsimony argument. He does so by giving contemporary theistic solutions to the problem of evil as rendering God explanatorily useless, he can say *a la* his 'atheistic' razor, discussed above, that since God can explain nothing, God does not exist. So Sober would read those two objections as being one. I don't wish to deal with the problem of evil, but I think Aquinas would also find the theistic objections Sober considers to the problem of evil to be unpersuasive as well, since I think they assume a lot of our contemporary, broadly speaking naturalistic framework. Indeed, it seems as if this is the only argument or place where the theist gets any traction for Sober, which is not unexpected as he has done much in the philosophy of science, with a special interest in evolutionary theory.

So, what we have is a picture where methodologically naturalistic³⁵ science has accounted for most of the world's natural phenomena. This does not necessarily imply that ontological naturalism is true, not yet anyway. That's what the problem of evil does, it forces the theist to say that God is explanatorily inefficacious, in the sense that if God

³⁵ Sober's definition of the distinction between metaphysical and methodological naturalism is as follows: "*metaphysical naturalism: the only things that exist are things in nature. Methodological naturalisms: scientific theories should not postulate the existence of things that are outside of nature.*" (Sober, 2015, p. 244).

is meant to be omnipotent and benevolent, then how does the existence of God account for the obvious existence of evil? We then can apply Ockham's Razor and remove this anachronistic residue of our primate past. The problem is that the razor is employed to complete the methodological picture; we need the razor in order to say that all we need are natural entities. If all our explanations (following methodological naturalism) should start from the assumption that no supernatural entities exist then when we apply the razor in our physics and biology etc., we should posit no essences, forms, souls, or First Causes since these are non-naturalistic entities. We will then conclude that upon a survey of all the world's possible knowledge there is not a single non-naturalistic entity. Thus, we say quite naturally, there are only such entities after we've applied the razor. This is circular, since the species of entity that has been permitted in our ontology has already been decided beforehand, in our methodology, which has that self-same ontology baked in.

More importantly for us, we still don't really know why the razor is a good principle. So even before we get to razoring away the gods, we are already razoring away the aether, the planet Vulcan, unicorns, essences, and a whole lot else. What justifies doing so? For Sober, as we have said, the razor is just good induction, which is a logical method which (apparently) does not presuppose the existence of universal essences, Aristotle's definition of induction being "passage from *particulars* to *universals*." (*Posterior Analytics* I 1 71^a5-8)³⁶. For the universal in this case is presupposed then, if we are to say that the principles of induction justify the inference to the simpler explanation, known as Ockham's Razor. But herein lies the difficulty with that position: if it is ontological or metaphysical, then all that exists are the particulars and some version of nominalism and naturalism is true, since all we need to posit is the already known and existing, and 'retroactively' apply the razor to our general ontological assumptions. On this account to call the razor *qua* a principle of induction a methodological principle, would presumably be acceptable to Aristotle, if we remember that for Aristotle the particular is nearer and prior *to us* even though the universal is ontologically prior (*Posterior Analytics* I 2 72^a1-5). But it is common cause that Aristotle is not an empiricist and so

³⁶ I doubt there could be much to dispute about this definition see Stanford Encyclopedia *The Problem of Induction* for an analogous definition of induction.

will not, perhaps, give induction its due. So instead let's turn to Hume to see if an empiricist account of the razor is possible.

Hume

Hume is probably the most influential philosopher of the Scottish Enlightenment.³⁷ Part of his enduring appeal is his ability to be simultaneously subtle, yet accessible. This is how I propose to use Hume to solve our problem, which is what or how to justify Ockham's Razor. The first part of this section will focus on developing a Humean idea of simplicity and see whether this notion 'fits' into his wider project. Second, we will look at the other formulation of the razor which admonishes the multiplication of entities beyond necessity and see how it fits into Hume's work.

In his *Enquiry into Human Understanding* Hume begins by distinguishing *the* two ways of doing what he terms moral philosophy, one is abstruse and difficult, the other is, by comparison, easy and pleasurable. The former he identifies with metaphysics, the latter *action* or *exhortation* to virtuous action. While metaphysics is difficult, prone to induce melancholy and error, the other is easy to understand and do. Hume's project is to limit or eliminate metaphysics. I want to draw attention to the embedded nature of simplicity in that right at the very beginning of Hume's project, we already find simplicity. Hume is among the *pantheon* of philosophers and should have some notion of what it means for the simpler theory to be better. It is possible that we may find that this idea (I mean 'idea' loosely, for now and not in its specific Humean or empiricist sense) is either in contradiction with Hume's wider project, so that is not possible for him to account for it in a non-circular way, or he cannot say at all why we should choose a simpler solution.

