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# **Does Methodological Naturalism Lead One to Accept Ontological Naturalism?**

by

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Science excludes the supernatural in its explanations and theories - a principle called 'methodological naturalism'. This strategy of eschewing supernatural causation has been criticised, in particular by some religious communities. One reason given is that this principle leads one to a total rejection of anything supernatural (ontological naturalism). In this paper I argue that methodological naturalism is a stable but also necessary position, which does not cause one to accept an atheistic worldview.

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# Does Methodological Naturalism Lead One to Accept Ontological Naturalism?

## Introduction and Overview of the Thesis

Science is neutral as to the existence of a supernatural realm. This, in a nutshell is the view of methodological naturalism (abbreviated as MN): the basic principle that the scientific method restricts itself to naturalistic explanations and eschews any form of supernatural causation. Note that MN does not deny the existence of a supernatural realm, whereas ontological naturalism (abbreviated ON) makes the substantive claim that the natural world is all there is.

The concept of MN has increasingly come under a two-pronged attack: some voices from religious communities regard MN as too restrictive, blocking the way to a fully comprehensive picture of nature. The scientist should follow the evidence, wherever it leads and therefore accept supernatural causation (Plantinga 1997a). On the opposite side, some advocates of ON who reject any form of supernaturalism, declare MN as too lenient. The concept of MN leaves the backdoor open for supernaturalism and science would stand on firmer ground by abandoning MN and adopting ON (Coyne 2016).

I refer to these extreme views as 'radical theism' and 'radical atheism' and contrast them to 'moderate' theism and atheism. As an ontologically neutral position MN can accommodate both, the acceptance as well as the rejection of a supernatural realm. However, both radical views allege that MN is an unstable position which forces one to either admit or deny the supernatural. Considering the main goal of science - the explanation of natural phenomena through natural causation - the MN-based methodology of science is more likely to lead one to the rejection of a supernatural domain. The alternative would be a type of theistic science, admitting supernatural causation, which would not be acceptable to the science community. If MN was indeed an unstable position, it is more likely to be supplanted by the more substantive doctrine of ON.

In this thesis I argue that MN is a mandatory restriction imposed on science; it is a necessary requirement in science for explaining phenomena encountered in the natural world. The

question of whether MN is an a priori requirement or not will be discussed. It will be shown that MN is a stable position that does not slide into ON.

Chapter 1 begins with an outline of the concept of 'supernatural', pointing out the difficulties when distinguishing natural from supernatural explanations of events. This chapter also presents working definitions for MN, ON and theistic science. I divide supporters and critics of MN into four categories: radical and moderate, theists and atheists.

Chapter 2 discusses the arguments for the alleged slide from MN to ON. Radical atheists claim that the scientific method for probing reality does (or will eventually - given sufficient time and resources) answer any gaps we still have in our understanding of nature. Thanks to past successes of science the possibility of a supernatural sphere, left open by the concept of MN, has diminished steadily and has been replaced by a comprehensive naturalistic worldview (ON).

The opposite camp of radical theists echoes the claims of radical atheists and basically agrees with their arguments that the principle of MN in the methodology of science leads one to reject a supernatural realm, in particular a personal deity. Both extremist sides therefore claim that there is a slide from a provisional rejection of a supernatural realm while doing science (MN), to a total rejection (ON). The radical theist's solution is to replace MN with a type of theistic science, which makes allowances for supernatural causation.

After outlining the reasons given for the alleged slide, the rest of the thesis is focused on the critique of MN directed from both extremist sides. The aim is to refute any criticism and demonstrate that MN is indeed a stable position which does not have to give way to the comprehensive worldview of ON.

Chapter 3 confronts the critique of MN coming from the radical theist camp. Alvin Plantinga, a philosopher of religion, will be their spokesperson listing their arguments against MN. One of the main concerns is that MN acts as a straightjacket for science in its search for truth.

Chapter 4 distinguishes between two possible historical pathways leading to the concept of MN. One is a slowly emerging process of supernatural explanations being supplanted by naturalistic ones. The second possible origin of MN traces its roots back into the Middle Ages, being triggered by Christian theistic arguments. The latter pathway would be evidence against the criticism of MN raised by radical theists.

The principle of MN only comes into play when explaining observed phenomena. It does not prevent the scientist from investigating any claim of supernatural causation. However, MN has often been interpreted as an a priori requirement in science to shun the investigation of

alleged supernatural phenomena. In order to eliminate this confusion, the concept of 'provisional' MN has been introduced (Boudry 2010). The pros and cons of this move are being discussed in Chapter 5.

The attempt of introducing the concept of a provisional form of MN highlights the importance of distinguishing between natural and supernatural causation. Chapter 6 goes into some detail about the question on how to demarcate the supernatural from the natural. This distinction does become critical when we want to isolate natural causation for the explanation of observed phenomena in rejection of supernatural causation. Four propositions are listed as distinguishing criteria; however, they do not provide us with a single benchmark or joint group of principles for an unambiguous definition of the term 'supernatural'.

Chapter 7 deals with the critique of MN voiced by some radical atheists: MN leaves open the possibility of supernaturalism and all its ensuing uncertainties. Science would stand on firmer ground under the umbrella of ON. In this chapter I present the arguments voiced by the philosopher and scientist Martin Mahner (2012) who claims that science requires ON for its foundation. I will argue that such a restriction is unfounded and unnecessary.

# **1. Two Types of Naturalism and their Role in Scientific Justification**

## **1.1. The Meaning of 'Supernatural' – A Working Definition**

Brief definitions of methodological naturalism (MN) and ontological naturalism (ON) are given under the next heading. Both call for an unambiguous distinction between what we call 'natural' and the 'supernatural'.

At the outset it is important to differentiate between observed phenomena and their causal explanations: Any event that can be witnessed with our senses<sup>1</sup> is part of the natural world. On the other hand, the observed event can have a natural cause (known or yet unknown), or it may have been given (or demand) a supernatural explanation. As an example, any healing process of a cancerous tumor will be an event within the natural world. As such it might have a known natural explanation, or it might be ascribed to a hitherto unknown natural cause. Another observer might assign the healing to supernatural intervention; however, this explanation would fall outside the purview of science (according to the principle of MN, as explained below). Similarly, a transformation of water into wine, as reported in the Bible, would be open to scrupulous scientific investigation, although such an event would (probably) remain inexplicable in terms of known scientific laws.

However, when attempting to define the supernatural I will follow the common usage of the term 'supernatural' as a depiction of an event which defies a natural explanation, thereby blurring the distinction between the observable event and its explanation. For example, in the case of a shrinking tumor in response to intercessory prayer, we would simply describe it as a supernatural event.

As an example, for the definition of the supernatural we can take the statement from the Belgian philosopher Maarten Boudry:

[W]e propose to define 'supernatural' as referring to any phenomenon which has its basis in entities and processes that transcend the spatiotemporal realm of impersonal matter and energy described by modern science. (Boudry 2010, 233).

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<sup>1</sup> This includes observations only discernible through instrumental extensions of our senses, using microscopes, spectrometers etc.



As we will see later, this definition is flawed, showing that it is exceedingly difficult to propose a clear-cut demarcation. Chapter 6 will list a number of criteria which are commonly used to distinguish the supernatural from the natural. One characteristic of an event classified as supernatural is that it does not follow any known laws of nature. Another common attribute of supernatural events is that they don't appear contingent, but exhibit teleological traits and present themselves as goal directed (e.g. supernatural healing, water turning into wine).

## **1.2. Two Types of Naturalism – Ontological and Methodological**

There is no precise definition for 'naturalism'; it is generally regarded as the assumption that reality is exhausted by nature and that it contains nothing 'supernatural' (Papineau 2016). The main problem comes from the fact that there is no clear-cut demarcation between the realms of 'natural' and 'supernatural', as indicated above.

In this paper the primary focus will be on distinguishing two components of naturalism: ontological and methodological naturalism. The ontological constituent deals with the contents of reality, whereas the methodological component is concerned with the ways of investigating reality.

Ontological or metaphysical naturalism (ON) makes a statement about what exists or doesn't exist. Commonly, the ontological naturalist makes specific claims about what exists in nature and then adds a closure statement "and that is all there is" (Pennock 2000, 190). In short, ON denies the existence of anything outside the knowable and unknowable universe, including any transcendent non-physical worlds, supernatural entities or processes. However, Draper (2002) raises the concern that this definition rules out the possibility of naturalistically acceptable parallel universes, which could nonetheless be considered "physical" (although totally different to our "physical", they would still not be "supernatural" in the sense that concerns us). For this reason, Draper argues that the key element to ON is the claim that the physical universe is causally closed, that no part within the natural world can be affected by anything outside that system (Draper 2002, 198). For our discussion here, I will understand ON to be the claim that what exists in this universe does not go beyond the natural and that, whatever else may be the case in parallel universes, there are no causal interactions from 'outside' our

physical universe and therefore no interferences in our way of doing science. The distinction between Pennock's and Draper's definition of ON could become important when cosmologists consider other universes and conditions 'before' the Big Bang.

In contrast to ON, methodological naturalism (MN) makes no commitments as to what exists, but only outlines the proper methods of practicing science. MN does not deny the possibility of the existence of a transcendent, non-natural world; it simply ignores – in the context of scientific enquiry – any possible supernatural realm. The methodological naturalist eschews supernatural explanations of observed phenomena and is committed to purely naturalistic interpretations. MN remains neutral as to the question of whether or not there exists a supernatural realm.

It is important here to note exactly what MN excludes from the scientific view. MN is often regarded as an a priori philosophical commitment which does not even allow the consideration of supernatural explanations. This is not the case in everyday life: scientists routinely investigate events for which supernatural causation has been claimed, for example, miraculous healings. Such claims are conducive to scientific investigation and scientists have indeed investigated paranormal claims, telepathy, homeopathy, the effect of intercessory prayer and others. Science can deal with supernatural claims and MN only starts to function in the explanatory section of the scientific investigation. In no way is science prevented from studying the occurrence of supernatural or paranormal phenomena.

Paranormal claims have been tested and experiments on the efficacy of intercessory prayers etc. have been conducted all along. The exclusion of the supernatural is something arrived at due to the poor track record of supernatural explanations, and the success of naturalistic explanations. However, in principle, science needs to remain open on investigating any new claim of supernatural causation.

Following through with this distinction between the event under investigation (which by definition occurs in the observable 'natural' world) and the explanation of said event (which might have a natural, or an inexplicable supernatural cause), MN in effect becomes an a posteriori principle. This means that science does not hesitate to investigate an event claimed to be supernatural, but must be able to attribute it to natural causation, or label it as 'unexplained'<sup>2</sup>.

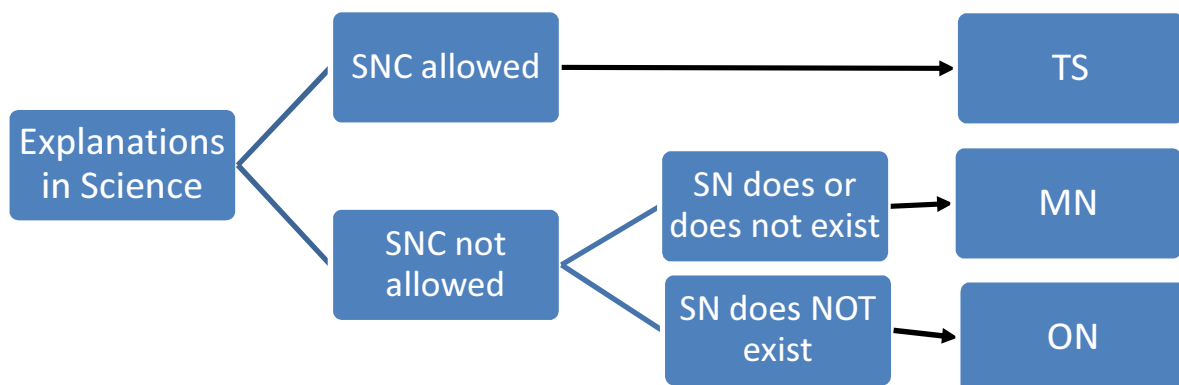
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<sup>2</sup> The event will be identified as 'unexplained', but not as inexplicable. The latter would concede a non-natural causation. If more evidence can be gathered, science will proceed in looking for a natural explanation.

However, the perceived a priori rejection of supernatural causation has been criticised as a bias of science against supernatural claims. This has led philosophers to distinguish between intrinsic MN (iMN) and a type of provisional MN (pMN). For all practical purposes iMN is equivalent to conventional MN, as defined above. Boudry (2010, 241) defines provisional pMN as “a provisory and empirically grounded commitment to naturalistic causes and explanations, which in principle is revocable by extraordinary empirical evidence”. As will be shown in Chapter 5, pMN falls short of its expectations and the distinction between natural and supernatural causation does not overcome the limitations introduced by the lack of a clear-cut demarcation between the concepts of ‘natural’ and ‘supernatural’.

Finally, I want to introduce the term ‘theistic science’ (TS). This concept is advocated by some critics of MN. It affirms the existence of a supernatural realm, but then goes one step further by allowing for supernaturalistic explanations to be part of science. We will encounter TS briefly in Chapter 3 when we examine Alvin Plantinga’s critique of MN.

The following diagram illustrates the positions of ON, MN and TS in respect to supernatural causation (SNC):



### 1.3. The Use of MN in Scientific Reasoning – Four Distinct Positions

In respect to the acceptance of MN as an explanatory limiting tool in science I distinguish between four positions (I restrict myself here to supernaturalism in a religious context).

(a) **Radical Theism** claims the existence of a supernatural realm which does affect the natural world in a recognisable way. In particular, science can identify those interactions as non-natural. Events ascribed to non-natural causes are not necessarily linked to a deity, for example the assignment of alleged healing powers of homeopathic remedies to some kind of mysterious 'energy'. However, I limit my discussion to the radical theist who argues that the intervening actions of a supernatural deity can be detected and explained by science as supernatural. For example, Alvin Plantinga calls for a God who "will intervene miraculously or otherwise, if and when he sees fit" (Plantinga 2011, 101). Radical theists are critical of MN and want supernatural explanations to be part of science. In other words, they call for a type of theistic science. Other radical theists, critical of MN are William Dembski (1999), Philip Johnson (1993; 1996), Stephen Meyer (2013) and Michael Behe (1996).

(b) **Moderate Theism** is the accepted view of theologians, plus a substantial number of philosophers and scientists. Physicist Howard Van Till (2001) describes the universe as being created with 'functional integrity', not requiring any outside supernatural interference in its lawful functioning. This view underlines the concept of a causally closed physical universe, however, without dispensing of a supernatural deity. God is regarded as the primary cause, acting through what science defines as the 'laws of nature'.

In this scenario there is no need to postulate supernatural causation that would derail the conventional scientific methodology and MN is taken as the correct working frame in the pursuit of science.

Other examples of scientists advocating moderate theism are: Theodosius Dobzhansky (1973), Kenneth Miller (2008; 2009) and Francis Collins (2006). Representatives for theologians who reject theistic science and defend MN are John Haught (2012), Keith Ward (2008), Alister McGrath (2017), Nancy Murphy (1993) and Arthur Peacocke (1993).

(c) **Moderate Atheism** is the position supported by the majority of philosophers and scientists<sup>3</sup>. This also includes the agnostic position, which neither affirms nor denies a transcendent non-natural world. According to this view a supernatural realm (presumably) does not exist, but even if it does, it has no impact on the workings of science. We have a very similar situation as before with moderate theism, except that moderate theists believe that a supernatural world does exist. As expected, moderate atheism will accept MN as a legitimate premise for the practicing scientist. The moderate atheist will reject theistic science with its implied supernatural causal explanations. ON will be regarded as a personal worldview which does not have any bearing on the methodology of science. In their view ON is not a necessary a priori assumption for the practice of science. The scientist, following the principles of MN, simply rejects any supernatural explanations of observed phenomena. Moderate atheists realise that their disbelief in a supernatural realm is simply a worldview which does not clash with an opposing worldview which admits supernatural entities, as long as any interaction with a spiritual world is excluded from the explanatory methodology of science.

One can draw a distinction between ‘positive atheism’, which is an active disbelief in the existence of God and ‘negative atheism’, the absence of belief (Martin 2007, 2). The latter is also called ‘soft atheism’ and is essentially the same as agnosticism, the position that “the existence of God cannot be proven, and skepticism is therefore appropriate” (LeDrew 2016, 256/6170). Richard Dawkins points out that the term ‘agnostic’ will apply to most people since only few will claim absolute certainty either way (Dawkins 2006, 50)<sup>4</sup>. Agnostics will be concentrated in the category of moderate atheism. They will also populate places of moderate theism and, as in the case of Dawkins, radical atheism. However, agnostics will not fall into in the category of radical theism.

Examples for advocates of moderate atheism (and agnosticism) are Eugenie Scott (2009a; b), former head of the National Center for Science Education in the US, Stephen J Gould (1992; 1997) and philosophers Michael Ruse (2010; 2015), Robert Pennock (1998; 2000; 2011) and Elliott Sober (2011, 128).

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<sup>3</sup> A 1996 poll conducted in the US by Edward Larson, a historian of science, showed that only 40% of scientists believed in a personal God, compared to more than 80% in the general population (Masci 2009). The 60% of nonbelievers will include the radical atheists, mentioned below; however, I assume that moderate atheists will constitute the majority. Incidentally, Masci also reports that a similar survey conducted in 1914 showed almost identical results.

<sup>4</sup> In his 2006 publication Dawkins puts himself into position 6 on a 1-7 scale. In a 2008 interview with Bill Maher Dawkins suggested it might be a 6.9. He confirmed the latter figure in 2012 during a discussion with the Archbishop of Canterbury ([http://www.age-of-the-sage.org/atheists/richard\\_dawkins\\_existence\\_of\\_god\\_scale.html](http://www.age-of-the-sage.org/atheists/richard_dawkins_existence_of_god_scale.html)).

(d) **Radical Atheism** denies the existence of anything beyond the natural world; if it would exist it would be accessible to science. As stated before, most atheists will accept MN as a sufficiently broad assumption for the working scientist, thereby falling into the circle of 'moderate' atheists. Jerry Coyne (2016, 17) indicates that there are a number of motivating factors for the atheist scientist to accept MN, e.g. the desire not to alienate their religious colleagues, or the funding of research work might depend on their attitude. Be that as it may, I will label the faction of scientists (and philosophers) as radical atheists who claim that the assumptions made under MN lead to, or forces one to accept an atheistic worldview (i.e. ON). Some will regard MN as too lenient, leaving the backdoor open for the supernatural. Others go one step further claiming that science requires one to presuppose ON (Mahner 2012; Lewontin 1997). I will show in Chapter 7 that this assumption is flawed and that the practice of science does not require any ontological restrictions as to the existence of supernatural entities.

Apart from the scientists already mentioned, Richard Dawkins (2006) and William Provine (1988) also qualify as radical atheists. Examples for philosophers are Maarten Boudry (2015) and Barbara Forrest (2000).

The two moderate positions are consistent with the conditions of MN in the pursuit of science, whereas both radical positions are critical of MN. In particular, the radical theist rejects MN and demands theistic science with its supernatural causation. The radical atheist will regard MN either as merely superfluous, with the worldview of ON as a logical consequence, or even demand ON as a prerequisite for doing science.

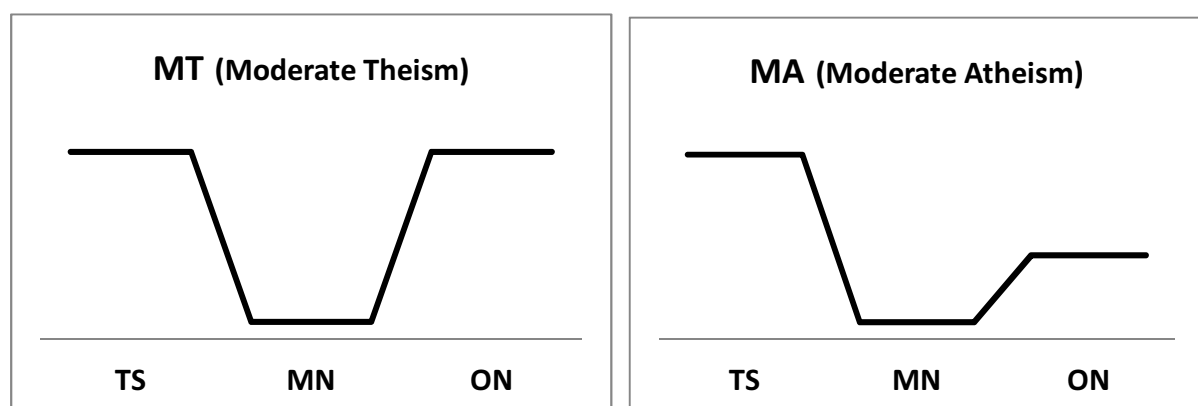
## 2. The Alleged Slide from MN to ON

### 2.1. The Relative Stability of TS, MN and ON in the Four Scenarios

As was pointed out in the previous Chapter, both the moderate theist and moderate atheist positions accept MN as a valid means for identifying and specifying natural causes for observed phenomena in the context of doing science. However, both radical positions claim that MN is built on shaky grounds which leads one into, or forces one to accept ON. In other words, the working assumption of the practicing scientist, namely the exclusion of supernatural causation, leads one to accept the worldview that denies the existence of a supernatural realm.

To better illustrate the perceived unstable position of MN and the alleged slide into ON I want to use a type of 'energy diagram'. These are commonly used in the field of chemistry to depict the relative stability of compounds which can convert into one another. The vertical y-axis represents the thermodynamic internal energy of a chemical compound: a low energy state indicates a stable position. The higher the energy state, the more unstable the compound becomes. The system will tend to drift to the most stable position at the lowest energy level. In our case the y-axis depicts the relative stabilities of the three positions to be compared: TS (theistic science), MN and ON.