At the beginning of the *Enquiry*, the distinction that Hume makes between kinds of philosophy suggests what I would take his goal to be, that of *reducing* the purview of the metaphysical kind. Hume is already applying Ockham's razor and appealing to a kind

³⁷ With the possible exception of Adam Smith.

simplicity. He appeals to simplicity in the sense that his project is to eliminate the abstruse form of philosophy, perhaps so we can dispense with inquiry into non-existent entities. That said, he does seem not to dismiss metaphysics entirely, saying that its insistence on precision is useful to society. This is a noble end, since to save humanity and philosophers from enquiry into fruitless fantasies, which are painful to inquire into, is to save us and philosophers from needless pain. However, to do so, he will show that it is simpler to do so and true, since that is what he suggests.

Hume and Simplicity

Hume is not directly or at least outwardly concerned with simplicity or Ockham's razor nor does he engage directly with these as part of his project. Rather, it seems to me at any rate that Hume is using the notion of simplicity in an implicit way, relying on the assumption of its superiority in an explanation. However, he does give two notes, seemingly in passing, the first at chapter 14 of his *Enquiry* (Hume, 1970, p. 19) and second at chapter 26 (Hume, 1970, p.30). The first of these is preceded by a statement of empiricism, Hume claims that *all* of our ideas are *derived* from *simple* (i.e., uncomposed) sense data. This even includes our idea of God, which is formed by a kind of extrapolation to the infinite of the virtues which we *experience* in our day-to-day life. The idea of God is for Hume composed of an amalgam of other ideas, which are in turn derived from sense experience(s). Hume thinks that ultimately, all such ideas will have a *corresponding* sense impressions. I think this is the 'dogma' of reduction as Quine would term it is essential to the empiricist project (Quine, 1951, p. 20). However, it may be germane here to point out that Quine defines the dogma of reduction as a relation of equivalence, while Hume uses 'corresponding' and 'derived' seemingly interchangeably, with Humean derivation, implying something more like 'composed of' and therefore slightly different to the '1:1' relation that equivalence connotes (Quine,

1951, p. 20). This is a problem then that will need to be cleared, what exactly is meant by ‘correspondence’ and ‘derivation’ for Hume.³⁸

The second statement is found later and denotes a slightly different notion of *reduction* (Hume, 1970, p.30). Here what happens is that we reduce vast numbers of ‘things’ and events down to few principles. Hume’s examples include gravity, cohesion of parts and motion. What he is keen to point out is that these are by no means “ultimate” causes. This seems to be part of his “anti” metaphysical project and his ‘skeptical’ stance (Hume, 1970, p.31) Hume takes it to be that the lack of ‘finality’ (in the sense of ultimacy) in these principles is not necessarily due to the principles themselves not being the final principles, rather the lack is a function of our own inadequacy. We can see how this is ‘simpler’; it allows us to explain a large number of events using very few principles, without having to discuss each individual instance that happened (or didn’t) and without being metaphysically ultimate. The principle we use to explain why objects fall isn’t justified by a simpler or more ultimate principle that we can know through reasoning through all the instances.

Now it seems to me that Hume should be keen to maintain that these principles (like gravity) are secondary, in a sense *derived* from the instances from which we infer them. This in turn generates an ambiguity: it seems on the one hand Hume must say that the principle explains the phenomena which are ascribed to it, that gravity explains objects falling rather than flying, and thus is the simplest possible explanation for that being the case. What I mean is either gravity *explains* why objects fall or it doesn’t (at least better and simpler than anything else), if it doesn’t then the simplicity we are discussing here seems to be a kind of simplicity of ‘reference’, we are simply using a one-word catch all to describe all past observations of the phenomenon. On the other it seems like it shouldn’t ‘explain’ since then we have a kind of circularity, since gravity explains incidents of objects, but we seem to get the idea of gravity from the experience(s) we have of objects falling.

³⁸ There are ideas for Hume that are not compounded, designated ‘sublime’- pure /simple experience unadulterated by our own interference. ³³ See chapter 26.