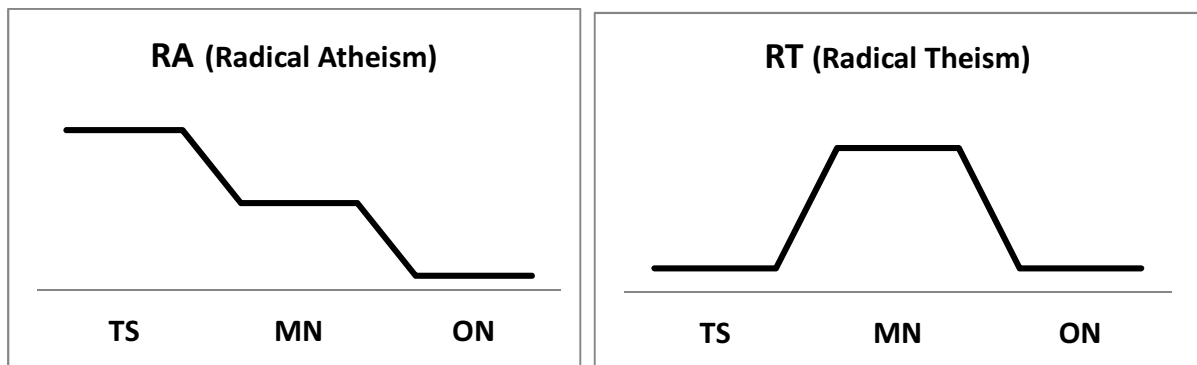
I start with moderate perspectives of theism and atheism:



For moderate theism, both TS and ON are unacceptable. MN is the preferred (and only) option to take in respect of explaining phenomena in the context of science. MN is a stable position and there is no slide from MN to ON.

Theistic science is also unacceptable to the moderate atheist and MN is the preferred option. ON is more tolerable to the moderate atheist than to any theist, however, the strong position of ON is considered as unnecessary. The moderate atheist believes that there is no supernatural realm, but - thanks to MN - the methodology of science would be sufficiently protected in any case. Again, there is no slide from MN to ON in this scenario.

The picture changes when we move to the radical positions:



In the case of radical atheism, TS is (of course) unacceptable. MN is tolerated, but ON is the preferred option. The slide from MN to ON as the most stable position is evident.

The situation for radical theism is the opposite of its moderate counterpart. MN is an unstable location which leads either to the stable (desirable) position of TS or slides one to the (undesirable) setting of ON. MN is regarded as “provisional atheism” (Plantinga 2001, 137) which forces one into a black-or-white dichotomy. The right choice is theistic science, but the strong pull towards ON, encouraged by the radical atheist, is acknowledged. The radical theist points to the claims of radical atheism and basically agrees that the suspension of supernatural causation in science (MN) will pull one towards the permanent worldview of ON.

In the following the two radical positions and their reasoning for a slide from MN to ON will be examined in detail.



## 2.2. The Slide from MN to ON in the Case of Radical Atheism

I want to start the discussion with the radical atheist position because here the slide from MN to the more stable (and desirable) position of ON is straightforward and easy to see.

The supernatural is not limited to religious belief<sup>5</sup>, however, the main discourse in this thesis is centred on science and religion, and I therefore restrict my discussion on whether the acceptance of MN leads on to a rejection of a belief in a supernatural realm governed by a theistic God.

Before tackling the problem as it presents itself in the 21<sup>st</sup> century, I want to step back for a while in history. In the Middle Ages, science, as the study of the created world, was seen as an activity honouring the creator (a more detailed discussion of the origin of MN will be presented in Chapter 5). However, the stellar rise of science soon gave rise to a collision between science and religion. In particular, new scientific finding was found to conflict with longstanding religious beliefs. Kelly James Clark differentiates between three historical phases: conflict, separation and integration (Clark 2014, 9).

A militant tone of warfare was set in the late 19<sup>th</sup> / early 20<sup>th</sup> century by influential books titled *History of the Conflict between Science and Religion* by John William Draper in 1874 and *History of the Warfare of Science with Theology in the Christendom* by Andrew Dickson White in 1896 (Livingstone 2008, 192). According to Ronald Numbers (2009, 30) this warfare thesis is generally overblown and many people of faith had no problem integrating the new knowledge generated by science with their religious belief.

The second phase, the separation of science and religion is best illustrated by Steven Jay Gould's account of "Non-overlapping Magisteria" (1997): there is no conflict between science and religion because their respective domains don't overlap. Finally, the last phase, integration, should not have been a problem - *if* science had adopted the protocol of MN. Through the rules of MN naturalism is confined to the engine of scientific exploration; it allows the practicing scientist to be part of a wider worldview, not restricted by naturalism.

This was the original intention of the theologian and philosopher Paul De Vries for introducing the concept of MN (more detail on the history of MN in Chapter 4). However, more recently the warfare scenario has sprung up again with the so-called 'new atheists' preparing to do battle (Plantinga 2011; see also Ruse 2015, Pigliucci 2013a, and LeDrew 2016)<sup>6</sup>.

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<sup>5</sup> The reader might think of alleged phenomena in the areas of homeopathy, spiritual healing and other New Age elements.

<sup>6</sup> The common term 'new atheist' is synonym with my label of 'radical atheist'.

Stephen LeDrew distinguishes between scientific and humanistic atheism (LeDrew 2016). The latter considers religion primarily as a social phenomenon, whereas the former understands religion as an obstacle to science-driven progress. It is only scientific atheism that concerns us here – it focuses on the attempts of religion to explain nature, thereby competing with science.

Darwin's theory of evolution plays a central part in the rise of radical atheism. The simple explanation of complexity through random variation and natural selection provided a convincing alternative to the religious account of creation. Richard Dawkins remarked that "... although atheism might have been logically tenable before Darwin, Darwin made it possible to be an intellectually fulfilled atheist" (Dawkins 1991, 6). For many conservative Christians (and members of other faiths) accepting evolution is tantamount to denying God and Darwin's theory plays an important role in the perceived slide from MN to ON. During a 2002 TED talk Dawkins admits that "educated theologians from the Pope down are firm in their support of evolution", however, shortly later he states that evolution - and science in general - are "deeply corrosive to faith" and "religion is corrosive to science" (Dawkins 2002, 4-9).

This ambivalence is not uncommon in the radical atheist camp. Martin Mahner and Mario Bunge (1996, 102), both scientists and philosophers, state that "science and religion, if properly understood, are not incompatible as the implicit materialistic outlook of science ... might suggest". However, two paragraphs later they contradict themselves by claiming that a religious education is detrimental to scientific understanding and that science and religion are incompatible. Dawkins in his 2002 TED talk further adds fuel to the fire by hinting at an inverse correlation "between religious belief and one's intelligence or intellectual level" (Dawkins 2002, 13).

The message is clear: theoretically, a belief in the supernatural is possible while having a scientific understanding of the world, however, the resulting cognitive dissonance almost forces one to embrace the ontological worldview of naturalism.

Biologist Jerry Coyne uses biological evolution as the prime example for showing that modern science has made supernatural explanations redundant. He points to the overwhelming success in recent history of biology and the sciences in general and states "Because of this success, and the recurrent failure of supernaturalism to explain *anything* about the universe, naturalism is now taken for granted as the guiding principle of science" [original emphasis] (Coyne 2016, 92). Here Coyne still limits naturalism to the 'principle of science'. However, two pages later he declares: "[B]ecause there is no evidence for supernatural entities or powers, although there *could* have been such evidence, one is

justified in thinking that *those entities and powers do not exist*. This attitude is called *philosophical naturalism*" (Coyne 2016, 94). Coyne gives us a clear mandate for abandoning MN and embracing ON. The biologist and philosopher Martin Mahner takes it one step further claiming that ON is a presupposition for doing science. We will discuss his claims in detail in Chapter 7.

In his book *The God Delusion*, Dawkins declares war on the supernatural: "I am attacking God, all gods, anything and everything supernatural, wherever and whenever they have been or will be invented" (Dawkins 2006, 36). Steven Weinberg, a Nobel laureate in physics remarks that "The more the universe seems comprehensible, the more it also seems pointless" (Weinberg 1988, 191). In 2006 at a conference on science and religion Weinberg went one step further and declared "Anything that we scientists can do to weaken the hold of religion should be done and may in the end be our greatest contribution to civilisation" (Johnson, G 2006)<sup>7</sup>.

The reasoning behind this rhetoric is that science has been most successful in replacing supernatural explanations with natural ones, and there is no reason why we shouldn't believe this process to continue into the future. Science excludes supernatural causation in its explanatory machinery, but the use of MN suggests that there remains a possibility that something supernatural might still pop up. It should not come as a surprise that the radical atheist objects to MN in favour of ON.

When scientists make a claim on the existence or non-existence of supernatural entities, then these scientists have overstepped the boundaries of science. Either they voice their personal opinions and make an argument from authority, appealing to the high standing of science, or they are advocating *scientism* (explained below).

How then can we explain the 'new atheism' rhetoric? Anthropologist Matt Cartmill suggests:

Many scientists are atheists or agnostics who want to believe that the natural world they study is all there is, and being only human, they try to persuade themselves that science gives them grounds for that belief. It's an honourable belief, but it isn't a research finding (Cartmill 1998, 83)<sup>8</sup>.

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<sup>7</sup> Other examples of renowned scientists advocating ON are listed in Chapter 3. Massimo Pigliucci in particular names Jerry Coyne, P.Z. Meyers, Sam Harris and Victor Stenger. Interestingly, most of the people associated with the 'new atheism' movement also belittle philosophy as a source of knowledge or insight (of course, with the exception of Daniel Dennett) (Pigliucci 2013a, 144).

<sup>8</sup> One might add to Cartmill's statement that the persuasive desire is not restricted to the radical atheists, but their rhetoric is clearly intended to seduce their audience.

The idea that science can eventually answer any question and resolve every problem, given enough time and resources, is called *scientism* (Peterson 2003). The spectacular rise of science in the last few centuries, coupled with the extraordinary progress in technology has led many to regard science as the pinnacle of human knowledge. Philosopher Arthur Peacocke remarks that “... scientism [is] the attitude that the only kind of reliable knowledge is that provided by science, coupled with the conviction that all our personal and social problems are ‘soluble’ by enough science” (Peacocke 1993, 7-8). Massimo Pigliucci, himself not a believer in the supernatural, states that “[scientism] seeks to expand the very definition and scope of science to encompass all aspects of human knowledge and understanding” (Pigliucci 2013a, 144)<sup>9</sup> <sup>10</sup>. The theologian John Haught points out that “[s]cientism tells us to take nothing on faith, and yet it takes faith to make a commitment to scientism” (Haught 2012, 15).

So far we have heard from scientists championing scientism, and as a consequence they endorse the leap from MN to full-blown ON. What have philosophers to say?

Boudry (2015, 2) admits that “God is not a scientific hypothesis”, but in the very next sentence he refers to scientist Yonatan Fishman (2009) who maintains that the belief in a supernatural Creator *amounts* to a scientific hypothesis [Boudry’s emphasis]. However, Boudry doesn’t explain how a *belief* can amount to a scientific hypothesis. In my opinion this constitutes another example of scientism<sup>11</sup>.

Boudry is not as bold as the scientists quoted earlier, but he doesn’t hesitate to use God-of-the-gaps argument<sup>12</sup>: “[w]henver scientific knowledge advances, religion is forced to retreat” (Boudry 2015, 4). In the same article Boudry reiterates his justification for provisional MN (pMN, which is discussed in Chapter 5): “... as a result of centuries of scientific investigation, earlier animistic, anthropomorphic, and teleological views have

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<sup>9</sup> At the core of Dawkin’s *The God Delusion* is the notion that the ‘God hypothesis’ is sufficiently akin to a scientific hypothesis to treat it as such. It is therefore in the power of science to reject it (Dawkins 2006, 50; Pigliucci 2013a, 147).

<sup>10</sup> Most proponents of scientism are scientists, however in Alex Rosenberg we find a philosopher of science in clear support of scientism. On page 6 of his book *The Atheist’s Guide to Reality* he states “Science provides all the significant truths about reality” and in the Preface he declares even more boldly “We know the truth” (Rosenberg 2012).

<sup>11</sup> For example, when studying evolution, the scientist only sees random mutation with no teleological fingerprints, however, this does not prevent the theist from ‘believing’ that God has guided evolution. How can this belief amount to a scientific hypothesis that “has testable empirical consequences [and] is amenable to scientific investigation” (Boudry 2015, 2)?

<sup>12</sup> The so-called God-of-the-gaps is a derogatory reference to some religious believers who try to insert God into the current gaps of our understanding of nature. The conclusion is that the concept of the supernatural has to retreat with every advance of science. This is going to be discussed in Chapter 3. Boudry will be aware that this argument does not hold with today’s theologians, but uses it in a sarcastic sense.

gradually been superseded by more parsimonious, impersonal explanations". It is not stated directly, but we can surmise that Boudry regards pMN only as a steppingstone to all-encompassing ON.

Let us now turn to philosopher Barbara Forrest who critically analyses the relation between MN and ON.

Forrest admits that supernaturalism is not *logically* impossible, but "it has not proved its mettle" neither from an epistemological, nor from a methodological standpoint (Forrest 2000, 13). Forrest demands evidence:

The philosophical naturalist, without making any metaphysical claims over and above those warranted by science, can demand from supernaturalists the *method* that legitimizes *their* metaphysical claims. In the absence of such a method, philosophical naturalists can not only justifiably refuse assent to such claims, but can deny – tentatively, not categorically – the existence of the supernatural, and for the same reason they deny the existence of less exalted supernatural entities like fairies and ghosts: the absence of evidence. [Original emphasis] (Forrest 2000, 11).

Forrest expects to be shown a method for investigating the supernatural, probably akin to the scientific method. Examples would be the ill-fated investigation into the effectiveness of intercessory prayer (Benson et al. 2006), or some of the many studies on parapsychology, psi, afterlife, reincarnation, and others (Martin and Augustine 2015).

Eugenie Scott points out that any attempt to investigate the supernatural through the methods of science is destined to fail:

First, science is a limited way of knowing in which practitioners attempt to explain the natural world using natural explanations. By definition, science cannot consider supernatural explanations: if there is an omnipotent deity, there is no way that a scientist can exclude or include it in a research design (Scott 2009a, 9).

This is especially clear in experimental research design: an omnipotent deity cannot be "controlled". Since God is omnipotent and unconstrained any test outcome would be compatible with God's acts "You can't put God in a test tube, and, one must add, you can't keep God out of one" (Scott 2009b, 56).

Attempts to analyse the supernatural will also fail for another reason: If a phenomenon previously considered to be supernatural can now be confirmed with unequivocal empirical evidence, this would then establish the discovery of a new verified aspect of reality – a facet of nature that hasn't been supernatural after all. For this reason, science cannot be used to test for

the supernatural, and consequently the radical atheist cannot use, or demand scientific evidence (which goes through the filter of MN) to state that ON is the correct worldview.

When discussing supernatural causation, we need to distinguish between two distinct scenarios. In the first alternative (A) we use the supernatural as an explanation when confronted by an observed phenomenon that seemingly defies a natural explanation. Any currently unresolved problem would fit the picture and the reader might take quantum entanglement as an example - the 'spooky' action at a distance. No matter how spooky the phenomenon is, it is part of the natural world and science will approach it with the a priori assumption that it will eventually be explainable naturalistically. The common practice of the scientist will be to assign the phenomenon in question to the mountain of 'unexplained' or 'not yet explained' problems. The radical theist will regard this as an 'unresolvable' phenomenon which demands a supernatural explanation. The radical theist will present this as the 'empirical evidence' for supernatural intervention. The ontological naturalist will, rightfully, reject this type of explanation as evidence for the supernatural.

Most theologians (the wing of moderate theists in my terminology) discern the supernatural in a different way. In this second alternative (B) of explaining the supernatural, the natural world is regarded as a closed, self-sufficient system. God, as the creator and primary cause, sustains nature through secondary causes, what we describe as the laws of nature, which we discern through the tools of science. This is the concept of the supernatural that contemporary theologians have in mind (McGrath 2017, 192; Bishop 2013, 13). In this case there is no physical, scientifically detectable evidence for anything supernatural. Coyne remarks that "If something is supposed to exist in a way that has a tangible effect on the universe it falls within the ambit of science" (Coyne 2016, 94). Coyne's reasoning would apply to any event we would describe as 'miracle'. As we have seen, theologians are content with the notion of a causally closed physical universe with no detectable intrusion from an external supernatural realm, arguing for a supernatural deity acting through the laws of nature.

Under this viewpoint any event we observe in the natural world will have two causes: a natural cause explored and established by science, plus a supernatural indirect cause in the way a supernatural deity has instituted the laws of nature. The radical atheist will object to this line of argument. Indeed, Barbara Forrest leaves no backdoor open by stating that a supernatural explanation is not allowed once we have detected a causally explanatory principle in the natural world (Forrest 2000, 11). Forrest refers to Arthur Strahler who claims that "A specific event in history in a specific time segment must fall into either (a) divine causation or (b) natural causation" (Strahler 1992, 345). Supernaturalism is thus ruled out by

fiat, which is not a convincing argument. One could point to Ockham's razor, the principle of parsimony, which states that (other things being equal) we should prefer simple theories and the fewest number of assumptions to more complex ones (Augustine 2001, 31). However, in my opinion, this principle can only be invoked when comparing theories of equal weight, or at least of the same ontological status.

Forrest then concludes that ON is "the most methodologically and epistemologically defensible world view" (Forrest 2000, 21). However, her reasons for this conclusion are the same as we have heard from the camp of scientists who reject MN in favour of ON: the proven success of non-supernatural explanations and the absence of any evidence for the existence of the supernatural.

In conclusion we can affirm that MN with its demand for naturalistic explanation is an essential principle for the practice of science. The call for ON is unnecessary and unwarranted. ON is a personal worldview and its truth value has no bearing on the workings of science. The perceived pull towards the worldview of ON is, as Matt Cartmill observes, for many scientists (and philosophers) simply a desire "to believe that the natural world they study is all there is" (Cartmill 1998, 83).

### **2.3. The Slide from MN to ON in the Case of Radical Theism**

Radical theists tend to regard MN as a simple stepping stone to full-blown atheism (ON). There is the desirable - and stable - option of theistic science, but the radical theist recognises the strong and enticing pull towards ON, encouraged by the relentless progress and successes of science. There is the option of a slide into theistic science with its desirable supernatural interpretations. However, the radical theist realises that this position would not be acceptable to most scientists, one reason being that it would rob science of its universality (see Chapter 3).

Alvin Plantinga labels MN as "provisional atheism" (Plantinga 2001, 137). When criticised by the theologian Ernan McMullin and physicist Howard Van Till for using this term, Plantinga defends his choice of words by stating that "... you are very likely to end up with the very sort of science you would aim at if your materialism weren't merely methodological ... but the sober metaphysical truth" (p 235).

Plantinga's use of the term 'provisional' can be interpreted in two ways. It would be acceptable if Plantinga uses this expression in a conditional sense, meaning that the researcher needs to put on the hat of atheism while practicing science. However, when the

attribute 'provisional' is viewed as 'temporary', it would indicate a slide over time from the temporary exclusion of supernatural causation (while practicing science) to the permanent worldview of ON, rejecting anything supernatural in general.

Plantinga did not himself formulate the term 'provisional atheism' as a description of MN, but took it from the English historian Basil Willey. In a 1959 publication titled *Darwin's Place in the History of Thought* Willey states that science is in the business of replacing the supernatural with the natural "... and while it is engaged upon this task it must be provisionally atheistic or cease to be itself" (Willey 1959, 15). Willey uses his term 'provisional atheism' in the conditional sense, referring to the exclusion of the supernatural while engaged in the business of doing science.

In my view Plantinga adapts Willey's phrase but changes the original conditional meaning of 'provisional' to describing MN as an unstable position. His use of the words "you are very likely to end up with ..." points to his view that MN is a transitional state, which then naturally leads to the more solid and permanent position of ON. Plantinga's critique of MN is being discussed in detail in Chapter 3.

Michael Ruse describes Plantinga's reasoning in vivid colours:

[E]ven if you do not think that methodological naturalism necessarily leads to denial of God – pitchforks you into metaphysical naturalism – at a minimum there is a tendency that way, and at a maximum there are theoretical and pragmatic reasons why you will go that way (Ruse 2010, 100).

Andrew Torrance (2017, 705) states that "MN encourages scientists to develop theories that are essentially incompatible with Christianity" and "MN creates a culture that affirms a tension between science and Christianity" (p 707). In particular, he singles out the theory of evolution and claims that the randomness of mutations challenges the Christian account of providence. Torrance believes that the adoption of MN will slide one into a purely naturalistic worldview:

If a Christian assumes the language of naturalism, it is hard to see how this will not generate a process of subliminal transformation whereby her epistemic base becomes tacitly conditioned into developing a naturalist metaphysics (Torrance 2017, 716).

Philosopher William Dembski, also a critic of MN, expresses the slide from MN to ON very succinctly:

We need to realise that MN is the functional equivalent of a full-blown ON. ON asserts that nature is self-sufficient. MN asks us for the sake of science to pretend that nature is self-sufficient. But once science is taken as the only universally valid



form of knowledge within a culture, it follows that MN and ON become functionally equivalent (Dembski 1999, 119) [I substituted ON for Dembski's "metaphysical naturalism"]<sup>13</sup>.

Dembski's solution is simple: "*dump methodological naturalism*" [Dembski's emphasis]. By eliminating MN we are left with two alternatives: (a) theistic science or (b) science coupled with ON. If faced with only those two options, scientists would have little choice but to opt for full-blown ON.