In fact, we can see the same ambiguity in the earlier instance of simplicity, where the idea of

‘God’ is composed of uncomposed sense experiences. Therefore God (like ‘gold mountain’ or ‘virtuous horse’), as an idea, really is just linguistic shorthand, for infinitely wise, powerful, benign etc. and more specifically the sense experiences that those ideas are derived from, which simple or uncomposed. I think that he intended in 14 to stress an uncomposed notion of experience and that latter at 26 to show how, with reduction we may simplify many instances into a principle which explains which explains the instances. If we delete the explanatory power of this type of simplicity, we are left with a referential notion of simplicity, which cannot really connect truth to simplicity since it seems arbitrary to ascribe *more* or a *better* truth to the brevity of an expression that is not reducible to the power of ‘terminology’, which allows its users to summarise their conversations without compromising on clarity or truth, like doctors and nurses in theatre.

I think I have slightly deeper problems with Hume’s definition(s) of simplicity. In short, they follow the structure illustrated in Chapter I, namely that it is either that simplicity is presupposed as part of the intellectual furniture that all comers are entitled to or that one cannot show why it *should* be part of an intellectual project at all. In Hume’s case, this is made worse by the fact that these two notions of simplicity seem to possibly conflict with one another. The first one defines experience as simple, while the second defines reduction as the activity of simplifying many particulars into general principles. So, which does Hume prefer?

I think there are two options here, either both statements of simplicity are parallel (distinct but not in conflict) and therefore reconcilable or they are actually in conflict with one another. This second option is obviously the most problematic for Hume’s project and could undermine much of the work Hume does. That these two statements are congruous would be useful. The first posits that there are simple sense experiences,

the second that there are discreet instances which form the basis of our principles, the principles being the result of a mere simplification of our thinking which is termed reduction, So, reduction aims at a kind of simplicity, the result being laws of nature, like gravity, then laws like 'gravity' are *derived* from sequences of sense experiences, but also *correspond* to simple sense data.

We could also say that 'gravity' and 'God' are composed. But if they are composed (derived or correspond) of the same thought 'stuff' as each other, they can then be reduced to the same 'thought' stuff i.e., experience, in the same way presumably and so we can then have one common operative notion of simplicity. This then means that the second statement, in so far as it is a statement of simplicity, is to be read as an elaboration, with an additional example, of the first. This would then mean, that whenever Hume uses the term principles, he intends explanatory simplicity, ultimately comprised of simple experience(s).

Unfortunately, this reading has a problem in what one might call the 'direction'. In the first statement, 'God' as an idea is composed out of our more 'fundamental' and *simple* sensory data, while in the second simplicity is what allows us to reduce the number of particulars down, from many instances of objects falling to gravity. The second kind is a general principle that simplifies by explaining a larger number of phenomena. These are two very different notions of simplicity. The first, for lack of a better word is the immediate instance and sensory experience that we reason *from*, latter the simplicity of the general principle (or at least is more concerned with this) that we reason to, and then from. This is I think in principle part of the problem with the fact Hume seems to use the terms correspondence and derivation, interchangeably, since the sense of correspondence is 1:1, while derivation suggests more of a composition out of. I think we should forgo the idea that these are really the same. One way would be to say that our sense experience (which is one kind of simplicity), is prior to the others. So, our sense experience is prior, we derive all our knowledge from it, because everything else is composed from it, including our ideas about the laws of nature. One might ask whether this leaves a problem

as to which of those two is simpler, whether it is experience or the general principles, since if gravity is to explain all the instances in which it occurs it must be prior to them as each instance would be an instance of the same thing that explained each instance, or it would be better to say the principle is explained by the instances.

However, what suffices for now is that whatever simplicity actually is for Hume is intrinsically connected to our sense experience. This shouldn't be controversial, for as an empiricist Hume was concerned to show that all knowledge is ultimately derived from sense experience. One way to discuss this is to ask, "Aren't the two (if we assume scientific laws are derived from sense experience) in tension with each other?" The one is very particular and the other 'two' are general, the one is prior to the others while the others are essentially a feedback loop to the former one. Now, it is either simpler, since simplicity is one or the other, to talk of gravity or God, or it is simpler to think of the experiences which 'undergird' those terms?