Dembski considers MN and ON as equivalent and the scientist who adopts MN simply 'pretends' that there exists no supernatural causation. Dembski objects to ON, and therefore also to MN, because theism provides a wider range of resources: "The ontology of theism is far richer than that of naturalism" (Dembski 1999, 213). Plantinga (2011, p 73) echoes this view by stating that "... in the modern world of science ... God never acts specially or intervenes in the world".

Whereas Plantinga points to the dangerous pull from the labile, 'provisional' position of MN to the more stable worldview of ON, Dembski regards them as practically equivalent. ON is not acceptable because it excludes any supernatural causation, but MN doesn't lessen the problem because it also rules out the supernatural. Dembski's recommended solution would be a type of theistic science (although he doesn't use this term) which caters for supernatural causation. As we will see in Chapter 3 which discusses Plantinga's critique of MN in greater detail, Plantinga acknowledges the shortcomings of theistic science (for example, it would not be universally acceptable by the scientific community) but he raises the question of whether a Christian community "should engage in Christian science ... unconstrained by methodological naturalism" (Plantinga 2011, 190).

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<sup>13</sup> Note that Dembski here refers to science "as the only universally valid form of knowledge". This, again, is the view of scientism which we have encountered earlier in this Chapter.

## Conclusions – Is there a Slide from MN to ON?

Science only deals with the natural, physical world. One basic assumption of science is that our physical universe does exist, but that is as far as the ontology of science can reach. Science does not deal with any supernatural, transcendent realm – and it does not make any claims about the existence or nonexistence of such a realm. The concept of MN isolates science from any ontological assertions. Therefore - strictly on philosophical reasons - there is no slide from the working concept of MN to the position of ontological naturalism.

Here I want to point to a distinction between a *pull* towards ON and a *slide* from MN to ON. As has been shown, by both radical camps, there is a definite pulling force from the scientific enterprise of finding purely natural explanations to the assertion that there is nothing beyond the natural world.

Not everybody succumbs to this pull - the set of moderate theists, which includes religious scientists prove the point. This leads one to two questions: (1) Why is there a perception of slide to ON, and why is it so persistent? (2) What can be done to counter this perception?

Most people are not familiar with the concept of MN; even the majority working scientists are not troubled with philosophical technicalities, although scientists, irrespective of their religious belief, will intuitively adhere to the rules of MN.

The aim of the following Chapters is to emphasise MN as a stable position which can accommodate both, a theistic as well as an atheistic worldview. The issue is mainly of a psychological nature: science is highly esteemed and (correctly) regarded as our main generator of knowledge about the natural world. Both, theists and atheists want to claim science as supporting their worldview. Matt Cartmill has been quoted already as pointing out that it is human nature to persuade oneself that science confirms one's adopted worldview (Cartmill 1998, 83).

The radical theist, who perceives MN as provisional ON, calls for theistic science as a replacement for 'traditional' science. This would undermine the objectivity and universality of science. Admitting supernatural causation into science would act as a barrier for further and deeper investigation of still unresolved phenomena (this will be explored in more depth in Chapter 3).

Secondly, radical theists paint 'traditional' science as atheistic, because of its strong association with rejection of supernatural causation (or supernatural 'events'). As Plantinga points out, science is often portrait as 'provisionally' atheistic. This creates a distorted

picture of science and the science-illiterate person is faced with a false dichotomy: the perceived need to choose between theistic or 'atheistic' science.

The radical atheist exploits the a priori assumption of MN, which rejects any supernatural causation. The slide from MN to ON is depicted as a logical and pragmatic consequence of centuries of scientific discoveries, which all have yielded to natural causation. This is regarded as sufficient 'proof' that there does not exist a supernatural realm.

Both radical camps regard MN as a temporary and unstable position. The characterisation of MN as unstable comes when MN is associated with a worldview. The ambivalence of MN (a supernatural realm may or may not exist) is then interpreted as a weakness when contrasted with the certainty associated with ON. ON offers the more stable worldview, free of any doubt. The slide from MN to ON is the shift from a worldview of doubt and uncertainty to a stable and secure position. Note that theistic science also offers this outlook free of ambivalence. However, here the highly regarded scientific method is taken as the tool which provides certainty for a supernatural realm.

There is still the possibility that the working scientist *has to* exclude even the possibility of supernatural causation. In other words, science requires ON as an a priori principle. In this scenario the slide from MN to ON would be justified. This will be discussed in Chapter 7.

### 3. The Radical Theist's Critique of MN

Methodological naturalism is an ontologically neutral position, providing a reliable and firm platform for the operation of science. It allows one to practice science independently of one's ontological outlook.

However, both radical camps, theists and atheists, perceive MN as unstable, forcing one into either of the two ontological corners. The previous Section outlined the alleged slide from MN to ON in general. We now examine the radical theist's position on MN in more detail. As can be expected, the radical theist wants the scientist to accept supernaturalism into his or her methodology. We will see later that bringing supernatural causation into science is fraught with difficulties and controversy. The radical theist concedes to this weakness and therefore tends to agree with his atheistic counterpart that the unstable position of MN is likely to give way to full-blown naturalism (ON).

The aim of this Section is to analyse the various arguments against MN raised by the radical theists. At the same time I want to show that these arguments are unfounded, that MN is a strong and stable position for the practicing scientist and that MN does not compel anyone, neither the scientist nor the community accepting scientific discoveries, to relinquish a worldview which contains supernatural agents or forces.

The key difference between the radical theist's and the moderate theist's point of view is centred around the very definition of science. The radical theist believes that science should be able to answer all questions about the physical universe. Since naturalism doesn't provide all the answers, in other words science cannot identify every cause to observed phenomena, the radical theist wants to introduce supernatural causation into science<sup>14</sup>.

This view of science is in contrast to the moderate theist's perspective, who regards science as a path of investigating the world, using the tools of observation, testing, logical argumentation and theory building. The scientific method will lead us to the truth about our world, however, science doesn't necessarily lay the claim of telling the entire truth about the world. The moderate theist has no problem with accepting MN for two reasons: Firstly, there is the possibility that science might encounter phenomena which defy a naturalistic explanation (for example, the origin of self-reproducing organic matter, or the causation for the Big Bang). Secondly, the moderate theist has no problem regarding God as a 'first cause'

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<sup>14</sup> Incidentally, the radical atheist agrees with the claim that science can answer all questions about the universe, however, they reject any supernatural causation.

acting through secondary causes, which are open to scientific investigation. This is regarded as the “functional integrity” of nature, which will be discussed in Subsection 3.4.

If MN, by its very definition, does not undermine any form of belief in a supernatural world, why do some theists (the radical theists in my definition) reject MN? A couple of reasons come to mind.

(a) One reason is the understandable desire of radical theists to ‘prove’ the existence of a supernatural realm using the methodology of science. This would demand a type of theistic science. Science has risen to a very high status in the last few centuries and any finding sanctioned by science is perceived as having a superior standing compared to any ordinary claim. Accepting a supernatural world would not just have to be reliant on belief - it would have the backing of science. However, any form of theistic science would be prohibited under the rules of MN.

(b) Another reason is the human desire for certainty when explaining observed phenomena. Scientific theories are always tentative, which can be amended or even overthrown by new evidence coming in. This is often regarded as a general weakness of scientific reasoning when contrasted with supernatural interpretations. As an example, consider the evolution of simple into complex lifeforms through random mutations and natural selection. Supernatural causation would eliminate all the uncertainty and constant new questions about the mechanisms involved. In contrast to (a) we have a general mistrust of science. Supernatural causation would give a final answer, not subjected to shifting scientific theories. MN is rejected because it stipulates that supernatural causation is ruled out in science. As opposed to scientific evidence, supernatural explanations enjoy the benefit of being immune to falsification.

(c) Science is about the search for truth; it follows the evidence, wherever it leads. Radical theists reason that if the evidence points to supernatural causation, we should admit it. This is probably the strongest argument against MN. This will be discussed below. As already mentioned, the moderate theist accepts that science only gives part of the full picture.

(d) Another reason for mistrusting MN is the perceived pull towards ON, discussed in the previous Chapter: Science is in the business of resolving unexplained phenomena we encounter in nature. MN stipulates that only ‘natural’ explanations are to be admitted in science and in this process it often happens that phenomena, previously attributed to supernatural causes, have now been given a mundane, natural explanation. If this pattern continues – and there is no reason not to believe so – all supernatural explanations are going to become redundant.

Going any deeper into explaining those reasons for rejecting MN would lead us into the field of human psychology, which is outside the scope of this thesis. The starting point for this philosophical discussion is the picture painted by the radical theist of MN as an unstable or dubious support on which to build scientific theories.

In my discussion Alvin Plantinga will be my main spokesperson for radical theism. He is one of the preeminent philosophers of religion in the US and probably the best-known critic of MN. In brief, Plantinga holds to the idea of a directly intervening deity and argues that science should incorporate this concept. This is also the sentiment behind the so-called Intelligent Design movement.

In his 2011 book *“Where the Conflict Really Lies: Science, Religion and Naturalism”*, Plantinga counters the popular notion that science and religion are in conflict, arguing instead that there is a “deep concord” between the two. On the other hand, there is a superficial concord between science and naturalism, which masks a deep conflict. Plantinga therefore does not reject a worldview that accepts the findings of science, but he opposes a naturalistic worldview. As a consequence, Plantinga rejects MN whose function is to act as a buffer between the two.

In the following I will examine the objections against MN raised by the radical theist using Plantinga’s two papers from 1997 titled *“Methodological Naturalism?”* as a starting point.

### **3.1 MN Poses a Constraint on Science**

The concern that MN unnecessarily constrains science is probably the most common argument against MN. Science should follow the truth, wherever it leads (Plantinga 2011, 169; Torrance 2017, 695; Meyer and Nelson 2017, 567).

Science is seen as a cold and sterile tool used to dissect and explain nature, with purely materialistic premises. The concept of MN does allow for a supernatural realm, although anything beyond the ‘natural’ world and natural causation is excluded from the purview of science. MN is thus a *restriction* imposed on science, excluding supernatural causation by fiat (Pennock, 2008). In fact, Basil Willey labels MN ‘provisional atheism’ (Plantinga 1997a, 2) and Nancey Murphy (1993, 464) uses the term ‘methodological atheism’. This constraints on science can be seen in two different ways:

(a) A person with a worldview that includes a supernatural dimension might interpret this restriction as a limitation imposed on science. Because of MN, science does not have the freedom to go wherever the evidence leads. This is Plantinga's position.

(b) The alternative view is that science limits itself to natural causes and MN thus puts the scientific enterprise in a more humble position, giving us only a restricted subset of all knowable truths. This is opposed to the common misconception that science can, in principle, give us all the answers, a view which goes under the name of 'scientism', discussed in the previous Chapter.

MN does not rule out supernatural causation, but makes it undetectable with the methodology available to science. As a theist, Plantinga believes in an intervening deity and thinks that God's interactions with the natural world are detectable scientifically.

The question now arises as to whether such a constraint poses a serious handicap, which stifles our progress in understanding nature. According to Plantinga the problem with MN is that it *restricts* science and robs it from its full potential of explaining the natural world. Plantinga looks at the vast resource of explanations a theist has got at her disposal to describe and explain natural phenomena. He writes "A Christian therefore has a certain freedom denied [to] her naturalist counterpart: she can follow the evidence where it leads" (Plantinga 1997a, 7; 2011, 172-173).

When looking at the constraints MN poses on conventional science, Plantinga distinguishes between the evidence base and the scientific theories themselves. The evidence base of a Christian theist, for example, will include the belief in God, revelation, belief in direct intervention, miracles etc. Similarly, theories emerging from conventional science have to exclude references to any supernatural agents, although they can refer to beliefs about the supernatural. Plantinga uses the example of Herbert Simon's theory of altruism<sup>15</sup> which a theistic scientist would reject because it is "massively improbable with respect to a Christian evidence base" (Plantinga 2011, 172-173). Plantinga not only objects to the constraints imposed by MN on the social

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<sup>15</sup> Herbert Simon (1990) developed a theory that explains altruistic behaviour (which reduces the fitness of the individual, but increases average fitness within society) within the framework of neo-Darwinism. He proposed a mechanism based on human "docility" and "bounded rationality" to account for the evolutionary success of altruistic behaviour. Plantinga disagrees and uses the example of Mother Teresa for his claim that her behaviour "displays a Christ-like spirit" that cannot be explained through naturalistic evolution (Plantinga 1997a, 3).

sciences but also denounces evolutionary biology<sup>16</sup>. From the perspective of MN, evolution with its naturalistic mechanisms is “the only game in town, whereas the theist has other options” (Plantinga 2011, 56).

According to Plantinga (1997a, 6-7; see also Johnson 1993, 118), if science does not allow for miraculous interventions, then the scientist needs to come up with naturalistic explanations, even if in actual fact supernatural explanations are the correct ones.

This could be interpreted as an allegation that scientists are ‘making up’ theories, simply to force explanations of observed phenomena into a naturalistic straightjacket. However, as customary science practice shows us on a regular basis, the scientist will admit it if a naturalistic pathway for an observed, or a given phenomenon has not been identified. A good example is the origin of life (abiogenesis): Science has not found a purely naturalistic causal account for the appearance of life out of non-living matter. Scientists willingly admit this and will keep looking until a naturalistic path has been found. There is the possibility that no such naturalistic pathway will ever be found. This will relegate the problem to the pile of unresolved (or rather not yet solved) dilemmas of science. As Kathryn Applegate (2013, 43) points out:

Limiting science to natural explanations may not successfully uncover all the causes at work within our world, but this should not trouble us .... it is not the job of science to provide a comprehensive view of reality.

Allowing for supernatural explanations would make the scientist’s job too easy and MN “spurs us on towards deeper investigation of the natural world” (p 41). MN further prevents us from using science to answer ‘ultimate’ questions, the ‘why?’ questions which will influence our worldview. This would give science too much authority, again leading into scientism. Applegate further notes that MN allows the theist “to honour God by discovering his work in creation and by not invoking him in place of secondary causes” (p 37). In this way “MN demonstrates a deep respect for the creator/creature distinction by ensuring that God’s activity is not confused with creation’s activity” (Torrance 2017, 699).

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<sup>16</sup> It is worth noting here that Plantinga was more critical of evolutionary theory in his earlier writings (Plantinga, 1987). Two decades later Plantinga’s objections to biological evolution have softened (Plantinga, 2011). However, he remains firm in his belief that evolution and naturalism cannot both be true at the same time. This is the so-called Evolutionary Argument Against Naturalism (EAAN), which is an argument against ON and will not be discussed here.



Phillip Johnson is a professor of Law and prominent spokesperson for Intelligent Design movement (ID). ID critiques MN by claiming that supernatural interventions, detectable by science, are required to explain the complexity of living organisms. Johnson exploits the provisional truth claim of any scientific theory by stating that supporters of naturalistic evolution (i.e. evolution through random mutation and natural selection) do not claim to make ontologically true statements about the history of life, but only statements about what inferences can be drawn from a naturalistic starting point (Johnson 1993, see also 2001, 61). Since super-naturalistic interventions are ruled out a priori, naturalistic evolution by default becomes the only game in town, simply because it is the best, or rather the only explanation of the observed facts, under the restrictions of MN. Another observer, not burdened with any preconceived notions, would resort to miraculous intervention as the most obvious explanation, when confronted with the diversity and complexity of living life forms. Note that Johnson highlights the fact that scientific theories are always provisional, pointing to the backdoor of a possible supernatural intervention. Whereas science cannot give us final answers, supernatural explanations have the important benefit of absolute truth and certainty.

This perceived constraint on science is well exploited by other supporters of the Intelligent Design movement which state that MN is inherently atheistic. Dembski and Witt (2010, 19) claim “In its most ambitious form, methodological naturalism says that we can believe whatever we want in our personal life, but when we’re doing serious academic work, we should only consider and defend explanations fully consistent with philosophical materialism”.

In a recent publication the Finnish philosopher Rope Kojonen (2016) coins the term “Truth Seeking Objection” for the claim that science is unjustly restricted by MN. His answer is that there are various types of truths and that we fall into the trap of ‘scientism’ if we assume that science can answer every question.

Robert Delfino (2007) criticises MN on the grounds that it is opposed to realism. He points out that an essential attribute to realism is that our theories conform to reality in order to be true. MN with its bias against supernatural causation prevents us from constructing true theories about reality (assuming that reality is indeed supernatural). Delfino proposes to replace MN with what he calls the ‘principle of methodological neutralism’, which states that “scientists should simply search for causes without setting any a priori conditions on what ontological status those causes must have” (Delfino 2007, 7). However, Delfino fails to define what he means by ‘supernatural’

(the definition of supernatural is dealt with in Chapter 6). Taking the example of abiogenesis – at what point can the investigating scientist, following the principle of methodological neutralism, decide on having established the cause of life to arise from its molecular constituents?

A safer way of conducting science seems to be to follow the principle of MN and keep searching until we can identify a natural pathway as solution for our problem. We simply need to admit that science can only address a subset of reality - unless we acknowledge ontological naturalism.

Still on the topic of MN restricting science, it has often been pointed out that the history of science is littered with examples of scientific ideas born through what appears to be supernatural spark. In his critique of MN, philosopher Steve Fuller points out that “the history of science is full of hypotheses of ‘supernatural’ inspiration” (Fuller, 2007, 102). This point may have both descriptive and normative aspects. First, scientists have considered and do consider supernatural analogies in their work, and second, they ought to do so, as this has produced good results. Examples given are Newton’s appeal to gravitational attraction and Mendel’s hereditary factors. These hypotheses had indeed theistic origins; however, their role in the process of discovery became superfluous once further investigation and experimentation have exposed the natural causes underlying them. Fuller maintains that the original spark that lead to the discovery survives as “ideas of a divine plan and special creation” (p 103; see also Fuller 2006).

Fuller is conflating the context of discovery, in which scientific hypotheses are developed, and the context of justification, in which hypotheses are tested. MN places no restriction on the process of inspiration and discovery in any way. Making use of supernatural concepts in a thought experiment (Einstein’s riding on a light beam comes to mind) or as a provisional crutch to get one’s head around a particularly intricate problem should be encouraged. MN only insists that the ensuing analysis, predictive evaluation and confirmation must strictly adhere to the rules of science which do not admit any causation from outside the natural world.

Summarising it can be stated that MN could restrict the explanatory power of science – *if* indeed supernatural causation does affect the workings of nature. The goal of science is to make true statements about physical reality (Behe 2001, 255), however, we need to accept that science cannot provide a comprehensive view of reality. The alternative, namely admitting supernatural causation into scientific theories, would make the scientist’s job too easy: in the end, supernatural causation could be used to explain anything and everything.

On the other hand, MN poses no restriction on how the idea for the solution of an intricate problem originated. It could have been sparked through a dream or, as Fuller suggests, the idea could have been caused by ‘supernatural inspiration’.

### **3.2 Should MN be an Intrinsic Part of Science?**

The previous subchapter showed that introducing supernatural causation into science, as demanded by the radical theist, would be fraud with complications for science. MN seems to be a good and necessary concept to keep supernatural explanations out of scientific theories. This raises the question of whether MN is an intrinsic part of science.

The exclusion of the supernatural has de facto been built into the definition of science. The US National Science Teachers Association (NSTA) in their Position Statement declares that “Science, *by definition*, is limited to naturalistic methods and explanations and, as such, is precluded from using supernatural elements in the production of scientific knowledge” [added emphasis] (NSTA, 2000).

The intrinsic connection between science and its rejection of the supernatural has been highlighted in recent US court cases dealing with the claim of Intelligent Design (ID) being a scientific theory. One example is the so-called Kitzmiller et al. vs. the Dover Area School Board trial in 2005. In his decision Judge John Jones concluded that “... ID violates the centuries-old ground rule of science by invoking and permitting supernatural causation.” (Jones 2005, 64). This is only one of a string of court cases in which supernaturalism in science was on trial - and was rejected. MN is generally seen as a basic assumption in the practice of science, a premise mostly taken for granted (Pennock 2008).

An argument for the assumption of MN in science is as follows. Any observation, following regular patterns (what we would call law-like behaviour) or showing a lack of such patterns, would be compatible with the hypothesis of a supernatural agent, unconstrained by natural laws. Any supernatural hypothesis can be rescued from being falsified by ad hoc stipulations. For this reason supernatural agents and entities simply have to be excluded from the business of doing science. The same holds for supernatural explanations.

For example, let us consider again our standard example: abiogenesis, the origin of life in the form of self-replicating molecules from non-living matter. After many decades no natural solution has been found. Defining this event in the distant past as supernatural would solve the problem, but the search for a naturalistic explanation would grind to a halt.

This is the so-called ‘science stopper’ argument, one of the strongest arguments in favour of MN. The radical theist’s answer to this argument will be discussed later.

This science stopper argument is a strong motivation for the inclusion of MN: the scientist is simply obliged to eliminate any reference to the supernatural. In this sense, yes, MN can be regarded as a ground rule of science and scientists are forced to eschew the supernatural.

The theory of ID with its supernatural ‘intelligent designer’ interfering in nature has been repeatedly described as pseudoscience by the scientific community (Pigliucci 2013b). In his critique of MN Plantinga then points out that the demarcation problem, the dispute over the dividing line between science and pseudoscience, is and remains unresolved (Plantinga 1997b). Indeed, Larry Laudan (1983) has demonstrated that there is no simple set of necessary and sufficient conditions to distinguish what counts as science and what merely purports to be science.

Pennock (2011) points out that Laudan’s obituary of the demarcation problem was almost entirely directed against Ruse’s five criteria to distinguish science from non-science (Overton 1982)<sup>17</sup>. What is needed is not a list of criteria that strictly define science – in the day-to-day practice of science a more pragmatic approach is needed, “a ballpark demarcation that simply identifies a position as violating a basic value, or ground rule” (Pennock 2011, 184). Pennock suggests MN may be such a ground rule for the principle of scientific research:

[W]e should regard the universe as a structured place that is ordered by uniform natural processes, and that scientists may not appeal to miracles or other supernatural interventions that break this presumed order. Science does not hold to MN dogmatically, but because of reasons having to do with the nature of empirical evidence (Pennock 2011, 184).