One response to this problem is essentially deflationary. It could be possible that this ambiguity is not really a problem for Hume. Would it suffice to say which one he is using here or there or to allow him to use each tacitly so long as he is consistent in that use, i.e., is there a need for the idea of simplicity to be uncomposed? Is there any just cause for saying that we should have one notion of simplicity? There is no way I can quarrel with the questioner here, but the point is then, which of these two notions are consistent with Hume's project of removing the abstruse and difficult subject of metaphysics. If we look from this vantage point then, one or the other of Hume's notions of simplicity will permit us to do so. We should be able to say given such-and-such an idea of simplicity, then there is no metaphysics possible or that metaphysics is minimal at best. For Hume there is no metaphysical notion of simplicity, nor can there be without compromising his project. All propositions can be understood either as relations of ideas and matters of fact (Hume, 1970, p. 25)³⁹, and since all Ideas (for Hume at any rate) are derived from sense

³⁹ see chapter 20 of the *Enquiry*

impressions (Hume, 1970, p. 19)⁴⁰, it follows that all knowable true propositions are derived from sense experience, thus excluding the possibility of interesting results in metaphysics. None of the two notions of simplicity that Hume discusses can deviate beyond what can be expressed in those terms then. But here lies the rub, if there's no metaphysics (or not a meaningful metaphysics), then there cannot be a metaphysical simplicity that's intellectually useful. But if we say there is no metaphysics on the basis of the simplicity of saying so, this would presuppose the simplicity of doing so. In short experience itself must be simple.

Perhaps this will make it clearer:

1. If all propositions are reduced either into a relation of ideas or a matter of fact, there is no metaphysics.
2. If there is metaphysical simplicity (that is meaningful and intellectually useful), then there is metaphysics of some kind is possible.
3. The reduction of all propositions into matters of fact and relations of ideas (i.e. nonmetaphysical) is justified by the non-metaphysical notions of simplicity given by Hume. (Derivation or reduction and correspondence)

Therefore, a non-metaphysical notion of simplicity is the justification for there being no useful metaphysical discourse.

Reduction, as was noted above involves the activity of *simplifying* the many particulars into general principles. The general principles in this case would be matters of fact and

⁴⁰ See chapter 13 of the *Enquiry*

relations of ideas. The point is this, in order for Hume's project of denying metaphysics to work, he must reduce all ideas like gravity and God (and simplicity) to non-metaphysical experience. If that's the case then simplicity implies its own non-metaphysical status. It must then be identifiable with experience, being therefore either circular or outside the ambit of Hume's two kinds of truth.

It would be circular in this way. Since reduction is a function of simplicity, it is the shifting of particulars down to a general principle, Hume's two kinds of truth would be in the "boxes" into which the all was reduced and these boxes are by nature non-metaphysical (at least as Hume would have it). Simplicity is an idea as well, so it must fit into either of the two non-metaphysical boxes and thereby be non-metaphysical. But we reduce because it simplifies, so simplicity fits itself inside a non-metaphysical box because it is simpler that it do so. Thus, it must be that simplicity is simpler when non-metaphysical, and yet we need simplicity to put everything inside the non-metaphysical boxes relations of ideas and matters of fact.

If the foregoing is true, then Hume is left with one option I think, that simplicity and experience are one thing, since he cannot accept that circularity, nor can he accept that simplicity is metaphysical and thus lies outside of his famous cleavage. Then experience must be uncomposed, that is the simplest thing that can be. Presumably, in one way this is what Hume wants to say anyway, that since the razor would have us choose the simplest explanation, the simplest thing must be experience. As an empiricist Hume would want to say that the best explanation must be the one that is closest to our sense experience and experiences. We do not, for Hume, derive our idea that objects fall when left suspended in the air from some reasoning *purely* by itself, but rather with aid of experience.

This is where the tension between the two notions of simplicity comes back into focus. If the reader remembers, we said we had two notions of simplicity. One was a kind of

‘fundamentality’⁴¹ and was attributed to sense experiences which composed our notions such as God and gravity, the sense experiences were uncomposed while the Ideas (like God) were composed. The second and third seemed to be like a simplicity of reference or explanatory simplicity (that seemed to amount to the same thing). We derived our notion of gravity from a large sequence of sense experiences, while we never really ‘get’ the true undergirding principles themselves, much in the same way that words are not the things themselves, but signs. We averred earlier that the sense experience was *prior* to the second simplicity, was a shadowy kind, since impressions are always more vivacious than any memory or abstraction from them (Hume, 1970, p. 17)⁴². Now we see that the ‘second’ notion has to be ‘inside’ the principle that generates the first! However, they ‘push’ in ‘opposite’ directions. Therefore, the same principle, experience, is both kinds of simplicity, that ‘pushes’ in two opposite directions at the same time.

For Ockham’s razor, in the sense of the appeal to simplicity, it seems as if we can’t choose between the general principle and the generative experiences. The general principle is not simple at all, but actually composed of lower order experiences. The other fundamental simplicity of experience, giving some account, leaves us without any substantive notion of what it is we are appealing to, when we use the razor. If I think I see green, it is simpler to suppose I see green, I think I hear cat noises because I hear cat noises, not dog noises. Redundancies aside any content I give to the ‘fundamental’ notion of simplicity is essentially incommunicable without the second ephemeral one, I can’t say how I differentiate between them, without presupposing it. Yet, to even attain to this observation, requires that I be possessed of the second notion.

However, the two ‘kinds’ of simplicity are embedded in experience from the beginning with neither being prior to the other. Since neither is prior to the other, the only conclusion possible is that they are the same. Hume cannot dispense with one or the other notion without comprising his project. If he says that the latter notion (found at chapter

⁴¹ In the sense that no further ‘thing’ may be found. It might be said to be prior to anything else in our thought for Hume.

⁴² See chapter 11 of the

26) is actually not necessary and can be dispensed with (or be seen as secondary to the other), he will have no account of why or how laws of nature are formed by experience. He also cannot dispense with the *idea* that experience is the simple 'material' from which all of our ideas are derived, he forgoes the entirety of his empiricist project. We are in a sense forced to go back to original thesis that the two notions of simplicity are the same. However, this means that there is an idea which is not reducible to experience, either as a relation of ideas or as a matter of fact. Therefore, there must be a metaphysical simplicity, which is prior to both 'latter'(posterior) notions employed by Hume. But this would mean that there is something which is irreducible to experience.

If the reader will permit me to illustrate what I am saying in the *Kantian idiom*, that Hume has failed to reduce simplicity to either *analytic* or synthetic judgement, it follows therefore that simplicity is neither synthetic nor analytic (if we assume as Quine and Scruton (Quine, 1951, p.20)(Scruton, 1996) do that Kant's terms are foreshadowed in Hume's distinction). I do not want to get too involved in whether Kant would have endorsed this interpretation of simplicity, the point was more to illustrate that Hume's terms are insufficient for the use of the razor as the appeal to simplicity, since, it would mean that the user either steps outside of Hume's epistemic framework and helps himself to a metaphysical notion, or assumes that the non-metaphysical notions of simplicity proffered by Hume are sufficient to allow one to assert that the simpler explanation is superior. Yet, there is no evidence on these two notions that it is possible to assert such a thing. In fact, it seems to me that the opposite is true, that since the two are in tension with each other, that we should think that they may not justify anything.

However perhaps it may be worthwhile to turn the forgoing argument on its head. The argument purported to show that Hume's reduction of all ideas into either relations of ideas or matters of facts was circular since reduction is a form of simplicity or insufficient given the 'tension' embedded in the two notions of simplicity given by Hume. Perhaps, a defender of Hume might wish to suggest this, that the two 'simplicities' are not really one and are given the same name by virtue of analogy and we should *not* 'read' them together or too literally, that Hume is actually using a turn of phrase. We do not need an independent notion of metaphysical simplicity, in order to reduce all ideas to experience.

What we should use and is justifiable is the statement of the razor that allows us to parse entities away, “Do not multiply entities beyond necessity”.

Hume and the ‘other’ razor

If we could find a way to dispense with all of the metaphysical notions and use Ockham’s razor, we can say that metaphysical entities are unnecessary entities (including perhaps metaphysical simplicity). This is to read the two expressions of Ockham’s razor as distinct principles, and then we read Hume as giving us the means to reduce all of our ideas and propositions to either relations of ideas or matters of fact. Simplicity then isn’t anything over and above experience, our ideas are composed of sense experience and there are no knowable entities outside our sense experience or none that we can use. Metaphysics is then redundancies and fantasies and Hume’s project of dissolving metaphysics is complete.