The exclusion of the supernatural through the introduction of MN is a convention adopted on purely practical and not dogmatic reasons.

Should MN be part of the definition of science? Michael Ruse writes “ ... miracles lie outside of science, which by definition deals only with the natural, the repeatable, that which is governed by law” (Ruse 1982, 322). Plantinga points out that “It is hard to see that .... a

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<sup>17</sup> Ruse’s five criteria are:

- (1) It is guided by natural law
- (2) It has to be explanatory by reference to natural law
- (3) It is testable against the empirical world
- (4) Its conclusions are tentative, i.e., are not necessarily the final word
- (5) It is falsifiable

dispute about what is and isn't science could be settled just by appealing to a definition" (Plantinga 1997a). However, it is clear by now that the core dispute is not about trying to offer an analytical definition of science.

This point of defining science as being restricted to "natural" explanations has often been criticised by opponents of MN, but then again vigorously defended by scientists. In November 2005 the Kansas State Board of Education (NCSE 2005) changed the official definition of science by removing the two words "natural explanations" (NCSE 2005; Overbye 2005). The previous definition read (in part) "Science is the human activity of seeking *natural explanations* for what we observe in the world around us" [added emphasis]. The new definition describes science as "A systematic method of continuing investigation that uses observation, hypothesis testing, measurement, experimentation, logical argument and theory building to lead to more adequate explanations of natural phenomena".

In the following I would like to mention one more reason for science to eschew the supernatural. A main requirement, generally agreed on by scientists, is the *testability* of scientific hypotheses and theories. In contrast, the supernatural, does not follow any rules or regulations and therefore cannot be tested<sup>18</sup>. Closely related to the concept of testability is the characteristic of being repeatable. Plantinga (1997b, 2) seizes this point by reminding us that the Big Bang is presumably unique and not repeatable, and any study of this event should therefore not be part of the purview of science. In reply, Ruse (2005, 47) points out that there have been many unique events in history which are not amenable to direct testing, however, scientists are able to make predictions on the assumption that those events have taken place. These predictions can then be tested, eliminating or strengthening the proposed theory<sup>19</sup>.

Summarising, we see that opponents of MN are trying to smuggle supernatural interventionism into science. What is their aim? This takes us to the next subchapter in which Plantinga proposes a kind of theistic science.

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<sup>18</sup> One could argue that supernatural phenomena could also be subject to laws and restrictions. However, the general understanding of the "supernatural" is that it doesn't follow laws recognised by science. This is one of the criteria used to distinguish between natural and supernatural (see Chapter 6).

<sup>19</sup> One example is the detection, and accurate measurement, of the background radiation as a remnant of the Big Bang event.

### 3.3. A Theistic Science?

Plantinga refers to St. Augustine's *De Civitas Dei* in which Plantinga views "human history involv[ing] a struggle, a contest, a battle between what [Augustine] calls the *Civitas Dei*, the City of God, on the one hand, and, on the other, the City of the World or the City of Man" (Plantinga 1997b, 17).

Plantinga (1997a, 1) points to the popular conception of science as "a cool, reasoned and wholly dispassionate attempt to figure out the truth about ourselves and our world, entirely independent of ideology, or moral convictions, or religious or theological commitments". However, Plantinga does not see contemporary science as theologically neutral, standing serenely above this Augustinian struggle.

Here Plantinga distinguishes between the basic sciences (physics, chemistry etc.) and the "attempt to come to understand ourselves as human beings", in other words the so-called 'soft sciences', in particular psychology and social science. This kind of reasoning also echoes Pigliucci's distinction between 'established' sciences (e.g. physics, chemistry, evolutionary biology) and what he labels as 'soft' sciences (economics, psychology and sociology, etc.) (Pigliucci, 2013a; see also Pigliucci 2013b, 23). The latter are rich in evidence, but are characterised by incomplete theories. As an example, the reader might consider the multitude of theories and hypotheses that have some bearing on persuasion. Plantinga concedes that the 'basic sciences' may be free of ideology, but does not think this applies to these 'soft sciences'.

Here Plantinga demands that the Christian academic and scientific community pursue science by taking into account what Christians believe when trying to understand a given phenomenon. For example, Christian psychologists should be able to include the notion of sin into their therapies and the social sciences should consider that human beings are created in the image of God.

In reply to Plantinga's proposition one needs to point out that any attempt to introduce metaphysical assumptions into the everyday practice of science or to use those assumptions as basis for explanatory theories, would rob science of its universality. A psychologist who bases his work on the Hindu perception of Karma and reincarnation will come to a different conclusion than his Christian or humanist counterpart.

One can argue that it will be difficult to shield the sciences concerning human behaviour from being influenced by subjectivity and temporary factors. In the context

of this thesis we are mainly concerned with explaining the workings of nature, in other words the 'hard sciences'. MN forces the scientist to proceed in a manner which allows him to produce results that are amenable to verification or falsification by others who face the same data, but have different spiritual commitments. Dropping MN from the practice of science would introduce an element of subjectivism. MN doesn't require the scientist to give up her subjectivity but obliges her to record the findings in a way that is not based on her personal commitments.

Torrance (2017, 699) argues that "Christians should not need to compartmentalise her theological and scientific worldview. She does not need to adopt MN in order to avoid invoking God in place of secondary causes." Plantinga (2011, 190) also suggests that the Christian community should "engage in Christian science .... [an] empirical study unconstrained by methodological naturalism".

However, introducing 'Christian science' would rob science of one of its major strength, namely universality. It would also open the floodgates to a plethora of different sciences: we would have to accommodate not just Christian science but also the sciences adhering to the worldviews of other religions and ideologies.

If science needs to be shielded from supernatural intervention and causation, this leads us to the question of how the group I classified earlier as moderate theists can accommodate the concept of God. This will be addressed in the next subchapter.

### **3.4. Plantinga Critique of the "Functional Integrity" in Nature**

Under this heading I want to present the view generally accepted amongst theologians, namely that nature is self-sufficient. God created the universe with no functional deficiencies, i.e. shortcomings or flaws which would require correction from a supernatural realm.

The term "functional integrity", which was coined by Howard Van Till (2001, 158), underlines the clear distinction between the natural world and the supernatural. The former is the province of the natural sciences, confined by MN, and the latter is the territory reserved for religion<sup>20</sup>.

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<sup>20</sup> This ideology also conforms with the thesis that MN originated during the Middle Ages as a consequence of Christian thinking. This is going to be addressed in the following Section on the history of MN.

Van Till explains:

[By functional integrity] I mean to denote a created world that has no functional deficiencies, no gaps in its economy of the sort that would require God to act immediately, temporarily assuming the role of creature to perform functions within the economy of the creation that other creatures<sup>21</sup> have not been equipped to perform.

This is also the view of the theologian John Stek (1990, 254) who regards the universe as having its own “integral and integrating economy”. He states “[Creation] contains no gaps that have to be filled with continuous or sporadic immediate operations of divine power; God is not himself a component within the internal economy of his creaturely realm”. The aim of the natural sciences is to detect and explain relation between the members of the universe, not their origin (Allen 1989, 53).

Plantinga criticises this view and claims that at least some phenomena “resist a naturalistic explanation” (Plantinga 1997b, 7). Plantinga might be alluding to events a Christian theologian would describe as miracles, but he then goes further and proposes that we “postulate a deity in whose actions we can explain [the] things that *current* science cannot” [my emphasis]. In this context Plantinga brings up Newton’s suggestion that God periodically needs to adjust the planets’ orbits. Isaac Newton was a devout Christian and he filled the gaps in his scientific theories with God, claiming that only divine intervention could account for the long-term stability of planetary orbits. Later discoveries showed that Newton’s theory of gravitational forces was sufficiently equipped to explain the stability of the solar system. This concept of postulating a deity to fill in the gaps that *current* science cannot explain, is an example of the so-called God-of-the-Gaps fallacy. If God is only needed to fill in the gaps in our current knowledge about the world, then God recedes with every new scientific discovery made.

The concept of ‘functional integrity’ within nature allows the moderate theist to restrict naturalism to the methodology associated with science without giving way to an all-encompassing ontology of naturalism.

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<sup>21</sup> By “creature” Van Till means any member of the universe; it might be an atomic particle or a planet.



### 3.5. Plantinga's Response to The Science Stopper Argument

The science stopper argument is probably the strongest reason for introducing the concept of MN in our pursuit of science. The pragmatic argument is simple: until now, perseverance in the search for naturalistic explanations has proven very successful. Although there are many unsolved problems at any moment in time, past experience has shown that most of these problems will be resolved eventually through a methodologically naturalistic approach. For this reason one should persist, no matter how improbable the finding of a solution seems today (Ruse 2005).

Pennock also highlights that the naturalistic method has the virtue of spurring deeper investigation: "If one were to find some phenomenon that appeared inexplicable according to some current theory one might be tempted to attribute it to the direct intervention of God, but a methodological principle that rules out appeal to supernatural powers prods one to look further for a natural explanation" (Pennock 2000, 293). Pennock likens the appeal to supernatural agencies to the ancient Greek playwright's reliance upon the *deus ex machina* to extract his hero from a difficult predicament (ibid.).

How does Plantinga justify his criticism of MN in light of these persuasive arguments in favour of MN?

Plantinga uses the ongoing search for the origin of life (abiogenesis) as an example for his argument:

Consider the question of how life originated: as a theist I believe that God created it in one way or another, and now the question is: how did he do it? Did he do it by way of the ordinary workings of the laws of physics and chemistry ..... or did he do something special? If after considerable study, we can't see how it could possibly have happened by way of ordinary workings of matter, the natural thing to think ..... is that God did something different and special here. (Plantinga, 2001, 219).

Plantinga is simply wrong in his assessment of "we can't see how it could have happened [naturally]". We do in fact know a great deal about possible pathways that could lead to replicating organic molecules (see for example Freeman Dyson "Origins of Life", 1999). Our knowledge in this field has greatly advanced over the last decades and abiogenesis might become another example for the God-of-the-Gaps fallacy. Also

interesting is Plantinga's choice of abiogenesis as an example of a seemingly insoluble problem. He could have chosen consciousness to illustrate his point. However, consciousness is a common phenomenon, whereas the origin of life could have been a once off event, which is a more illustrious candidate for supernatural intervention. The puzzle of where matter and energy originally came from (the question of what caused the Big Bang) would have been another good example, although scientists are scrambling to address this problem<sup>22</sup>.

How does Plantinga deal with the science stopper argument, which clearly favours the principle of MN? After painting abiogenesis as basically insoluble for naturalistic science to solve, he immediately adds the following statement (in brackets), still on page 219:

“Such a conclusion, of course, would not be written in stone; the inquiry wouldn't be finally closed at any point”.

I can see three problems here with Plantinga's argument. Firstly, how should we interpret “after considerable study”? After forty years of investigating abiogenesis, should we accept defeat and posit a supernatural cause? Secondly, in what way would the research program change after accepting supernatural causation? It seems likely that there would be a split in the discipline, with supernaturalistic scientists on one side and naturalist scientists on the other. And thirdly, there is the question of how we could test the hypothesis of supernatural causation of abiogenesis. The normal scientific procedure is to evaluate a tentative hypothesis by making predictions which can then be weighed. Falsifying a supernatural explanation means having found a natural explanation of the phenomenon in question. This takes us back again to the God-of-the-Gaps problem.

Interestingly, Plantinga's suggestion of postulating a supernatural explanation while not abandoning the search for a natural cause is not unlike Maarten Boudry's proposition of introducing the concept of a 'provisional MN' (to be discussed in Section 5). The difference is that in the case of Boudry's provisional MN the research program is not affected in any way and the only aim of the researcher is to determine a natural cause for the observed phenomenon. Plantinga's intention, on the other hand, is to have *scientifically* identified an incident with supernatural causation.

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<sup>22</sup> For example, see Lawrence Krauss's book *A Universe from Nothing: Why There is Something Rather than Nothing*. Incidentally Krauss is in the radical atheist corner, wanting science to disprove the supernatural.

Phillip Johnson also addresses the science stopper argument in the context of abiogenesis. He writes:

Why not consider the possibility that life is what it so evidently seems to be, the product of creative intelligence? Science would not come to an end, because the task would remain of deciphering the languages in which genetic information is communicated, and in general finding out how the whole system works. What scientists would lose is not an inspiring research program, but the illusion of total mastery of nature. They would have to face the possibility that beyond the natural world there is a further reality which transcends science (Johnson 1993, 112).

Here Johnson conflates two concepts: The first is the notion of biological evolution (“deciphering the languages in which genetic information is communicated”), which is a topic that has been studied for half a century and where the explanatory powers of natural causation are fully adequate. The second is the problem of explaining the origin of life. Here, just as with Plantinga, Johnson wants us to posit a supernatural “creative intelligence”. And science, as we know it, would indeed “come to an end” in respect to the exploration of abiogenesis.

One might object that supernatural explanations have been proposed – and accepted – in the past. Newton’s suggestion that God needs to adjust the planetary orbits from time to time, is a good example. It did not stop the scientific enterprise looking for a naturalistic solution. However, this was three centuries ago. In the first half of the 19<sup>th</sup> century Charles Darwin still referred to the “Creator”, but since then references to supernatural causation have been eliminated from the toolbox of science.

Also note that Johnson’s phrase “the illusion of total mastery of nature” hints at the common, but distorted view of science as the fountain of all knowledge. This is exactly what the concept of MN is trying to prevent.

At this stage, one might be tempted to ask: What happens if supernatural causation is indeed the true and only explanation for an observed phenomenon? In that case, science will not be able to come up with a natural pathway, but at no point in time can science admit a supernatural explanation.

In summary of Plantinga’s critique of MN it can be said that MN is an underlying principle of science (Maarten Boudry uses the term intrinsic, as we shall see later). Yes, MN is restricting science by excluding supernatural causation, but the alternative would mean science became too unconstrained. Any phenomenon could be

immediately 'explained' in a subjective way. It would halt, or at the least hamper further research and would end in the God-of-the-Gaps dilemma if further research does lead to a naturalistic solution. Allowing supernatural causation would rob science of its universality because there is no clear, universally accepted concept as to what constitute a supernatural cause, nor have we a universal concept of God. Parting from its naturalistic premises would be to the detriment of not only science, but of theology as well, because the concept of a supernatural God would be undermined with every new naturalistic explanation.

Limiting science to natural causation to all observed phenomena in nature will not uncover all possible causes operating within our world (we might think of the question of what happened 'before' the Big Bang), however, this is a small price to pay considering that the universality of science is at stake.

As the idea of 'functional integrity' demonstrates, the concept of God can be accommodated with a world that is created in a self-sufficient manner that does not require supernatural interventions. Such a world can be studied with science wedded to MN. The attack on MN by the radical theists is primarily motivated by their desire to point to a scientific proof for a supernatural God.

## 4. Historical Development of MN

There are two ways of explaining the emergence of the concept of methodological naturalism (MN). The first is the idea that it slowly arose through our gradual better understanding of nature. As our comprehension of the natural world gathered momentum, supernatural explanations were abandoned and replaced by natural causation over the course of time. For example, our discovery that diseases are caused by microbes has replaced the belief in demonic possession. Thanks to our increasing scientific knowledge over the past few centuries, virtually every observed phenomenon, originally assigned to supernatural causation, has found a natural explanation, and we can expect this trend to continue. This is one of the reasons given for a slide from the position of MN to the rejection of everything supernatural. Both, radical theists and atheists, claim that the continuous erosion of supernatural explanations takes one closer to the absolute rejection of anything supernatural.

This gradual emergence is contrasted with the idea that the concept of MN originated in Medieval Europe, triggered through Christian philosophy. Evidence that MN emerged out of Christian thinking would undermine the argument given by radical theists, namely that MN arose out of *atheistic* thinking.

Let us start with the first proposition - the hypothesis that MN gradually evolved.

### 4.1. Origin of MN as a Gradual Process

One might speculate that at a very early stage in human history the need for certainty and predictability will have triggered the desire for finding correlations between observed phenomena. Recurring patterns such as the cycle of the seasons, the phases of the moon and the link between steady rains in the spring season and a favorable harvest will have made life more predictable and secure.

The Ancient Greeks contrasted the ordered world (*kosmos*) with the capricious world (*chaos*) of divine intervention (Lindberg 2007, 27). This indicated a clear distinction between the natural and the supernatural world. We can regard this as the beginning of MN: people ascribed irregular and unexpected events, such as earthquakes and comets, to supernatural agency and distinguished them from common, everyday observations, which were given a

more mundane explanation. Lindberg (2007,27) claims that “there was wide agreement that causes (if they are to be dealt with philosophically) must be thought only in the nature of things”. In other words, the behaviour of objects we find in the world are not influenced by supernatural spirits. For example, heavy objects long to be united with earth, which explains why they are falling to the ground, whereas fire rises because of its desire to join the heavenly realm. The tendency of heavy objects falling to the ground is an attribute of the object and does not involve any supernatural agency.

It was Aristotle who pointed to observation of the natural world as the main source of new knowledge (Poe and Mytyk, 2007). However, his methods of operation were still rooted in logic based on philosophical premises. Right into the late Middle Ages, science meant fitting one’s observations into Aristotle’s metaphysical system.

Starting in the 12<sup>th</sup> century, a reawaking of philosophy took place in the West and “natural philosophers” typically expressed a preference for natural explanations over divine mysteries. The Englishman Adelard of Bath was one of the first who would argue in a way we would call ‘scientific’ today:

I will take nothing away from God: for whatever exists is from Him and because of Him. But the natural order does not exist confusedly and without rational arrangement, and human reason should be listened to concerning those things it treats of. But when it completely fails, then the matter should be referred to God. (Quoted in Numbers 2008, 267).

By the late Middle Ages it had become the norm to first look for natural causes in explaining natural phenomena, although always leaving the door open for possible divine intervention.

The real push for a naturalistic study of nature originated with Francis Bacon towards the end of the 16<sup>th</sup> century through his emphasising the importance of observation rather than metaphysical ideas. He attacked the shoehorning of observational data into Aristotle’s metaphysical framework and thus laid the foundation to what we today call the scientific method. Bacon realised that metaphysical explanations of observed phenomenal stifle further inquiry into natural causes (what we call “science stopper” today). He distinguished between categories of causes. Metaphysics deals with the ultimate causes, whereas observations tell us about immediate causes (Poe and Mytyk, 2007). McGrath (2010, 1178/6236) lays out the distinction between primary and secondary causes:

The natural sciences are concerned with asking “how” questions, where theology asks “why” questions. The former deals with secondary causes (that is, interactions

within the sphere of nature), while the latter deals with primary causes (that is, the ultimate origin and purpose of nature).

Deistic theology regards God as setting up the primary conditions, leaving things to develop according to the laws of nature – a type of hands-off approach. On the other hand, theistic (Christian) theology sees God as sustaining nature, without direct and detectable intrusion or intervention.

Bacon's new philosophy took off in the 16<sup>th</sup> and 17<sup>th</sup> century, supported by the discoveries made by Galileo, Kepler and Newton, marking the beginnings of the new scientific age. Newton, himself a man of deep religious convictions, proposes a new force, gravity, as the explanation for Kepler's elliptical orbits. The concept of invisible forces, acting over distances, was reminiscent of the dark forces during the Middle Ages and this created a lot of skepticism. Newton pushed natural explanations for observed phenomena as far as he possibly could. However, in the end he postulated that God was required to intervene in the workings of nature from time to time, otherwise the planets would end up spiralling into chaos (Westfall 1986, 233).

Darwin begins his *Origin* by quoting two philosophers, William Whewell and Francis Bacon on the relationship of God with the world (Darwin 1859, Introduction).

“But with regard to the material world, we can at least go so far as this – we can perceive that events are brought about not by insulated interposition of Divine power, exerted in each particular case, but by the establishment of general laws.” – W. Whewell, *Bridgewater Treatise*.

“To conclude, therefore, let no man out of a weak conceit of sobriety, or an ill-spirited moderation, think or maintain, that a man can search too far or be too well studied in the book of God's word, or in the book of God's works; divinity or philosophy; but rather let men endeavour an endless progress or proficience in both.” – Bacon, *Advancement of Learning*.<sup>23</sup>

Throughout his work Darwin refers to “the Creator”. He often contrasts his theory to the supernatural theory of Special Creation. Since the time of Darwin, scientists have strictly adhered to the rule of appealing only to naturalistic causes in their reasoning, explanations and theories. This, in a nutshell is the concept of MN: the basic principle that scientific

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<sup>23</sup> Interestingly, by quoting Bacon, Darwin omitted the last sentence in Bacon's paragraph which says “... that they [people] do not unwisely mingle or confound these learnings together” (Bacon 2015, 3474/12249). Bacon is saying that men should strive at acquiring knowledge in both, religion and science, but we should keep these learnings separately and not mix them together.

method restricts itself to naturalistic explanations and eschews any form of supernatural justification.

This naturalistic principle, firmly linked to science, came increasingly under attack from the religious community, especially during the second half of the 20<sup>th</sup> century. As we have seen from its historical development, the core concept of methodological naturalism has been operative for millennia, but it was the philosopher Paul de Vries who introduced the phrase “methodological naturalism” (De Vries 1986, 388; Numbers 2008, 320). In his paper De Vries contrasts MN, a disciplinary method that makes no claim about the existence of God, with “metaphysical naturalism” which “denies the existence of a transcendent God.”<sup>24</sup>.

De Vries (1986, 394) points out that Christians need to be “enthusiastic supporters of the naturalistic methodology of the natural sciences”. Through the natural sciences, restricted to their methodology we can uncover God’s mysteries. However, while immersed in the natural sciences, we should not be distracted by “theological or philosophical speculation” (p 394). De Vries means that science should not overstep their boundaries, trying to answer philosophical or theological questions.

On the other hand, De Vries also voiced concern about efforts applying the scientific method to disciplines outside the sciences, in particular theology (Poe and Mytyk 2007).

The historical development outlined so far suggests that the concept of MN had been operational throughout history as a way of acquiring knowledge about the natural world. Supernatural explanations, abundant centuries ago, have slowly been replaced by causes which are themselves part of the physical universe. Demonic forces, once seen as responsible for lightning, thunder and earthquakes, have given way to electric discharges and moving continental plates. The emergence of MN over the centuries is a consequence of supernatural and theistic explanations being superseded by natural ones. Once an observed phenomenon can be explained through a natural cause, the previous supernatural explanation can be dropped.

The Belgian philosopher Maarten Boudry summarises the slow evolution of MN through inductive reasoning as follows: “.., as a result of centuries of scientific investigation, earlier animistic, anthropomorphic, and teleological views have gradually been superseded by more parsimonious, impersonal explanations” (Boudry 2015, 3). In other words, science

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<sup>24</sup> The original authorship of the term ‘methodological naturalism’ actually goes back to Edgar Sheffield Brightman who published a paper in 1937 “An Empirical Approach to God” (Brightman, 1937). The primary focus of the paper is on naturalism, by which he means “metaphysical naturalism”. He introduces the term “methodological naturalism” simply to distinguish it from its metaphysical counterpart, however, without developing the idea any further. Brightman then argues that theology and philosophy are valid ways to knowledge which naturalism cannot address.



arose in response to superstition; it is a reaction against religion. This underlines the radical atheist's view, namely that supernaturalism is false and that science, despite objections from the theistic community, is leading the way towards a purely naturalistic universe.

Radical theists agree with their radical counterparts: MN arose gradually as a consequence of supernatural causation being slowly eliminated by science in the course of history.

Radical theists regard Newton as a great scientist because he allowed for divine intervention in nature. It was Darwin who came up with a purely mechanistic account to explain the diversity of life. Dembski (1999, 84) remarks that “[b]y giving a plausible picture of how mechanization could take command and make life submit to mechanistic explanation, [Darwin] cleared the ground for the triumphant march of mechanistic explanations in biology”. It is certainly the case that because of MN science rejects any appeal to theistic interventions, “but not because of some special distance for God” (Pennock 2000, 283).

## **4.2. Origin of MN Though Christian Philosophy**

In the following I will outline a different approach to the origin of MN, favored by theologian and some contemporary philosophers: instead of originating in the naturalism of Ancient Greece, MN is claimed to have its root firmly in 13<sup>th</sup> century Christian Europe (Koons 2003, Kojonen 2016, Bishop 2013, Applegate 2013, Matzke 2006). Smith (2017, 16) claims that the concept of MN arose rather suddenly during the Middle Ages and the “abrupt shift towards a natural method was not the result of the chronic failure of supernatural hypotheses”. This would suggest that the rejection of supernatural causation in scientific explanations was triggered through Christian thinking during the Middle Ages, and not through a gradual process. In that case our perception of MN would change markedly: *If* MN arose from a desire to study the natural world as a creation of God, then the overt search for natural explanation of observed events in nature cannot be regarded as a ‘failure’ of supernatural explanations. The justification for this shift in thinking is going to be outlined below.

It was in 1277 when part of Aristotelian physics was condemned for wrongfully imposing limits on God's omnipotence (Koons 2002, 17). God was seen as having created the universe freely and not out of necessity (‘divine freedom’), which was contrary to the Aristotelian picture of the cosmos. Following this insight, Christians could not use philosophical first principles to discover how God had created the universe and consequently ‘natural philosophy’ became more reliant on observation (Bishop 2013). This new understanding reinforced the need for an empirical approach to the study of nature. If God had created out of necessity, then the laws of nature would have been discoverable by reason alone (a view

held by Spinoza), whereas as if God was free to create any world, then natural laws should become discernible empirically.

A second point of difference between Ancient Greek and Medieval philosophers is the clear distinction between God as the creator and his creation. As a consequence of a creation *ex nihilo* there must be a qualitative difference between creator and the created world.

This also leads us to the third point of difference between Ancient Greek and Medieval philosophers: the perception of the cosmos. In ancient times the celestial realm (perfect, unchangeable, divine and infinite) was regarded as qualitatively different to the terrestrial (imperfect, changeable, mundane and finite) (Bishop 2013). Therefore, the celestial and terrestrial realms operated on different principles. Consequently, systematic observation, mathematics and record keeping were mainly limited to celestial observations with the expectation of discovering regular patterns, whereas earthly events were regarded as more disorganized and lawless. In light of the Christian creator/creation distinction, some early Christian philosophers thought that everything created, terrestrial and celestial, was of the same order of being (Bishop 2013). Blurring the distinction between the heavenly and terrestrial sphere should have encouraged the more systematic study of earthbound nature. However, as Bishop points out, the ancient worldview, and especially Plato's and Aristotle's perception of celestial and terrestrial as qualitatively distinct, had a strong pull on early Christian thought and the concept of ontological homogeneity was lost during much of the Middle Ages. It was Galileo who pointed to mathematics as a universal tool to be used in all areas of natural philosophy. And it was Newton's metaphorical falling apple, culminating in a universal account of motion, that finally eliminated the distinction between the celestial and the terrestrial realm in nature.

Taken together, the concepts of divine freedom, creator/creation distinction and the ontological homogeneity of creation suggest that the creation implies contingent rationality (Bishop 2013, 12, Applegate 2013, 41). It is contingent because it depends upon God for its very existence, and secondly because God could choose out of many possible creations. Natural philosophers reasoned that the rationality of the created order is intelligible. They concluded (with the exception of Cartesian philosophers) that empirical means were best suited for the study of nature.

The goal of the natural philosopher - the forerunner of the 19<sup>th</sup> century scientist – was to understand “what kind of creation God had made and how God was at work in and through creation” (Bishop 2013, 13). God was seen as the ultimate, or primary cause, but acting in the world through secondary causes which were discernible. Medieval philosophers were competent in both theology and natural philosophy and “did not allow their theology to

hinder or obstruct inquiry into the structure and operation of the physical world” (Grant 1986, 69). In the 13<sup>th</sup> century Albertus Magnus emphasised the distinction between the causes of God’s will and the natural causes by which God’s will produces its effect (Lindberg 2007, 240). Only the latter are the subject of natural philosophy, however, focusing on those secondary causes “in no way implied that God was absent from creation, nor even that God was somehow excluded from explanations of how creation worked” (Bishop 2013, 13).

This alternative view of the historical origin of MN, which seems very plausible, places the roots of MN squarely into Medieval Europe. Theological reasoning led those natural philosophers to exclude the supernatural from their methodology. MN thus started out as a voluntary restriction to natural causes in the study of the natural world. This was in stark contrast to a purely rationalistic (Cartesian) approach, or one which used scriptural revelation to discern the nature of God’s creation.

This train of thought held throughout the following centuries. Nancey Murphy (1993) points out that early modern scientists, like Newton and Boyle were consistent in the move to exclude theology from science, and they did it for theological reasons. Their motivation was the radical distinction between God the Creator and the operation of the created universe.

Where does all this leave us in our contemporary understanding of MN? The principle of MN, whether it started in ancient history or in the 13<sup>th</sup> century, should not in any way be biased against the supernatural. For the natural philosopher in the late Middle Ages, MN was a tool to study and explore “God’s regular means of creating and sustaining the material world” (Applegate 2013, 43).

### **4.3. Summary**

Since the early beginnings, the survival of the human race would have depended on the ability to cope with its environment. In order to make the world more predictable there must have been a strong desire to explain observed phenomena through natural means. Our aspiration to better understand and control nature through science then gathered momentum in the past few centuries. For this reason, the slow evolution of the concept of MN certainly played an important part in its historical development.

The alternative view claims that the desire for studying the natural world, which later developed into science, originated out of Christian thinking during the Middle Ages. We don’t need to go further into determining to which extent both of these alternatives contributed to the rise of science. If the second alternative is plausible – and it certainly

seems plausible – this will have taken the edge off the radical atheist’s claim that science arose as a reaction against religion. Secondly, the desire of Christian scientists (or ‘natural philosophers’) to study natural phenomena and isolate them from the supernatural, will also take the wind out of the radical theist’s argument against MN. If modern science originated out of Christian philosophy (Plantinga 2011), and if those Christian scientists emphasised the distinction between the natural and the supernatural, then there is no reason to critique the use of MN in modern science.

## 5. Introducing Provisional MN

As stated before, MN is usually assumed to be an a priori commitment of science. For example, Eugenie Scott states that science “acts as if the supernatural did not exist” (Scott 1993, 9). Nancy Murphy, a Christian philosopher, has a different take on MN and calls it ‘methodological atheism’ (Murphy, 1993).

In its standard meaning, MN stipulates that science has to exclude non-natural causation from its explanatory framework. This opens MN to the critique that science is forced to start off with the arbitrary presupposition that there are no non-natural causes to natural phenomena. However, shouldn’t science follow the evidence wherever it leads? This leads us to the concept of provisional MN (pMN), which takes the sharp edge off MN, opening science (at least temporarily) to supernatural claims.

Massimo Pigliucci (2000) sees MN as a provisional and a posteriori principle. It is provisional because the falsification of its conclusion about supernatural causation is, at least in principle, possible. In other words, science can approach any problem, with or without a supernatural claim, assuming that it will yield a naturalistic causation<sup>25</sup>. However, if no such naturalistic answer is found, the verdict remains open for a supernatural account. This is where the ‘provisional’ aspect comes in. The prefix ‘p’ can also stand for ‘pragmatic’ (Boudry 2010) which sees MN as a principal attribute of science which has evolved over time, through countless failures of supernatural claims (option 1 in the historical development of MN). MN demands that science eschews supernatural causation because history has shown that every claimed supernatural explanation so far has been found to be superfluous: “Since there is no evidence of any God or supernatural design in the universe, the scientifically-informed conclusion has to be that there is none” (Pigliucci 2000, 21). This conclusion is echoed by many: “[MN is] an inductive generalisation derived from 300 to 400 years of scientific experience” (Shanks, 2004, 141).

Pigliucci’s description of MN as ‘provisional’ seems to be a good way out of the often faulted a priori restriction of MN. If MN is not a strict restraint on the methodology of science and if the working scientist is allowed to consider supernatural causation, the dilemma seems resolved. Under this view science is free to not only investigate supernatural claims, it can

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<sup>25</sup> Maarten Boudry (2010) in particular, popularised the concept of pMN in response to the claims of the Intelligent Design (ID) movement, which accuses scientists of ignoring their claims that complex structures in living organisms have been ‘intelligently designed’.

even – provisionally – entertain the possibility of supernatural causation, but in the end needs to adhere to naturalistic explanations.

This idea has been taken up and expanded by the Belgian philosopher Maarten Boudry, suggesting a distinction between the conventional view of MN and the contrasting concept of provisional MN (Boudry, 2010)<sup>26</sup>.

Boudry distinguishes between two types of MN:

- (1) The first type of MN refers to an *a priori* limitation posed on science, namely the concession that science does not deal with the supernatural; it is simply not equipped to do so. Science *does not consider* supernatural explanations. This is the common view of MN, supported by most scientists and philosophers (and criticised by Plantinga). The intrinsic limitation imposed on science is denoted as iMN (intrinsic MN).
- (2) Alternatively, and this is the type which Boudry favours, there is the provisory and empirically founded convention of science to exclude supernatural explanations. It is justified in virtue of the historically based and consistent success of natural explanations for our observations of the natural world. This is in opposition to the persistent lack of success of supernatural explanations in science over its entire history (Boudry 2010)<sup>27</sup>. This second variation of MN is defined as pMN (provisional or pragmatic MN). It is, in principle, revocable by extraordinary empirical evidence.

Although these are epistemic claims, iMN seems less accommodating of the supernatural than pMN. The latter discards supernatural explanations only on the basis of their poor track record, not as a starting principle (Boudry 2010). ON is a more committing position than iMN, since it rules out the supernatural altogether, whereas iMN only claims the science is “ill-equipped” to deal with supernatural causes, but leaving open the possibility that they do exist (Boudry 2010, 230). Intrinsic MN in turn makes a stronger statement than pMN, because the latter allows for the possibility and investigation of alleged supernatural

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<sup>26</sup> Boudry has been introduced in Chapters 1 and 2 as falling under the heading of radical atheists. The title of his 2012 paper (*Grist to the mill of anti-evolutionism: The failed strategy of ruling the supernatural out of science by philosophical fiat*) says it all: The critics of MN (Boudry in particular addresses the supporters of the Intelligent Design movement) accuse science of being predisposed against supernatural causation and Boudry wants to take the wind out of their sails. By introducing pMN Boudry argues that we *can* allow the supernatural into science - but only temporarily. Then we quash the evolution-deniers by showing them that it's not supernatural after all. As we will see later, the idea does not work as intended, partly because of the unclear demarcation between the natural and the supernatural.

<sup>27</sup> By “lack of success” Boudry obviously refers to the repeated replacement of supernatural explanations by natural ones. A theistic commentator would object to this characterisation, pointing out that God is acting through the laws of nature, which we perceive as natural explanations.

causation. Intrinsic MN excludes the supernatural a priori, whereas with pMN the exclusion shifts to a posteriori.

Unlike under the conventional conception of MN (iMN), provisional MN is claimed to empower science to be equipped in detecting the supernatural (As we will see later, Boudry doesn't really tell us how pMN can empower science to do the trick). Science can suggest supernatural hypotheses; however, the verdict so far has been uniformly negative. Supernatural explanatory evidence has been claimed in the past, but have consistently been replaced by natural explanations at a later stage. The supernatural has not been detected in all of history and is ruled out on purely evidential grounds (Boudry 2010). A famous illustration from the past is Newton when, after successfully explaining the planetary orbits, he thought it necessary to bring in the supernatural power of God to 'wind up' the universe every now and then. Scientists after Newton have demonstrated that natural forces were sufficient to keep the planets in stable orbits. A more recent example would be one of the many claims raised by the Intelligent Design Community: for example, the assertion that the highly complex human blood clotting mechanism is shown to be "irreducibly complex", that it could not have evolved naturally, and that its existence implies a supernatural (intelligent) designer (Behe 1996). A few years later this claim could be disproven because a naturalistic pathway had been identified (Miller 2008). It should be mentioned here that Boudry's idea of introducing pMN is a direct answer to the claims of the Intelligent Design Community and their complaint that science shuns any supernatural alternative to a purely naturalistic pathway in biological evolution.

The above examples, citing Newton and Behe, are only two of many instances where supernatural causation was shown to be superfluous. Inductive reasoning tells us that current unexplained phenomena will be resolved following further investigation. Strictly speaking, Newton made a non-scientific claim when he appealed to supernatural causation. And, of course, this did not stop science to keep searching for a natural explanation<sup>28</sup>.

Newton's problem with the planetary orbits should make it clear that almost any supernatural claim cannot rule out further scientific investigation<sup>29</sup>. There is no need for science to discard supernatural explanations by philosophical fiat. Provisional MN becomes an empirically grounded commitment to natural causes and explanations, which is in principle revocable by extraordinary empirical evidence. Obviously, the usefulness of introducing pMN hinges on the question of what allowance is made for this "extraordinary

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<sup>28</sup> Science did not stop its investigation into this problem after Newton's claim of supernatural intervention, simply because it goes against one of the conventions of science, which was already recognised at that time.

<sup>29</sup> Unless the assertion is clearly based on supernatural causation, such as the resurrection of a three-day old corpse.

empirical evidence". We will come to this later. Let us first follow Boudry in his critique of iMN.

Boudry lists a number of points in support of iMN in order to show their weakness and to bolster his backing of pMN (Boudry 2010).

Boudry's first point addresses the contentious issue of MN being part of the definition of science, as mentioned in Chapter 3. This has been the main defining criterion in historical court cases across the US in their demarcation of science against pseudo-science. This defining argument contradicts the fact that scientists and other sceptics have spent considerable amount of time and energy investigating allegedly paranormal phenomena. An often-repeated claim is that "science can only deal with the natural", but when and how can we decide that the problem at hand is a 'natural' or a 'supernatural' problem? It can only be shown to be natural by reducing it to natural causation, which *is* the aim of science. It therefore seems unwarranted to restrict science to any a priori metaphysical assumption, when it is the very aim of science to find the true cause of the phenomenon under investigation.

Boudry's example is the well-known investigation by Benson et al. (2006) reported in the American Heart Journal. It describes the study of any therapeutic effect of intercessory prayer on cardiac by-pass patients through a methodologically sound RCT-trial. The study failed to demonstrate any effect, but can be seen as a demonstrable contradiction to the a priori principle of MN. If science cannot deal with the supernatural 'by definition' then these experiments were pointless and unscientific to begin with (Boudry 2010).

As discussed later in my critique of Boudry's concept of pMN, it seems that Boudry is picking up on a weak point in our common understanding of MN: As pointed out repeatedly, science is well equipped for studying phenomena which are claimed to be paranormal or supernatural, e.g. miraculous healings, UFO sightings, homeopathy etc. The Benson et al. study did not demonstrate any effect; it therefore failed to establish a supernatural interference. On the other hand, if it had demonstrated a statistically meaningful effect - a more successful recovery rate for patients who had been prayed for - the result would have been naturalistically accessible. It would have been a statistically meaningful outcome of a clinical trial, but with an *unknown mechanism*.

One way to defend iMN against such concerns would be to limit the meaning of the "supernatural" to any phenomenon that is inaccessible to science *in principle* (Boudry 2010). That is, the very fact that science can investigate phenomena such as the potential effects of prayer using observation and scientific methodology indicates that these are natural. Examples of the supernatural would then be entities residing outside our space-time



universe (and not interacting with the latter). I would also include ultimate causes for the existence of space and matter (although some physicists claim to have natural explanations for this (see for example Krauss 2012)). As soon as the alleged supernatural becomes scientifically detectable, it ceases to be supernatural and must, from that moment on, be reconsidered as “natural” (Boudry 2010, see also Ruse 1982, and Pennock 1998; 2000). This point will be discussed in my later critique of Boudry, but we clearly need to distinguish between an event under investigation, which by definition occurs in the observable “natural” world, and the explanation of said event, which might have a natural, or an inexplicable supernatural cause.

Boudry’s second argument against iMN draws on the presupposition that the world accessible through science has to follow lawful regularity. Boudry points to the statement from biologist Richard Lewontin in his review of Carl Sagan’s book *Billions and Billions of Demons*:

“[Scientists] have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our *a priori* adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door” (Lewontin 1997, 10).

This statement implies that we cannot practice science if a miracle can pop up anywhere and at any time. This view is underlined by Robert Pennock: “[S]cience does not have a special rule just to keep out divine interventions, but rather a *general rule* that it does not handle any supernatural agents or powers” (Pennock 2000, 284) (emphasis added). And here Pennock gives the reason for demanding a general rule:

Lawful regularity is at the very heart of the naturalistic worldview and to say that some power is supernatural is, by definition, to say that it can violate natural laws .... controlled, repeatable experimentation .... would not be possible without the methodological assumption that supernatural entities do not intervene to negate lawful natural regularities (Pennock 2000, 195).

Boudry also cites Barbara Forrest who claims that supernatural explanations would destroy the explanatory force of science (Forrest 2000). In the worst-case scenario “anything goes” and the stability of science “would consequently be destroyed” (Forrest 2000, 10). This obviously has not happened and Boudry asks us why we have to assume that *any* supernatural intervention would necessarily frustrate *all* experimental work (Boudry 2010).

Take the case of the intercessory prayer study, or any miraculous healing - there would be no reason for the scientific enterprise to immediately and entirely collapse. In other words, science would survive a miracle here and there, as long as they are not too frequent.

Under the heading of lawful regularities Boudry also points out that there are no logical objections to supernatural interventions in the natural world (see also Forrest 2000). If intervention from outside nature did involve logical inconsistencies, they could be ruled out on ontological grounds, a conclusion clearly to be avoided. This is the whole point of distinguishing between MN and ON. Any reliance on naturalistic methodology does not logically entail ON (Forrest 2004, 92).

In contrast to the natural world, the supernatural realm remains unknowable and defies any human attempt to gain knowledge (Forrest 2000). Due to this lack of methodology science has to ignore the supernatural as outside its scope of inquiry. The moment supernatural causation is postulated, for example in the case of abiogenesis, the claim is unassailable and science grinds to a halt. In this respect the criticism of iMN is justified.

Boudry's fourth argument against iMN is based on the "alleged procedural necessity" of science (Boudry 2010). He refers to Forrest who points out that any proof for the supernatural is impossible since science has not the right procedures and tools to investigate those claims. She writes:

Methodological naturalism does exclude the supernatural as an explanatory principle because it is *unknowable* by means of scientific inquiry, whereas philosophical naturalism, both by definition and because of the methodological and epistemological inaccessibility of the supernatural, excludes the latter from its *ontological* scheme (Forrest 2000, 14).

Steven Schafersman concurs that the supernatural is not amenable to scientific procedures:

It is impossible to possess reliable knowledge about the supernatural by the use of scientific and critical thinking. Individuals who claim to have knowledge about the supernatural do not possess this knowledge by the use of critical thinking, but by other methods of knowing (Schafersman 1997, 4).

In other words, supernatural knowledge does not rely on empirical evidence, but is mainly based on authority, faith, revelation and other sources, and would be rejected as unreliable evidence by philosophical naturalists. Therefore, Forrest and Schafersman claim that naturalism becomes a methodological necessity for science.