Hume thinks that a things existence is established, not by reasoning through relations of ideas, rather it as a matter of fact and experience (Hume, 1970, p. 35)⁴³. Let us imagine Hume in dialogue with our skeptically inclined five-year old girl who is insistent on the existence of unicorns. Hume of course would raise more than an eye-brow to such a suggestion. Now the existence of unicorns cannot be established by reasoning from relations of ideas. There is no logical contradiction in the idea that unicorns exist (or don’t), which is the definition of a relation of ideas, you need only put the idea of ‘horn’ and stick it on a horse (we will leave aside the exotic colours and magical properties). There is even an analogous idea in deer and horses, which bear a relation of *resemblance* to unicorns.⁴⁰ In addition the horn is found on narwhals has an attestable existence in nature (indeed this is the *official* explanation of unicorn horns). This is not enough for Hume, who was more than willing to accept that this true (presumably *sans* magical properties), but that what was needed was some sort of experience to establish the things existence, outside the pages of a few children’s books and the toothless retellings of ancient mariners and wanderers. To Hume we need experience to show us *that* something

⁴³ “We have said that *all* arguments concerning existence are founded on the relation of cause and effect; that our knowledge of that relation is derived entirely from experience; and all our experimental conclusions proceed upon the supposition that the future will be conformable to the past.” See chapter 30 of the *Enquiry*.⁴⁰ One of Hume’s three kinds of relations of ideas (Hume, 1970, p.24).

could exist, since reasoning about relations of ideas tells us what is and is not possibly in existence by virtue of necessity, while our notions of matters of fact always have probability in them and therefore it follows that we need experience to adjudicate these matters.

The reason for this is that probability implies that the contrary might be occasioned (Hume, 1970, p. 25)⁴⁴. That unicorns exist or do not, is the same kind of proposition as whether or not the sun will rise or objects will fall or stay suspended in air, at least from the perspective not being a relation of ideas, in this case not. The only difference for us, as to why we don't believe that the object suspended in air will stay or move upwards or why no serious-minded person is persuaded of the existence of unicorns, outside of questions about, "What do you mean *exist*?", is experience. Our own personal experience and that of others is therefore essential in making claims about the existence of things, given the inability of reason to do so without the aid of experience. Therefore, when we wish to either affirm or deny the existence of things, to Hume, we will need experience to help us.

Another take home point is this the argument implies that experience supplies our reasons for thinking something is or is not and is or is not the case, that or those reasons must, if the reader will permit me the use of the Leibnizian idiom, be 'sufficient' since some are clearly insufficient. This means that Hume endorses some principle akin to the principle of sufficient reason (PSR). Indeed, it would be strange if he didn't, since it would be self-contradictory to do so. The principle states, for that anything that exists there is a sufficient reason that it does so. We now might be able to see the razor (this second iteration of the razor), as a kind of negative PSR, when there is an absence of a sufficient reason for thinking that say 'x' is the case, we might infer that it does not exist or the contrary state of affairs, as a matter of fact does not pertain. Mary Willard, in her critique of Quine in 'On Simple Theories of a Complex World', has also argued that Ockham's Razor is justified through the Principle of Sufficient Reason (Willard, 2014, p.178). Indeed, Willard has said much of what I have been attempting to illustrate throughout

⁴⁴ See chapter 21 of the *Enquiry*

this thesis; namely that the razor itself entails certain ontological commitments, which many will find unpalatable, such as the existence of God (Willard, 2014, p. 179).

The Last Argument

The basis for Hume's claim that experience supplies the grounds for our reasonings concerning matters of fact is essentially two-fold, first is what we have discussed above, the inadequacy of reasoning from a relation of ideas to a true claim as to the existence of entity. Therefore, experience must be the grounds of inferences and is the basis of all of our reasonings concerning matters of fact. Secondly, the way that experience establishes matters of fact is the constant conjunction of events following each other. This means there cannot be a non-circular reason for such. Hume's example of the rising of the sun is illustrative,

1. Today, yesterday and the day before (and so on) the sun.
2. Experience has told me that what happened in the past will happen in the future.

Therefore, the sun will rise.