Boudry now points out that if the possibility of scientific evidence of the supernatural is already excluded from the onset, then we cannot expect to succeed in finding evidence for

the supernatural. Forrest also concedes the paradoxical situation: “Paradoxically, supernatural claims are the kind of propositions for which empirical evidence is required, but impossible to obtain” (Forrest 2000, 16). Boudry now seizes the opportunity to market his concept of pMN: “... this paradox can be resolved if Forrest and Schaferman ... choose the P-horn of the MN-dilemma and abandon the uninteresting and sterile definition of the term ‘supernatural’ “ (Boudry 2010, 240). Because pMN allows the possibility of discovering the supernatural, this problem does not arise.

Finally, Boudry addresses the principle of testability in his critique of iMN. According to iMN, scientific claims are testable against the empirical world, supernatural assertions are not. The intrinsic untestability of supernatural explanations is regarded as a strong reason for dismissing them from the purview of science.

A supernatural agent would, by definition, be unconstrained by natural laws and as Scott (1993) illustrates it: “you can’t put God in a test tube”. Indeed, “... the actions of an omnipotent creator are compatible with any and all observations of the natural world” (Scott 2004, 19-20). This is a problem because one understanding of testability is falsifiability – we cannot introduce a scientific hypothesis or theory if it cannot be proven false by empirical data.

Let us take the example of a supernatural Intelligent Designer. What patterns of design might we expect to find in nature and what counterarguments might we be able to raise? We might predict perfect design, but evidence of poor design and imperfections won’t convince the supernaturalist since we don’t know the intentions and characteristics of the designer. Similarly, failed double-blind tests of paranormal phenomena, such as telepathy, dowsing or homeopathic treatments will be explained away by blaming the experimental setup, psychological factors etc. Pennock points out that any supernatural claim can be “immunized” against contradicting evidence (Pennock 1998).

However, Boudry sees this ‘intrinsic unfalsifiability’ as a weak point of iMN. He indicates that “carefully controlled experiments” could reveal “repeated miracles or psychic wonders” which would falsify a naturalistic view of the world.

Boudry thus claims that the conception of MN as an intrinsic principle of science is unfounded. He uses the arguments from the definition of science and that of lawful regularities, the science stopper argument, the argument from procedural necessity and the testability argument. This very much echoes Plantinga’s objections to MN, who also particularly attacked the a priori attribute of MN. Boudry thus wants to replace iMN with a

provisory version of MN, which is an empirically grounded commitment to naturalistic causes and explanations. This principle is “revocable by overwhelming and unmistakable empirical evidence”. (Boudry 2011, 571)

## Critique of pMN

At first blush Boudry’s introduction of pMN seems to be the ideal solution everybody was looking for. It kills two flies in one hit: for the religious community science is finally free from the shackles of iMN. As it should be, science can follow the evidence, wherever it leads. Secondly, the scientist is free to investigate alleged supernatural events and causation. The ontology of the supernatural can at last be affirmed or disproven via the scientific method.

One would expect theologians, scientists and philosophers to have flocked to and embraced the concept of provisional MN. This has not happened since its inception in 2010.

Why did it not take the scientific community by storm? It may be because pMN is in fact what scientists have been using all along. Let us look at the current situation: if there is a claim of some supernatural event having occurred, it surely is the scientist or the medical professional who arrives first at the scene. These experts would proceed according to their job description, namely looking for a natural cause for the event in question. They would keep searching for a naturalistic explanation, which may be physical (e.g. an uncommon, but possible cure of cancer, which does not conflict with the laws of physics and chemistry) or it may have a psychological reason (e.g. hallucination in case of an UFO sighting).

However, there is a difficulty with this picture. If no explanation is found, the case will be filed as unresolved, but would science really affirm a supernatural event, with or without pMN? Included in Boudry’s definition of pMN is the clause that this type of MN is in principle revocable when confronted with extraordinary empirical evidence (2013). In his 2010 paper Boudry uses the words “overwhelming and unmistakable” empirical evidence. However, at this point we are left in the dark as to how this “extraordinary, overwhelming and unmistakable empirical evidence” might present itself.

Yonatan Fishman, in a paper co-authored with Boudry (2013) addresses this issue, listing a number of possibilities which could serve as a clear-cut attestation of supernatural intervention<sup>30</sup>.

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<sup>30</sup> The paper lists the eight following examples:

1. Intercessory prayer has healing power
2. Only Catholic intercessory prayers are effective

Many examples are unrealistic and over the top (e.g. no. 8). Some are far too strong, including the already mentioned scientific study of the efficacy of intercessory prayer. If this is what it would take to convince scientists that supernatural causes exist, pMN is the same as iMN in everything but name. Some of the examples are too weak. On Fishman's list we find the "scientific demonstration of extra-sensory perception or other paranormal phenomena". Let us assume for a moment that this kind of phenomenon has been shown to be true in a statistically meaningful way, as the result of an impeccable scientific study. Would this mean that science has proven the existence of supernatural phenomena? This is doubtful and Boudry would be among the first to remonstrate. No, scientists would keep investigating until a natural explanation was found to account for the observed phenomenon. Possibly a new way of transmitting information, other than through electromagnetic radiation would need to be postulated (and further investigated). Scientists would not let it slip into supernatural waters.

Let us consider one more example (which is not on Fishman's list). One as yet unresolved problem we are confronted with - which has occupied science now for more than four decades - is the question of how life originated (abiogenesis). Taking our lead from Boudry's definition of pMN, at what stage should researchers throw up their arms and admit defeat? What is the criterion determining the point when science finally needs to concede having come across a case where the supernatural is the only possible explanation?<sup>31</sup> In contrast, following the footsteps of iMN (the traditional concept of MN), we are forced to keep looking for natural causes. There is the danger that pMN turns out to be an effective science stopper. Worse, it would lead science unnecessarily into supernatural territory. The present threat of the Intelligent Design Movement intruding into the field of molecular biology is an ominous example.

In his critique of iMN Boudry warned us about the danger of the 'science stopper' argument. But at what point would the scientist, following the guidelines of pMN, conclude that "overwhelming and unmistakable empirical evidence" lead us to the conclusion that we are facing a supernatural phenomenon. Remember that the principle of pMN is revocable and must open the door to supernatural causation once the evidence *seems* overwhelming. In

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3. Anybody speaking the Prophet Mohammed's name in vain is immediately struck by lightning
  4. New scientific findings validate Young Earth Creationist's claims
  5. Messages from divine revelation or near-death experiences are being validated in the future
  6. Scientific demonstration of ESP or other paranormal phenomena
  7. Mental faculties persist after destruction of the physical brain, supporting the concept of a soul
  8. Stars align in the heavens to spell the phrase "I Exist – God"

<sup>31</sup> This could also lead to the question of what the criterion is for determining the endpoint of a particular paradigm / research programme, finally switching to an alternative paradigm / research programme.

the practical life of science there is no middle ground, either the collective enterprise of science admits defeat, or it keeps looking. We asked the same question in the section on Plantinga's version of the science stopper argument: in what way is naturalistic science going to proceed once the possibility of supernatural causation has been raised?

It all depends on the distinction between what we term 'natural' and 'the supernatural'. Boudry admits that this is a problem, and this distinction is more important in the case of pMN than for iMN. The conventional reading of MN (iMN) will simply 'naturalise' an unknown observation, event or phenomenon and classify it as 'natural', whereas in the case of pMN we need to decide if we are confronted with a genuinely supernatural phenomenon or not (consider abiogenesis as a prime example). The alternative, of course, is that no natural explanation for the observation in question has been identified so far. In that case scientists will carry on with their work, while it is relegated to the mountain of unresolved problems (abiogenesis!). The only drawback is that we would not assign a supernatural cause to the problem at hand, even if that *is* the correct explanation.

The conclusion is that the conventional and historical understanding of MN, including its a priori rejection of supernatural causes, is best suited to the methodology of doing science and is preferable to Boudry's concept of a provisional MN.

The burning issue now, which has been highlighted with the discussion of pMN, is the question of how we distinguish the supernatural from the natural. This topic is going to be addressed in the following Chapter.

## 6. The Distinction between Natural and Supernatural

### Introduction

Most of the discussion so far has been centred on MN with the understanding that the methodology of science excludes the supernatural realm. MN limits the explanations of observable phenomena to natural causes. This raises the question of how to distinguish between a *natural* and a *supernatural* cause.

The aim of this chapter is to shed some light on this distinction, without expecting to establish a clear-cut demarcation. In the following discussion I define naturalism as the domain of what is considered 'natural' (as opposed to supernatural). Also, in the context of this Chapter the term 'naturalism' refers to ontological naturalism.

We begin by considering three attempts to define the distinction between natural and supernatural.

### Martin Mahner, Maarten Boudry and Paul Draper

Mahner (2012) defines (ontological) naturalism as the claim that our lawful spatiotemporal world is all there is. Everything we perceive, directly and indirectly, every cause is part of the natural world. This includes any future discoveries to be made and, we might assume, anything which might not be discovered in future, perhaps facets of nature that are not even discoverable or comprehensible in principle<sup>32</sup>.

On the understanding that everything is natural a distinction between natural and supernatural seems to be superfluous. However, this cannot be the final answer because supernatural entities and causation cannot be ruled out, in principle. A spiritual soul is imaginable and cannot be a priori excluded from 'all there is', especially since it is thought to reside outside the spatiotemporal realm.

Mahner (2012, 1437) acknowledges that we can imagine a world outside the natural one. He describes "supernaturalism [as] the view that our lawful spatiotemporal world is not all

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<sup>32</sup> I am thinking here about the hypothesis that matter ultimately consists of 'quantum fields'.

that exists because there is another non-spatiotemporal world transcending the natural one, ...". Mahner simply denies that such a world exists.

Even if we ignore the supernatural, we need to admit abstract objects, for example numbers, which don't fit well into Mahner's 'lawful spatiotemporal' world. Mahner accommodates abstract objects as the contents of thinking brains and he regards the mental as being "an emergent, or .... supervenient property of highly complex neuronal systems" (Mahner 2012, 1447).

When trying to associate the natural with the physical, sooner or later one is confronted with the question of the status of minds. One cannot deny that minds are real; after all they are the object of study for psychology and the domains of social sciences. However, many of their properties are immaterial and the mind-body problem poses a serious challenge to simple physicalism.

This definition of naturalism uses non-reductive physicalism and maintains that everything existing within nature is either physical or supervenes on the physical. Furthermore, in order to qualify as natural, the phenomenon is solely influenced by physical causes, or causes supervenient on physical causes. This definition lets us get around the complex mind-body problem without having to resort to any supernatural explanations. The ontological naturalist can thus accommodate consciousness and therefore this issue will not shed any light on the natural/supernatural demarcation.

The concept of a soul cannot be regarded as an abstract object and Mahner would still need to accommodate 'non-natural' entities which are not abstracta. This leads to the question of whether we can define an exhaustive set of 'all there is'.

Let us now turn to Maarten Boudry. In contrast to Mahner, who simply denies anything supernatural, Boudry allows us to consider a supernatural realm (which may be amenable to the scientific method). Boudry proposes to define 'supernatural' as

referring to any phenomenon which has its basis in entities and processes that transcend the spatiotemporal realm of impersonal matter and energy described by modern science (Boudry 2010, 8).

Since the term science is conveniently defined as describing the spatiotemporal realm (the natural world)<sup>33</sup>, Boudry's descriptor for the supernatural runs into serious danger of being circular.

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<sup>33</sup> Note that in Chapter 3 I restricted science as the practice of investigating the world using the systematic method of observation, etc., however, without being in the business of telling the whole, exhaustive truth about reality. I therefore see science as giving us a limited description of the natural world.



In a later paper Boudry et al come up with another definition:

[T]he term ‘supernatural’ [refers] to processes and causes that transcend the spatio-temporal realm of impersonal matter and energy, and to phenomena arising from the interaction of those entities with the material universe (Boudry et al 2012, 1152).

This definition, if we disregard the term ‘impersonal’, would easily fit our current limited understanding of dark matter, which is invisible and of non-baryonic form<sup>34</sup>, but interacts with the ‘material universe’. On the assumption that scientists regard dark matter as a natural phenomenon, it seems Boudry’s definition is inadequate.

Boudry does make concessions to the shifting meaning of ‘natural’, by including the clause “described by *modern science*” in his definition. These shifting goal posts are the single weakest point of Boudry’s proposal of pMN.

Looking back in history, it is clear that the goal posts of science keep shifting as science evolves. Contemporary physics is certainly not complete; therefore we cannot interpret physical or natural by referring to current science, a problem that is known as Hempel’s dilemma (Alter, Internet Encyclopedia of Philosophy). The other option is to define physicalism with respect to properties of some future, idealistic and complete physics. However, this would be a rather empty claim because we cannot know the nature of any such future theories.

In order to utilise the concept of naturalism to denote the supernatural, it is necessary to nail down the limits of physics, not just the boundaries of present-day science. We need to establish criteria which reveal a breakdown of physical explanation (Edis and Boudry 2014). We have made ground-breaking discoveries in classical physics which have revolutionized our understanding of the natural world: the purely mechanical picture of physical objects augmented by the action-at-a-distance gravity, the initially occult-seeming phenomena of electricity and magnetism, particle-wave dualism and finally the wholly incomprehensible world of the quantum world, fields and M-branes. Any anomaly which seemed non-natural at the time of its first discovery turned out to follow certain laws, which made it reproducible and predictable, and the original anomaly was assimilated as part of the natural world. The so-called M-theory is a typical modern-day example where M, according to theoretical physicist Edward Witten (Cole 1999), could stand for “magic”, “mystery” or “membrane”.

Modern physics significantly departs from mechanistic materialism but is still an updated descendant of 19<sup>th</sup> century materialism, even if we now regard quarks, fields and M-branes

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<sup>34</sup> Baryonic matter is what we call normal matter, consisting of protons and neutrons.

as fundamental, connected through local and nonlocal interactions (Edis and Boudry 2014). Because our current theories are incomplete, and we are not even able to define future revision of those theories, we cannot base our demarcation between natural and supernatural on the concept of physicalism.

It would be simplistic to expect this pattern of the mystical turning into something comprehensible to continue indefinitely. When probing into the fine structure of matter it looks likely that all matter is made out of ‘interactions of quantum fields’. We need to accept that our capacity to comprehend is too limited to explain everything we encounter in the natural world. However, this does not turn the incomprehensible into the supernatural.

There is also the problem of circular reasoning if we follow Boudry’s attempt to define the supernatural by linking it to the conclusions reached by *modern* science. As we have seen, Boudry’s concept of provisional MN defines science as being restricted to the limited domain of the natural world. Now we cannot turn the argument around and define the supernatural as being outside the territory of science.

Let us look at a third definition: Paul Draper (2002, 198) defines naturalism as “... the view that the physical universe is a closed system in the sense that nothing that is neither part nor a product of it can affect it.” A plausible inference would be that Draper recognises the supernatural is the sum of all elements and phenomena which fall outside this closed system. Elsewhere Draper defines nature as “the spatiotemporal universe of physical entities together with any entities that are ontologically or causally reducible to those entities” (Draper 2005, 87). This again defines the natural as a closed system, in the sense that ‘there is nothing else’, encompassing any effects and causes we delineate as the natural world, including mental states that can be reduced to physical brain states. Draper defines naturalism without attempting to determine a precise demarcation and his interpretation doesn’t take us any closer to our goal of specifying the boundary of this closed system. I am thinking here of a typical ‘supernatural event’: water turning into wine. How can we be certain that the cause responsible for generating carbon atoms is to be found inside or outside of Draper’s “closed system”?

The definitions we have heard from Mahner, Boudry and Draper don’t give us a satisfactory demarcation of the natural/supernatural divide. I therefore want to start from the very basic and familiar features we generally associate with supernatural objects, events and causes.

## Four Characteristics of the Natural World

Here are four common criteria to characterise we associate with the natural world:

- (1) It is limited to three dimensions of space, plus time
- (2) It can be described through the most basic of the natural sciences (physics, chemistry)
- (3) It displays regularities which can be defined as laws of nature
- (4) Objects we find in the natural world exhibit no genuine design or purposefulness (with a strong caveat, as explained below).

We will examine each of these characteristics in turn to see if they are necessary and sufficient in isolation or as a combination to characterise what we mean by 'natural'. The next step is to see if those attributes can also function, in a negative way, to define the supernatural. Point (4) needs special attention because the natural world is teeming with seemingly purposeful and designed features. This apparent design will have to be reducible to random cause and effect events within the natural world to qualify as natural. Not only that, but the purpose/design has to come from an entity that itself is natural. The reader might think of a beehive which is built for a specific purpose; the bees themselves have been shaped through biological evolution.

### The Natural as Spatiotemporally Located

A common attribute of natural entities and events is the fact that they are confined to three-dimensional space and time. The supernatural often transcends this limitation. Our picture of the soul is a good example: it is regarded as not locatable in space. However, there may be objects or events which we associate with the supernatural that *are* located in the 'natural' three-dimensional space and also seem to follow a time line. An example would be the alleged miracle of turning water into wine. It seems that supernatural events might happen in our space-time world. Furthermore, cosmology describes 'black holes' as singularities in which our familiar space-time physics is thought to have broken down. Black holes are natural objects, detectable by their gravitational force. Also, ordinary matter 'falling' into black holes seemingly 'disappears' from the spatiotemporal realm. However, such an event won't be regarded as supernatural.

Spatiotemporality therefore cannot be used as an attribute to demarcate the natural from the supernatural.

## **The Natural as Physical**

Another possible distinguishing trait for the natural is what we call 'physical'. The historical definition of naturalism is that everything that exists is physical<sup>35</sup>. Physicalism states that all of reality can be described by physics and is reducible to physics. According to Keith Augustine reductive physicalism describes everything within nature as physical and solely influenced by physical causes (Augustine 2011).

Evan Fales (2013) points to three problems which come to mind when we limit the *natural* to our physical universe: Firstly, there may be other universes that are causally isolated from ours. This possibility would raise questions about the identity conditions for matter and suggests that being "material" is not a sufficient condition for being natural in our sense. In other words, it would be "material" or "physical" to any observer within the other universe, but not to us. However, we don't need to concern ourselves with distant universes, as long as they do not causally interact with ours. Of course, there is the possibility that our world is embedded in, say a four-dimensional universe. Any causal intrusion from an extra special dimension would cause events in our world that would be indistinguishable from supernatural causation.

Physicality has no problem with incorporating non-spatiotemporal objects (e.g. black holes) into the natural world, however, it is not the answer to our question for a demarcation criterium or the supernatural as we saw earlier with Boudry's definition.

## **The Natural Events Follow Certain Laws**

Another (third) promising candidate for distinguishing supernatural events is the uniformity we observe in the natural world. Natural events revolve around repeated patterns as if they were governed by some kind of law. Examples will be given below.

Natural objects display specific fixed properties and events follow certain predictable regularities. If there were no laws, the world would be an intrinsically chaotic, random and

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<sup>35</sup> The term materialism would be an even more basic descriptor than physicalism, but the latter encompasses the more recent discoveries of non-material fields and the interconnectedness of matter and energy.

unpredictable place (Bird 1998). Science would certainly be impossible. Bird thinks that a world without laws could not even exist, “since to be any sort of thing is to be subject to some laws”.

The aim of this section is to determine if the ‘breaking’ of a law of nature would constitute a supernatural event. First we need to clarify the following points:

- (a) How does a law defined in science relate to a law of nature?
- (b) When does a law refer to a natural ‘necessity’ (as opposed to a simple regularity)?
- (c) Are the laws of nature immutable? Can there be exceptions?
- (d) The problem with statistical laws.
- (e) Where do the laws come from?

The formulation of a scientific law always starts with the description of some regularity we detect in nature. For example, the attractive force between any two objects increases in proportion to their masses and becomes weaker the further the two objects are apart. Most, if not all laws in physics follow a mathematical relationship. In our example the attractive force turns out to be

$$F = G.(m_1.m_2)/d^2,$$

where  $m_1$  and  $m_2$  are the individual masses,  $d$  is the distance and  $G$  is a universal constant. This mathematical function, the “Universal Law of Attraction”, was formulated by Newton in the 17<sup>th</sup> century and represents a scientific law which in turn aims at describing a law of nature. As a ‘law’ it is supposed to be universal, independent of its parameters (masses and distances in the present example), of location and time. However, Newton’s formulation was found to be inadequate in the vicinity of very large masses, for instance in the sun-mercury system. This is a good example of a scientific law not corresponding exactly to the way nature behaves, i.e. a law of nature. Newton’s formula was overturned by Einstein’s law of gravity as a better, more accurate and more general description of how gravity expresses itself. However, even this revised scientific law will remain an approximation to the ‘law of nature’ which describes the precise behaviour of objects in nature.

Also note that Newton’s law characterises an observed phenomenon without explaining it. The law describes the observed facts without giving us an explanation, in this particular case the cause of the attractive force. The explanation was eventually formulated through a scientific theory, in this case Einstein’s Theory of Relativity which interprets the attractive force through the curvature of space.

Another example demonstrating the approximate nature of scientific laws for the description of natural phenomena is the Ideal Gas law. The relationship between the pressure (P), volume (V) and temperature (T) of a gas can be expressed as

$P.V = R.T$ , where R is a constant<sup>36</sup>.

Raising the temperature will cause the pressure and/or volume of a given amount of gas to rise in a mathematically determined and predictable way. More precise experimentation shows that gases generally do not follow this law. Yet again, the deviations from the stated law (the 'Ideal Gas' law) can be quantified and themselves follow certain patterns which can be expressed in a more complex mathematical relationship (the 'Van der Waals' law) which takes molecule size and intermolecular forces into account. In general, any observed anomaly from an established law will follow a strictly defined pattern which itself can be formulated mathematically. This once again highlights the distinction between a law of nature, which is an intrinsic part of nature (or built into nature) and a scientific law, which will always be a human construct, an idealisation of the natural world. A scientific law might be proven wrong, in which case it needs to be modified or replaced by a new and better law.