Therefore, instead of there being a 'reason' that the sun rises, that we can know that then undergirds my inference that it will rise, there is a similitude between events that have occurred so consistently that my psychology convinces me that this is the case. My thinking that the sun will rise tomorrow is the result of this constant conjunction, not some mysterious and unobservable reality to these events. So, the justification for thinking it so is not so much in the *things* or events but actually in human psychology, emergent from the nearly total agreement of experience on this issue, there is no reason so to speak other than that's just how we think, no interlocutor can seriously disagree that they are bound by the limits of human thought. If this is a serious limit of human thought, then we cannot really know the ultimate reason *why* it is this way or that. This is exactly what Hume wanted, these metaphysical objects constituting the things that are to be study by the abstruse and difficult form of philosophy, which Hume wishes to limit.

Where does this leave our ‘negative’ Principle of Sufficient Reason or Ockham’s Razor? If experience only gives us an *psychological* reason (i.e. a reason that is indifferent to the truth) for our reasoning about matters of fact and this grounds of our razor, then the razor is has the same authority and justification. However, the razor was necessary to ‘parse away’ the ‘medium’ (Hume, 1970, p.37)⁴⁵ that is the object metaphysical speculation and the grounds of cause-and-effect reasoning. Thus, to get Hume’s version of the razor, Hume needs the razor to mean that the medium does not exist.

1. The existence of all objects is established by experience.
2. There is a circularity in positing that an object exists via experience.
3. The razor removes objects that are unnecessary (a kind of negative Principle of Sufficient Reason).
4. The grounds of the Principle of Sufficient Reason (if you will) for Hume is experience.

I think we can see that the razor for Hume actually already implies that there is no ‘real’ middle term in the classical sense given by Aristotle (see Chapter II). No, rather the ‘medium’, as the idea of ‘necessary connection’, exists in ‘us’, but is not necessary to our understanding how it is that we think it so, since that can be accounted for in terms of the constant conjunction of experience.

However, this either implies that there is some knowable necessary connection, such that an object is or is not, so that we are forced to deny Hume’s claim or that the principle of Ockham’s razor does not necessarily apply or that it is circular. It may be clearer to put it like this, the razor, as a kind of ‘Principle of Sufficient Reason’, requires there to be a sufficient reason, and that is necessarily the case, although in the case of the razor it is ‘negative’, in the sense that the absence of a reason is sufficient grounds for denying the existence of the thing in question. In Hume’s case the reason for positing the existence of something is given by experience and in particular the constant conjunction thereof.

⁴⁵ See Chapter 32 of the

However, the entity of the ‘medium’, that he then uses the razor to dispense with, which has contained within it the idea of a necessary connection, is superfluous to the account of this thing. However, my point is that the ‘medium’ has within it the ‘necessary’ connection which undergirds the razor since there must be a necessary connection between the absence of a reason and the non-existence.

Hume is presupposing that reasoning about matters of fact is sufficient by itself, at least in the case of the razor. Hume’s original argument, that reasoning through relations of ideas is insufficient to establish the existence of something, in a sense still stands, however now, I hope I have shown, so is Hume’s other form of non-metaphysical reasoning, reasoning in terms of matters of fact, on its own terms it is, I think insufficient to account for the razor. Given, that the way I have shown this, I think that there is necessarily a third kind of reasoning and that this is what undergirds our understanding of the razor.

Conclusions

It is I think no accident that this is the case, Hume’s empiricism compels him to deny that there is a ‘medium’. For Hume, the medium is what we fallaciously think grounds the idea of a necessary connection between events. Hume claims such a thing does not exist and that we can do without it. His account of simplicity in some sense mirrors his fork, the matter of fact roughly equates to the kind of simplicity found in chapter 14 of the *Enquiry*, where we have equivalence, while the second, the analytic, corresponds roughly to the notion found in chapter 26 of the *Enquiry*, all instances of gravity are instances of objects falling. I think I showed something of a tension here. But Hume is not alone. Quine also recognizes this problem in ‘On Simple Theories of a Complex World’ (Quine, 1963, p.103), calling it a problem of curve fitting and contrasted simplicity’s relativity with the absoluteness of truth (Quine, 1963, p. 104). Further Sober identifies this problem and refers to it as the ‘problem of simplicity’, which he illustrates with a simple example, the plotting of data points in an experiment, the problem is one of the general relationship, choosing one hypothesis may be closer to the data as we get