The regularities we detect in nature, which we define as 'laws', are derived from observations of individual instances. It is simple (Humean) induction which takes us from particular cases to generalisations. Bird (1998) labels this view of a scientific law as 'minimalism' about laws. This approach regards a law as essentially no more than the collection of all instances described by the law. Objects in free fall near the surface of the earth accelerate at  $9.8 \text{ ms}^{-2}$ , and an apple falling to the ground is nothing more than an instance of this law. Empiricism states that the lawfulness we detect in nature relate to our sense experience.

In the context of finding a demarcation criterion of a supernatural event we might ignore the lack of perfect congruency between the precise behaviour of natural objects (following the laws of nature) and our artificial description of nature (through the laws of science) as a simple limiting factor imposed by our current state of knowledge and ability. We might assume that, in principle, we would be able to formulate accurate mathematical descriptions of natural cause-effect relationships.

To illustrate this point, let us assume that we have not yet mastered the Theory of Relativity and that the anomalous precession of mercury's perihelion presents us with an unexplained breach of Newton's laws. This would not have been regarded as a supernatural

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<sup>36</sup> This simplified equation ignores the number of moles of gas.

phenomenon for two reasons: Firstly, the deviation from the law itself follows a regular pattern and secondly, we would have detected the same behaviour by observing a similar planetary system (with a planet very close to its parent star).

The predictability of natural events (at least in the macro world) is a consequence of this lawful behaviour. The ability to predict lawful natural events would enable us - in theory - to identify events which contravene those laws. Those events could then be singled out as supernatural. We can also assume that in the case of a supernatural event we will be confronted with some *major* breach in those laws, such as for example water turning into wine.

If we find a longstanding scientific law violated, we cannot simply stipulate a supernatural event but need to consider that our knowledge of nature increases over time and previously unexplained events can be accommodated under a new law. The anomaly in the orbit of Mercury is an example from history; the phenomenon of quantum entanglement is a present-day conundrum, with information seemingly breaking the speed limit of light.

Another point is the distinction between a 'necessitarian' and a 'non-necessitarian' law. The latter also describes reality in a truthful way, has no exceptions, but doesn't possess the nomic force of a necessitarian law. Karl Popper uses the New Zealand moa, now extinct, to illustrate such a law (Popper 2010, p 448). Amongst all the moas which ever existed there must have been one that lived the longest, say to the age of  $n$  years. The statement "No moa lives beyond the age of  $n$  years" is universally true, however it describes a mere accidental, not a physically necessary truth. There could have been an older moa – it is not mandated by a law of nature.

Remarkable regularities can be found in nature which at first glance display a law-like behaviour. A good example is 'Bode's law' of planetary orbits, formulated in 1772, which showed that the radii of known planetary orbits fit the following formula (Bird 1998):

$$R = 0.4 + 0.3 \times 2^n \text{ (measured in astronomical units),}$$

where  $n=0$  for Venus,  $n=1$  for Earth and  $n=3$  for Mars (for Mercury  $n=0$  and the second term needs to be dropped from the formula). The formula holds for all five planets discovered at that time and even allowed for the existence of a planet between Mars and Jupiter, a space apparently left unoccupied. The correlation was further supported by the later discovery of Uranus in 1781 as well as Ceres in the asteroid belt. With this kind of empirical support, the established formula could have been regarded as a law. Eventually, the hypothesis was refuted with the discovery of Neptune and later Pluto. This example shows that we can find striking patterns of regularities in nature that turn out to be purely coincidental. In the case

of Bode's law the accidental nature was exposed by the discovery of nonconforming planets. However, Neptune (and even Pluto and further planets) might have fitted Bode's formula without raising it to the status of a law.

The classic example in the philosophical literature of an accidental generalisation is a hypothetical large sphere made out of pure gold. We can state with high confidence that: "All persistent lumps of gold-195 have a mass less than 1,000 kg" (Bird 1998).

But contrast this with the statement:

"All persistent lumps of uranium-235 have a mass of less than 1,000 kg".

The first scenario with the lump of gold describes a situation which very likely will never occur throughout the entire history of the universe. However, it is nothing more than an accidental generalisation, which does not contradict any laws of nature<sup>37</sup>.

On the other hand, the hypothetical lump of uranium simply *cannot* exist due to a particular law of nature that states that a certain critical mass of uranium (around 56 kg, if in spherical shape) cannot be exceeded without self-destruction. Given the properties of uranium, the existence of such a lump is physically impossible. This is neither a logical necessity nor an accidental truth. It is necessarily true in virtue of the laws of nature<sup>38</sup>.

Both accounts, the lump of gold and the lump of uranium, describe scenarios which will never occur anywhere in the entire history of the universe. But the necessitarian example of the uranium lump is not merely non-occurring or non-existent – it carries an additional *modal* element that is lacking in the regularity account of the example with the lump of gold (Swartz 2016). It is this additional nomic dimension which adds weight to the claim that laws which follow the necessitarian principle cannot be broken.

The necessitarian account thus contends that the laws in question describe physical *necessities* of nature. The necessities we see in these types of natural laws might inhere in the constituents of the universe or might be properties of laws themselves (Hanzel 1999). These laws will 'forbid' certain events from happening.

As Popper's example with the moa illustrates, one can come up with any number of laws that describe reality in a truthful way. For the purpose of identifying supernatural events,

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<sup>37</sup> We could imagine a gold sphere larger than the total mass of gold contained in the entire universe. Then the claim that such a gold sphere does not exist would again make it a necessarily true account. Nevertheless, it would still be a contingent statement, radically different to a necessitarian account of a natural law.

<sup>38</sup> One could object that this particular necessitarian law rests on the assumption that our current understanding of nuclear physics in general, and the behaviour of uranium in particular, are realised with absolute and final certainty. However, our knowledge of nature is never final. We will discuss this when we consider the immutability of natural laws.



we need to restrict ourselves to necessitarian laws. The violation of such a law, if observed, would be a prime candidate for a supernatural event. But what is the guarantee that our scientific laws, which are just approximations to the laws of nature, are true? As with Newton's laws, new discoveries can overturn an established scientific law and replace it with a new one. Like any other type of scientific knowledge, laws do not have the status of absolute certainty (as mathematical theorems or identities do). It is always possible that future observation will falsify an entrenched law. A typical example would be the Law of Energy Conservation: until the early 20<sup>th</sup> century this law was regarded as absolute, however, it was proven to be wrong once the interchangeability of mass and energy was discovered.

Let us consider the well-established law that no object can be accelerated to beyond the speed of light. The absolute speed limit imposed by the laws of General Relativity is regarded as binding and universal – a prime example of a necessitarian law. However, this very law was challenged when physicists claimed to have detected neutrinos that have travelled faster than the speed of light in 2011, possibly making way for a 'new physics' (Cho 2012). The experimental findings were subsequently shown to have been erroneous, but the fact that such possibilities cannot be rejected ad hoc demonstrates that even a 'necessitarian' law can be proven wrong if new contradicting evidence comes to light. Another example is the erroneous claim of a 'cold fusion' event in 1989. It cannot be stated categorically that a natural law, formulated as necessitarian, can never be broken.

Similarly, our current state of scientific knowledge rules out the existence of a 1,000 kg lump of uranium-235. However, the lack of absolute certainty would not preclude a natural explanation if we detect an object travelling at a speed greater than the speed of light, or encounter a stable large lump of uranium-235. We would not be compelled to regard these events as supernatural. The first reaction would be to search for a natural explanation by establishing a new law of nature. At most, we could only claim a certain probability of having come across a supernatural phenomenon. Reproducibility is an important factor. A failure to reproduce the event in question would point to either an extraordinary event, or a mistaken observation. The ability to reproduce the unprecedented event would be a strong indication that we are confronted with a natural phenomenon not yet explained.

It seems that most necessitarian laws are binding within a particular human-made framework describing the universe. There were a number of laws under the umbrella of Newtonian physics that were seen as immutable (for example, an object could be accelerated to any speed. Newton also left us with a precise formulation of the attractive force between two objects which was later shown not to be correct). The Newtonian model

was replaced with a better paradigm in the 20<sup>th</sup> century, introducing new ‘necessitarian’ laws. We can expect this trend of ‘breaking’ established laws to continue. However, we would expect the behaviour of natural objects within these improved models to again follow a lawful pattern, still giving us once again a clear demarcation between natural and supernatural<sup>39</sup>.

Scientists claim that the current laws of physics did not apply in the first moments after the Big Bang (Lange 2008). The present ‘laws of low-energy physics’ would have been violated in the early universe. Certain laws we observe today can only have emerged after their special subject matter arose. For example, the laws of chemical bonding could only have come about after the formation of stable atoms. The same applies to the laws of biology, psychology, economics etc. An alternative (less likely) scenario would be that the modal notion of exceptionality would allow those laws to have been pre-existent.

When examining matter at the very smallest scale we encounter a new problem: molecules and atoms do not behave like the physical objects in the world we perceive with our senses. The deterministic laws of the macroscopic world are replaced by probabilistic laws. Larger, unstable atoms and subatomic particles are prone to decay. This tendency is quantified as the probability that a large assembly of particles will decay within a certain amount of time. When the probability is one half, the corresponding time period is the so-called half-life time. On a macroscopic scale radioactive decay still has all the attributes of a necessitarian law, but the problem arises when we consider each of the many particles individually (Bird 1998). The law is perfectly consistent with any observed particle decaying well before or after the determined half-life time. And what is possible for any individual particle is possible for a collection of particles. The result is a law that allows for a radical divergence between the law and its instances!

The problem is not confined to unstable, radioactive substances – ordinary atoms in a gas move randomly, which explains the increased pressure the gas exerts on the container walls when raising the temperature. There is no prohibition for all particles in a given volume moving only in one direction, although we never experience this on any larger scale. Plantinga (2008, 381) point out that quantum mechanics does not predict a unique future configuration of the universe but only a distribution of probabilities. He then uses this indeterminism in the quantum world as an opportunity for explaining seemingly miraculous events in a way which would not contravene natural laws which we observe in the macro world, for a possible explanation of Biblical miracles, such as walking on water, changing

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<sup>39</sup> For example, if indeed particles were found to travel faster than the speed of light, then this phenomenon will follow certain laws, even before we find an acceptable explanation through better theories.

water into wine parting of the Red Sea, and even the resurrection of Jesus (the last of which would require a reversal of time - out of reach even for QM<sup>40</sup>). Plantinga claims that “what happens in the physical world at the macroscopic level supervenes on or is determined by what happens at the micro level – the quantum level – then if miracles are compatible with the laws of quantum mechanics, they will also be compatible with any macroscopic laws.” (Plantinga 2008, 382).

Finally, there is the question of where the laws governing the universe are coming from. Up into the 19<sup>th</sup> century the explanation would have been that God, the supreme lawgiver, commanded the world to be a certain way, for example for electrons to all have a charge of  $-1.6 \times 10^{-19}$  Coulombs. Twenty-century science has dropped God from its methodology (Swartz 2016). Confronted with the question of where the laws are ultimately coming from, Swartz simply states that the answer “lies beyond (far beyond) the ability of science to uncover”. In our quest to demarcate natural from supernatural events it does not seem necessary to have an answer as to the source of the laws of nature, as long as they can be identified and formulated with sufficient precision.

Up to now we have limited our discussion to basic laws of physics. Physical laws suggest that the world is uniform and simple. Biologists will respond that some aspects of nature are complex and redundant – biological systems make use of what is given and are consequently redundant and complex (Shea 2013). Shea distinguishes between ‘strong’ and ‘weak’ laws. One of the distinguishing attributes between the two is that strong laws would continue to be true if the world had turned out to be different in some physically possible way. The laws of biology, psychology and economy depend upon the fact that life on earth did evolve in a certain way. In light of this view, the social sciences, and even biology, are not governed by laws in the strict sense as defined earlier. Massimo Pigliucci (2013b), in his discussion of the science vs pseudoscience demarcation, alludes to a similar division between hard sciences (he labels them ‘established’ sciences) and soft sciences. Because our current goal is to find a distinguishing marker for the supernatural, I will follow the conventional normative approach in defining the lawfulness of natural events. We can assume that supernatural phenomena will differ from natural events in a profound and fundamental way, showing up as a clear inconsistency within the basic laws of physics.

In our quest for a definition of natural, as opposed to supernatural, we therefore need to focus on laws which are based on physical necessity. If we observe a phenomenon which is

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<sup>40</sup> A significant passage of time (say, three days) would invoke irreversible chemical reactions in a lifeless body at ambient temperatures.

not possible according to the laws of nature, we could be confronted with a genuine instance of a supernatural event. The lawfulness of nature should give us a clear, but not entirely conclusive demarcation of a supernatural event.

Let us consider the similar example of a marble statue waving its hand, described by Richard Dawkins (1991, 159-160): Under any circumstances the molecules in solid marble are continually moving and jostling against one another in random directions. These continuous random movements will cancel out and the arm of the statue stays still. "But if, by sheer coincidence, all molecules just happened to move in the same direction at the same moment, the hand would move". They might also simultaneously change their direction and the hand would move back. A marble statue waving its hand at us could be possible - in principle. No necessitarian laws of nature are broken, but if faced with such an event we would regard it as supernatural "because all our experience and knowledge tell us that marble doesn't behave like that" (Dawkins 1991, 159).

Dawkins here describes an event which, strictly speaking, does not contradict natural laws but is of such high improbability that 'any reasonable person' would regard it as a supernatural event. The conclusion is that many imaginable events would clearly count as supernatural, even if no natural laws are broken (our waving marble statue, or the parting Red Sea described in the Bible). Other alleged supernatural events distinctly contradict well established laws of nature (for example, water turning into wine).

The factor of time will also be decisive in distinguishing natural from supernatural. Reviving a clinically dead person within minutes would not be considered a miracle, whereas a resurrection from a decomposed body would violate a great number of natural laws. Short of mastering the art of time travel, we would be compelled to admit a supernatural event. Similarly, the shrinkage of a tumour – even if unexplained – would not be regarded as supernatural. However, its sudden disappearance, say within a second, would defy any natural explanation.

In summary we can conclude that we need to limit ourselves to fundamental laws of physics in order to be able to isolate supernatural events. However, an observed breach in such a law wouldn't automatically qualify it as being supernatural (example: objects travelling faster than light). In contrast to natural events, supernatural incidents are generally regarded as unrestricted by laws and non-reproducible.

All the examples for supernatural events we considered so far happen on a macroscopic scale, in plain view of our five senses. However, there might be supernatural causation on a microscopic scale, impossible to discern directly. Often cited examples are supernatural (God-directed) effect on random genetic mutations or on the emergence of complex

molecular structures from simple building blocks. This would constitute ‘supernaturally guided’ biological evolution. This type of supernatural intervention is advocated by the group I labelled moderate theists (Miller 2009, Collins 2006, Haught 2012, Ward 2008, McGrath 2017). The problem is that this claim of supernatural causation is undistinguishable from any purely ‘naturalistic’ random process.

Most examples of supernatural causation (with the possible exception of dowsing) have the common attribute of intentionality. We will consider this possibility for supernatural events in the following.

### **Supernatural Causation Characterised by Intentionality**

The aim of this Subchapter is to use intentionality as a possible attribute in distinguishing the supernatural from the natural. If an apparently intentional or goal-directed event or phenomenon cannot be explained, we have (1) observed a supernatural event and (2) have found a demarcation between natural and supernatural. An example would be one of the events described as miracles in the Bible, e.g. the conversion of water into wine. This would be an intentional, goal-directed event – *and* it would contravene a number of natural laws.

“Natural” events are thought to happen with no goal or purpose, only following certain patterns which we call laws of nature. Seemingly purposeful features in the natural world would suggest intentional design. The eye would be a good example: it shows apparent design for a specific task. Science will try to explain this alleged design through a step by step process built up from individual random, natural processes. If it is not possible to determine such a pathway, design must be inferred. A naturalistic pathway has been demonstrated convincingly for our example of the eye. If eyes would not have slowly evolved, but had popped up mysteriously, fully formed, we would need to infer some kind of supernatural intervention. Biological evolution is understood to be a two-step process with the first step identified as the process of mutation leading to random variations in the offspring. It is the second step – natural selection – leading to a better adaptation to the prevailing environment that is purposeful.

Phenomena and artefacts we observe in the world around us either seem to be designed (a beehive, a flower or a car) or they clearly are products of natural processes (a rock or a cloud). Whereas beehives and cars are clearly designed, the flower is the odd one out. However, as with our first example of the eye, if we can demonstrate a step-by-step process of random iterations with the flower as a possible outcome, we don’t need to insert any

supernatural intervention. The result of obtaining a seemingly designed flower (or eye) through a long chain of random changes is made possible through the winnowing out of less useful (or successful) modifications - in other words, through the process of evolution.

We therefore need to distinguish between the appearance of design (Dawkins, 1991)<sup>41</sup> and genuinely designed objects. Biological systems can in general be explained through the process of evolution: random modifications (mutations) plus the filter of targeted selection. In the case of genuinely designed objects, if intentional design is the only explanation, we infer a designer. This designer is either part of the natural world (bees, humans, ETs), or we need to postulate a cause outside the natural world, in other words supernatural causation. Processes which we call natural, determined only by the known laws of nature, are characterised as purposeless. Natural processes are not planned with any intention or goal in mind; they occur randomly, solely driven by natural forces and determined by the laws of nature. Conversely, seemingly purposeful features in the observable world point to a designer.

The notion of teleology (“telos” means “goal” or “end”) goes back to the ancient Greeks. The teleological, or design argument, is commonly used as a proof for the existence of a deity, however, since this chapter is focused on the distinction between the natural and the supernatural, I will limit the conclusion here to the existence of supernatural causation. If the origin of an entity or a process observed in the natural world *can* be explained through random mutation and natural selection we can assume it to have come about through natural processes. It is the simplest explanation and no designer, natural or supernatural is required. If evolution through natural processes cannot explain the phenomenon and if the object or event under investigation seems to be designed for a purpose, we need to postulate a designer. Examples are bird’s nests, cars, termite mounds and UFOs.

An example of an event designed for a purpose would be the alleged miracle of turning water into wine. In fact, any conceivable miracle would meet the requirement of being designed for a purpose and not having any natural origin. What about less spectacular events, such as a healing process brought about through homeopathy? The healing event certainly serves a purpose, but – assuming that homeopathy really works (it doesn’t) – science would attempt attributing the healing power of water to a presently unknown natural characteristics (e.g. water molecules having memories), rather than supernatural causes.

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<sup>41</sup> “Biology is the study of complicated things that give the appearance of having been designed for a purpose” (Dawkins 1991, *The Blind Watchmaker*, p 1).

The argument of purposeful design can be taken all the way back to the origin of the universe, turning it into a “first cause” argument. Similarly, the seemingly extraordinary fine tuning of the physical constants we observe in the universe (the four fundamental forces, mass ratios of elemental particles, etc) could be interpreted as a purposeful design. All these arguments fall under the umbrella of “cosmological and fine-tuning arguments”. They are used as explanatory arguments to show that the only possible explanation of these facts is the intentional action of a supernatural being. I did not use this argumentation and wanted to limit the discussion to directly detectable phenomena in the world around us, phenomena which we could single out as supernatural objects, entities or events. The aim of this Section was to clarify what type of causes are amenable to science through the concept of methodological naturalism.

In summary, where has this search for a demarcation between the natural and the supernatural taken us? Our original aim was to define ontological naturalism, the view that the natural world is “all there is”. This excludes any supernatural entity or event, and this distinction would require a clear-cut demarcation.

As stated at the beginning of this Chapter, we cannot not expect to find a single defining attribute to single out supernatural phenomena. We went through four distinct criteria which we associate with the natural world: (1) spatiotemporalness, (2) being amenable to the fundamental sciences (physics and chemistry), (3) behaving in a lawful manner and (4) having come about through random processes, seemingly un-designed and without purpose.

The first two factors are neither necessary nor sufficient. Black holes are not located in the space-time continuum, but certainly count as “natural”. Investigating the cause of an alleged miraculous healing would be amenable to scientific investigation.

Breaking a law of nature could be seen as a firm contender of a supernatural event. We would first need to ascertain that we are dealing with a necessitarian law, and not a simple regularity. But then we have the additional problem of being limited to the laws established by science. And, as we have seen, these are only approximations to the “real” laws of nature. On top of that there is the problem is that our current knowledge is not final and absolute.

At first glance the lawfulness we observe in nature certainly looks like a reliable criterion to isolate supernatural phenomena. Every imaginable event we regard as a miracle would break at least one established scientific law. However, as the example of the waving marble

statue showed us, the rules of quantum mechanics could - at least in theory - allow for macroscopic events which seemingly contravene established natural laws. Furthermore, because of the temporary nature of our understanding of nature, this criterion of lawfulness might yield an ontological demarcation, but not any applicable epistemic demarcation. A combination of the three criteria in form of a cluster concept might raise the probability of having identified an event with a supernatural cause, but still would not make it certain.

In my opinion it is the last attribute which, in isolation or combined with the other three, would give us the most reliable indication of supernatural causation. To take the extreme example from Maarten Boudry, the stars aligning in the night sky to spell out a word – this event would certainly be accepted as supernatural, mainly for being intentionally designed. Furthermore, I would add the factor of a necessary observer to a supernaturally caused event<sup>42</sup>. Another attribute is that the phenomenon is unique and non-reproducible. The reader might again turn to the example of breaking the absolute speed limit. If the results can be reproduced under identical conditions, the phenomenon would be regarded as natural.

However, supernatural causation could reside, seemingly hidden, behind perfectly natural causes<sup>43</sup>. This would be an acceptable manifestation of the supernatural for the moderate theist. The radical atheist will dismiss this option as an unnecessary add-on to perfectly simple naturalistic explanations. The theistic view of evolution is that God guided the various twists in the development of life, without ostensibly intervening and breaking of any laws. Note that this view is different to Plantinga's notion of an interfering deity whose actions are detectable in the workings of nature.