it, the other may be a more elegant curve and extrapolate the data better (Sober, 2002, p.16).⁴⁶ One may remember that at the beginning we dealt with Bayesian analysis and the distinction between the polynomial and the six-power law, the latter of which essentially plotted data points while polynomials are like algorithms. The problem then should become clear, each of these philosophers (and a pair of statisticians) have the same problem, one kind of simplicity is direct data, which while in one sense very precise and particular, but is predictively useless. The other is predictively far more valuable and in fact ‘works’ or derived from the other form (‘six power law’). I think I showed in the preceding work how this was impossible to solve without positing either an essence or metaphysical idea of simplicity. In fact, the dissolution of metaphysical notions had the prerequisite of there being only the non-metaphysical notions of simplicity, which means it either had to posit a third (presumably metaphysical idea of simplicity), which would be in contradiction with the project of empiricism, or one must simply assert it but on pain of circularity. A similar fate befell the Quinean simplicity, one had to presuppose the non-existence of the quality (say of aggression) in dogs in order to beget the relativity of simplicity, since the existence of such a quality cannot be relative when we are thinking about the entity which possesses the quality. However, we only get to rid ourselves of the necessity of positing the existence of such qualities because it was *unnecessary* i.e. the simplicity of doing so was commendable. We would then need another, more ‘absolute’ notion⁴⁷ to ground our move in doing so, but this would dissolve the relativity of simplicity.

The other expression of the razor advises a kind of restraint in the positing of entities. Here Sober argued that it could be as justified as a principle like induction. We retraced Humean induction to see if that worked, and found it didn’t since it asked us to erase metaphysical entities such as the middle which necessary to the use of the razor; also a certain kind of naturalism, the one that moves from *methodological naturalism* to *ontological naturalism* could not support the razor, since the *methodological naturalism*

⁴⁶ In fact, Sober also likens this problem to one of ‘curve fitting’.

⁴⁷ I put that in quotations to avoid Hegelian connotations.

presupposes the ontological variety, since we are asked to only look for and find natural entities, which if we did we naturally arrive at an ontological naturalism.

Although we need only posit purely naturalist or nominalist ontologies to superficially account for the ‘coin’ tossing example, when we go deeper and ask ourselves about the grounding of the razor. We could it seems always ask Quine or Hume why we ought to chose their version of the simpler theory and it seems they can only ever be at a loss when it is pointed that the existence of universal makes our choice of such non-arbitrary, the cheat coin has some essential features that explain, in a far more powerful way the reason why the data looks the way it does. One can by extension, push the argument forward, Einstein’s predictions were superior to the Newtonian theory, because they were a necessary outcome of his principles, which also accorded with the data better. It is this necessary connection that makes for essences, or rather the other way round. Since for Hume there is no necessary connection between ‘gravity’ and instances of objects falling, and indeed nor for Sober (Sober, 1981, p. 151), both denying the necessity of the existence of such a thing, it becomes a curious fact that that we tend to be suspicious of explanations with too many principles or entities becomes an enigma. When we survey the wide array of what we know, we’ve come to inherit it through what are often very byzantine means. This is inductive evidence against the use of induction to establish the principle of parsimony, if the reader accepts it. Both Hume and Sober deny the necessity of positing the existence of the explanans (see chapter 26 of the *Enquiry*) (Sober, 1981, p. 151). The only reason that they cannot be called ontological nihilists, is that they stop short of razoring away the existence of the appropriate or adequate explanans. But if it isn’t needed then we should razor it away, shouldn’t we? The response is that this would mean that we would have no way of explaining the explanandum. The nihilist can justly ask the empiricist why Sober and Hume are entitled to such *lese majeste*? Quine apparently bit this particular bullet and embraced ontological nihilism, razoring away potentially the whole of existence, albeit tempered by a pragmatism.

I don’t think it is really possible to agree with nihilism, not just only because it would leave us without an explanation for anything whatsoever, as Sober and Hume wished to avoid it. I take it they agree. Ockham’s case involved a similar circularity where he

presupposed his radical nominalism in his understanding the principle of non-contradiction and simultaneously presupposed the razor, albeit his version. For these reasons and the reasons enumerated in previous chapters I think that I have established a reasonably strong case that realist ontologies have a stronger account for why the principle of parsimony is applicable and how it is justified. It is therefore that we can say with some confidence that a realist ontology solves the problem presented in Chapter I better than its opponents.

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ⁱ The reader may notice the alternative spelling of his birthplace's name. He also is known as *Venerabilis Inceptor* (Venerable Enterpriser) or the Invincible Doctor.