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<sup>42</sup> From a theistic view it would make no sense for the stars forming a special alignment in a supernatural event, with no observer to witness it.

<sup>43</sup> The principle of overdetermination states that an event we observe in nature might have a perfectly natural explanation, behaving in a way which matches the laws of nature, but still have an additional supernatural cause.



## 7. Does Science Presuppose ON?

The alleged slide of MN to ON rests on the assumption that MN is an unstable position which forces one to either admit or deny supernatural causation. We looked at the critique of MN by assessing the arguments from the radical theistic side (Chapter 3). Now we come to the critique of MN raised by proponents of ON, the group of people I label 'radical atheists', who propose eliminating MN altogether. In their opinion MN is not only an unnecessary, but faulty presupposition when practicing science. They argue that science has been purged of supernaturalism in the last few centuries and accepting MN would keep the backdoor open to the possibility of supernatural entities and causes. These possibilities must be kept out of scientific thinking and methodology. The arguments are more complex since science is at its core a naturalistic activity and the pull to a full naturalistic worldview might seem to be a logical consequence to the use of MN in science.

The slide from the restricted rejection of supernaturalism in the methodology of science (MN) to a fully naturalistic worldview (ON) has already been examined in Chapter 2.2. There we discussed the pull from MN to ON as a logical and pragmatic consequence. In the present Chapter we look at claims that ON is a *necessary* presupposition for the practice of science. In other words, we must assume that nothing supernatural exists, because if we don't, we could never be sure that an observation was a reflection of the underlying workings of nature, and not interventionist meddling. Under this sceptical view, no observation can be relied on. The moderate theist would answer that a benevolent God is not expected to intervene in a way that would deceive us. My position is that an occasional miracle, such as the ones reported in the Bible, would not derail the scientific enterprise.

But let us now turn to biologist and philosopher Martin Mahner who argues that science needs to presuppose ON. I am going to lay out his arguments with the aim of showing them to be unwarranted.

The tension between MN and ON and the arguments around replacing one with the other are strongly linked to the question of religion versus atheism. While not identical with atheism, for the sake of simplicity we can regard ON as entailing a rejection of religion in general. In their 1996 paper Mahner and Bunge compare and contrast science with religion. Their conclusion is that the two are incompatible. Both disciplines have the quest for truth as their goal, but they differ vastly, mainly in their methodology. Science seeks to gain knowledge through observation, experiments and logic, whereas religious knowledge stems from faith, beliefs and revelation.

Having evaluated various arguments in favour of ON, we cannot overlook an obvious problem for the view that will be difficult to explain away: there are religious scientists who profess to believe in the supernatural.

In Chapter 5 I quoted a statement by biologist Richard Lewontin which I want to repeat here because it summarises the main arguments against MN and for ON:

[Scientists] have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our *a priori* adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door (Lewontin 1997, 10).

### **Mahner's argument that ON is a necessary presupposition for science**

A key consideration regarding the relationship between MN and ON is whether science presupposes ON. If it can be shown that science does not demand a commitment to ON, then we have proven that MN can act as a stable position which does not need to slide into the ontological worldview of ON.

In his critique of MN Mahner engages with these issues in both capacities, as scientist and philosopher. He presents a detailed breakdown of the essence of ON into six individual principles which he defends one-by-one.

Similar to Lewontin, Mahner considers it imperative that scientists need to start with the presupposition that no supernatural entities exist: if we don't exclude the supernatural from the outset we can never be certain that malicious entities are not affecting the natural world, including our cognitive processes:

If we admit the supernatural, there is no reason to exclude a priori the existence of a malicious entity that could meddle with the world including our cognitive processes.

*So we need to start with the postulate that no such entities exist.*

[my emphasis] (Mahner 2012, 1442).

Mahner does not claim that ON is infeasible – he refers to his position as 'provisional ON' (p 1457) - but it ties the fate and success of science to ON. In other words, science would fail as an enterprise if ON turned out to be false.

As consequence of his assumption that science cannot test the supernatural Mahner gets into a paradox, which he admits: “[T]he empirical operations employed to produce such evidence presuppose the nonexistence of the very entities whose existence is supposed to be confirmed by this evidence” (p 1449). Mahner thus asserts that science is not metaphysically neutral (as advocates of MN claim). On his view the success of the scientific enterprise relies on ON to be true.

We now come to Mahner’s six metaphysical (not methodological) suppositions which he regards as essential to the empirical methods of science:

1. Ontological realism
2. The (ontological) lawfulness principle
3. The ex-nihilo-nihil principle
4. The antecedence principle and an ontological conception of causation
5. The no-psi principle
6. The no-supernature principle.

Mahner claims that these suppositions are part of the ontology behind the methodology of science and he sets out to prove that each item on the list is indeed a necessary a priori condition.

To illustrate his arguments Mahner uses a simple high-school experiment in chemistry: the decomposition of hydrogen peroxide using yeast as the catalyst.

The first of his essential presuppositions is ontological realism. This is the claim that the experiment involves real entities in a real world and not fictional objects. The experiment is found in textbooks, can be copied and repeated and it always produces the same results under identical conditions. Mahner points out that this realism is supported by the successes, but especially also by the failures of scientific theories. It would be impossible to do science without the a priori assumption of ontological realism. Mahner admits that there is an ongoing realism/antirealism debate in philosophy, but points out that in the current context our concern is the epistemological status of unobservable entities and the truth of scientific theories.

Second on Mahner’s list is the lawfulness principle. The author claims that the lawful behaviour we experience in nature is not an item of empirical knowledge, but a necessary a priori condition in our search for truth. Scientists set out in their quest for truth with the assumption that the world *is* a lawful place.

Mahner’s third point is the ex-nihilo-nihil principle. This is Mahner’s label for the common-sense assumption that things do not pop out of nothing and also do not simply disappear. In

our chemical experiment we produce oxygen gas which has to come from somewhere and does not dissolve into nothingness.

We now move to the principle of causation, point four on Mahner's list. Something needs to cause and initiate the production of oxygen from hydrogen peroxide. The chemical reaction follows an orderly chain of events linked to one another. The production of oxygen is triggered by the presence of an enzyme. The present is determined causally by the past – the mixing of two chemicals causes the chemical reaction. By changing parts of the experimental setup, we can causally interact with the experiment giving us a different outcome. Mahner holds that what he calls 'antecedence principle' and the conception of causation is one of the metaphysical presuppositions we have to make in order to do science.

Item number five is the no-psi principle. Mahner points out that if the outcome of our experiments is to guarantee valid results, "we must exclude the possibility that the experimental setup can be causally influenced in a *direct way* solely by our thoughts or wishes" (p 1441, Mahner's emphasis). We need to ensure that our experiments are only controlled through motoric actions of our bodies. If the world were permeated by causally efficacious mental forces, we would not be able to trust instrument readings or any experimental outcome.

The last item on the list is the no-supernature principle. The goal here is to show that science cannot tolerate even the possibility of supernatural entities, because this would always entail the risk of them meddling with the orderly course of nature, which science relies on. Mahner refers to Descartes and his belief that the world was governed by a sovereignly good Deity; but things look different today:

Unlike Descartes, we no longer have reasons to believe that the supernatural is dominated by an all-good God, who, by his very nature, would not only refrain from malicious manipulation, but even function as a guarantor of the truth of our cognition and thus our knowledge. Even in traditional Christianity there are many other supernatural entities than God, like devils, demons, and angels. Now add the many supernatural entities of other religions, and finally everything we can imagine (Mahner 2012, 1442).

Mahner here voices the common belief that supernatural entities are bound to interfere with the scientist's experimentation and reasoning.

If Mahner's claims outlined in this section are proven to be correct then MN will have no role in science and needs to be replaced by ON. I will now discuss his six points individually.

## Discussion of Mahner's Six Presuppositions for Science

The author himself anticipates objections, which he addresses in footnotes. I will discuss each individual point with the aim of showing them to be empirical conclusions, derived through scientific investigation, rather than necessary a priori principles.

Mahner's first point is the presupposition of ontological realism. I would argue that it would be at least possible for science to discover that we inhabit an objective 'real' world, that it is a defeasible conclusion of science, rather than something that science needs to assume. It might be difficult or even impossible to prove that we are not trapped in a kind of simulation. In 2016 Neil deGrasse Tyson expressed the view that there is a "50-50 [percent chance] that our entire existence is a program on someone else's hard drive" (Moskowitz 2016). For practical purposes I think that Mahner's example experiment, its repeatability and the reproducibility, is sufficient proof of ontological realism, at least for the scientific community.

Mahner's next point is that science presupposes the ontological lawfulness of the natural world. It is important here to distinguish between the truth of particular laws and the claim that there must be some laws or other in order for science to proceed. Scientists do presuppose that there are laws of nature, which have been established and deduced through evidence and reasoning, remain constant over space and time. However, these assumptions (e.g. the constancy of the speed of light) are not taken for granted; they are challenged continually like any other scientific theory and verified across various scientific disciplines<sup>44</sup>. In fact, our knowledge that the universe is lawful at all is generally regarded as a consequence of empirical observation, not as a necessary presupposition itself (Fishman and Boudry 2013). However, this does not undermine the idea that scientific work requires some prior commitment to there being lawlike-regularities. The universe might indeed have shown chaotic behaviour, but in that case science would not have got off the ground in the first place. Mahner seems to have a point here with his 'ontological lawfulness principle', however, it still raises the question of how strictly lawlike these regularities have to be. Fishman and Boudry (2013) point out that beyond a minimum amount of regularity in nature (without which no organism would be able to thrive and accumulate knowledge), a blanket pre-supposition of regularity is not required.

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<sup>44</sup> In March 2012 a team of physicists at CERN in Geneva claimed to have detected neutrinos travelling faster than the speed of light - long-established as the maximum speed in the cosmos. Subsequent measurements proved these findings to be faulty. (<http://phys.org/news/2012-03-faster-than-light-particles-cross-check.html>).

Let us now turn to Mahner's ex-nihilo-nihil-fit principle. Mahner's point here is that only a supernatural entity would be able to break this law. In order to practice science we need to ensure that matter doesn't appear out of nothing, and cannot simply disappear. However, there are a number of problems for this principle as stated. In the last decade cosmologists have challenged the ex-nihilo-nihil-fit principle, claiming that particles can indeed be 'created' from a perfect vacuum (Krauss, 2013).

Number four on Mahner's list is the antecedence principle and an ontological conception of causation. Mahner concedes that physicists have considered the possibility of backward causation<sup>45</sup> to account for certain puzzling observations in quantum mechanics, however, "unless we encounter such causation, we may regard such talk as metaphysically misguided" (Mahner 2012, 1441). With this concession Mahner exposes the weakness of his insistence of taking ordinary causation as a presupposition: Were Mahner correct, scientists would not be able to even consider a phenomenon such as backward causation.

Let us now consider Mahner's 'non-psi' principle. Mahner indicates that the scientific methods would not be reliable if we live in a world that allows for extrasensory perception, telepathy or telekinesis. He claims that only a world without parapsychological forces would give us a guarantee of reliability. However, these very hypothetical forces have been to topic of extensive scientific study (Goode 2013).

The last item on Mahner's list is the 'no-supernature' principle. This point simply condenses all of Mahner's arguments into one: any influences coming from outside the natural world (any irregularity, breach of the conservation law, discontinuation of causation, psi phenomena) are prohibited from the outset. Mahner chose a simple chemical experiment to illustrate his claims. In this case all of his listed presuppositions seem to apply neatly. But we have seen that recent advances in the sciences of physics and cosmology requires one to introduce more and more exceptions. Therefore, a simple example such as a chemical experiment is not a good test for testing the boundaries of scientific endeavour. And Mahner hasn't even touched the highly controversial topic of the interaction between the physical brain and the mind. Mahner is correct in stating that his listed presuppositions are elements of the essence of ON, however, he failed in convincing us that those factors need to be excluded - a priori - from science.

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<sup>45</sup> Indeed, certain puzzling phenomena in quantum mechanics are best explained by backward causality (Stenger, 2000).

Then there is the additional conundrum that Mahner regards ON as a necessary a priori requirement, but also as provisory and defeasible<sup>46</sup>. On what grounds are we supposed to admit the supernatural for science to investigate, if science is not capable of doing the job?

Fishman and Boudry (2013) emphasise that ON is not an a priori presupposition of science. On their view ON is a defeasible conclusion of science, based on its successful track record over the past few centuries. On this view the two authors now open the door for supernatural claims which, according to their opinion, are amenable to scientific investigation, at least in principle. As we saw in Chapter 5, Boudry argues for pMN where supernatural explanations (as long as they satisfy the common explanatory criteria for science) should be provisionally accepted, if they rival naturalistic explanations.

Mahner then turns his attention to the possibility of supernatural interventions and explores any conceivable means of testing the supernatural. But let us pause here and ask how far Mahner has gotten with his six metaphysical suppositions. Each of them was claimed to be good reason to demand ON as a prerequisite for engaging in science.

However, we were able to show that not one of these assumptions could be regarded as a priori requirement: any one of them (with the possible exception of ontological realism) could have turned out to be false on empirical grounds<sup>47</sup>. For example, Mahner's antecedence principle has been shown to be wrong with the (fully naturalistic) backward causation detected in quantum mechanics<sup>48</sup>. Future development in science might point to a different conclusion, but the mere fact that scientists can question Mahner's ontological conception of causation should be sufficient to reject the a priori requirement. Basic regularities observed in nature were the reason for getting science off the ground in the first place, however, Mahner's ontological lawfulness principle could be disproven empirically<sup>49</sup>. In fact, an event occurring haphazardly outside the well-established laws of science, for example water turning into wine, would constitute an incident only explainable through supernatural intervention – the very phenomenon which Mahner wants to exclude a priori.

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<sup>46</sup> Mahner's position here runs into a paradox by claiming that his metaphysical principles are presupposed, but also defeasible by evidence (Mahner 2012, 1448).

<sup>47</sup> In my opinion, we can ignore the possibility that our universe is a simulation within a 'real' world since, for whatever reason, science does work in our universe, giving us reliable knowledge.

<sup>48</sup> The interested reader is referred to the entry on backward causation in the Stanford Encyclopedia of Philosophy <https://plato.stanford.edu/entries/causation-backwards/>.

<sup>49</sup> This, of course, would require strictly controllable conditions and reproducibility, as the already mentioned false alarm about 'cold fusion' has demonstrated.

The same reasoning applies to the no-psi principle. It is open to empirical testing and falsification. Again, no metaphysical assumptions are required.

The ex-nihilo-nihil principle applies without exception (so far we know) in chemistry. Any violation could and would be determined empirically. It would trigger a paradigm shift in chemistry (cold fusion claims from 1989 come to mind), but such phenomena would be observable and empirically testable. Moving to physics, on the very small scale of quantum mechanics, the principle of conservation of mass was already violated more than a century ago through the discovery of radioactivity. The by then established law of mass conservation had to be expanded to include the interchangeability of matter and energy. We can reasonably assume that nature does have more surprises in store and science will study any new phenomena with the aim of explaining them through naturalistic causes (the paradox of quantum entanglement is one recent empirical observation, still waiting for a better understanding and explanation)<sup>50</sup>. Any metaphysical barriers would only hinder the progress of science.

### **Mahner's justification for ON over MN**

Let us now turn to Mahner and his arguments for ON over MN.

Mahner does point out that there is a case in which we don't need to insist on adopting ON for practicing science: we could admit a supernatural realm, but then need to assume that it doesn't interfere with our natural, observable world. He calls it "non-interventionism" and this scenario could be described with the conditional statement "If supernatural entities exist then they don't intervene in the natural world". Mahner initially objects to non-interventionism on the grounds that contraposition leads to the absurd statement of "If supernatural entities intervene in the course of the world, they do not exist" (Mahner 2012, 1443). Mahner then rephrases non-interventionism as a conjunction of two statements: "Supernatural entities exist" and "They do not interfere in the course of the natural world". This turns a reasonable minimal supposition ("if supernatural entities exist, they don't intervene") into a statement presupposing supernatural entities.

Mahner insists that if the supernatural exists, it needs to intervene in the natural world, otherwise the assumption of a supernatural realm would be meaningless, a kind of null

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<sup>50</sup> Einstein famously described this phenomenon as a "spooky action at a distance" and did not accept it as real. He apparently made this remark in an argument with Niels Bohr in the 1930s (<https://www.technologyreview.com/s/427174/einsteins-spooky-action-at-a-distance-paradox-older-than-thought/>)



hypothesis – a presumption of nonexistence (Mahner 2012, 1443). This, in Mahner's opinion, is easy to demonstrate by referring to the principle of parsimony. If the supernatural realm doesn't interact with the known world, why would one want to postulate something beyond the natural world? And this seems right: Why should we make a superfluous assumption which cannot be tested, let alone proven? It is not only impossible to prove, but also unnecessary. However, Sober (2011, 37) has pointed out that the principle of parsimony is essential to the scientific method, but not necessarily applies to the supernatural realm.

In his intent to disprove the existence of anything supernatural on the grounds of non-interventionism, Mahner ignores further scenarios which do encompass the existence of supernatural.

For example, the supernatural could interact with nature by reaching into the known world, manifesting itself as the known "laws of nature". This roughly characterizes the picture of God delineated by present-day theology. God is regarded as interacting with his creation in a way which is reflected in the lawful workings we observe in nature. In other words, the supernatural *is* interacting with the natural world, but doesn't make itself obvious as being supernatural.

Alternatively, supernatural forces could have been at work in the past, in the creation of mass, energy, and whatever other entities science is going to discover as being part of nature (the mind, for example). This is the deistic picture of God, where a supernatural entity created the natural world *ex nihilo*, say through the Big Bang, and set up the laws of nature without any further interference. This depiction of God is not accepted by many theologians who see God as interacting continuously with the natural world, however, a supernatural creation in the distant past is a possibility which Mahner cannot ignore. It would also eliminate the problem of having to explain the existence of "something" coming from "nothing", contradicting the *ex-nihilo-nihil* principle, number three on his list of essential presuppositions of science. Mahner has thus not addressed a number of scenarios in which ON would be false, but modern-day science could still proceed. On the other hand, there would be no objection for the *a priori* assumption of MN.

## **Testability**

Mahner refers to Spiegelberg (1951) who distinguished between two types of the supernatural: the 'overnatural' and the 'transnatural'. The former is a quantitative concept

of the supernatural. Entities falling under the umbrella of the overnatural distinguish themselves only in degree from natural ones, although often to an absolute degree (Mahner 2012, 1446). For example, a supernatural being may be more powerful and more knowledgeable than the natural equivalent, perhaps even all-powerful and omniscient. However, the attributes of such beings can still be perceived on the basis of familiar natural properties.

The second category, the transnatural, is seen as categorically different to the natural state. The properties of such entities are “essentially mysterious, ineffable, incomprehensible” (Mahner 2012, 1447). Modern theology tends towards combining the two concepts, regarding the overnatural as too anthropomorphic.

Mahner uses these two categories of the supernatural to consider the testability of the supernatural. Because the properties of the overnatural are not categorically different from natural properties, one could label them as quasi-natural properties (Mahner 2012, 1448). This would make the supernatural intelligible to a certain degree and therefore testable.

On the other hand, if understood as transnatural, the supernatural must be seen as untestable since its inaccessible properties do render it unintelligible. There are two distinct concepts here: (a) a statement can be *testable*, if we can establish empirical evidence for or against it (Bunge, 1983) and (b) there is the *evidence* itself, which either supports or disproves the statement. Mahner (2012, 1448) points out that any evidence about the supernatural would need to have at least one meaningful predicate which is a natural or quasi-natural property. He uses the example of a supernatural being which would be able to “listen” to prayers. Pennock (1999, 302) contemplates how we could confirm the presence of ghosts: we would need to tacitly “take them out of the supernatural realm and place them squarely in the natural world”. To perceive ghosts as supernatural entities means that they are outside our law-governed, cause-and-effect universe.

Let us take a moment to pause and see how far Mahner has gotten with his claim that ON, the total denial of the supernatural realm, is an a priori prerequisite for doing science. Mahner has set out to show that because the supernatural defies any laws, is inaccessible and unintelligible, this makes it unpredictable and untestable. It seems implausible to claim that the supernatural is simply beyond the comprehension of our limited, physical brains when people not only quite naturally come up with supernatural explanations for unusual events, but that purportedly supernatural phenomena have also been subjected to empirical testing.

## Can scientists be consistent and religious?

In all likelihood the majority of religions will allow for the existence of something beyond the natural world. One might make allowances for an ontological naturalist who allows God in the picture, provided that the attributes of such a god are “appropriately constrained to conform the regimen of the given natural ontology” (Pennock 2001, 84). That is, just as long as supernatural does not interact with the natural world. However, the traditional theist would not accept such a naturalised concept of a deity. We can assume that the majority of scientists who believe in God will not accept ON, as a belief in God as well as the acceptance of a “universal spirit or higher power” is contrary to the demands of a purely naturalist ontology. A 2009 survey of scientists who are members of the American Association for the Advancement of Science showed that 33% of scientists believe in God, while 18% don’t believe in God, but in a universal spirit or higher power.<sup>51</sup> So given the above a significant percentage of scientists do not accept ON. And for these scientists, at least, ON is therefore not a prerequisite of science.

Nevertheless, one might claim that those scientists rejecting ON might not be first-rate researchers or that their belief in God is not sincere. Whereas we cannot disprove the latter, we can easily refute the former. I only want to mention the renowned geneticist Francis Collins as one example. When he was appointed in 2009 as the new director of the National Institutes of Health, a number of scientists publicly questioned whether the fact that Collins is an outspoken evangelical Christian, shouldn’t disqualify him for the job (Pew Research Centre 2009). Nevertheless, he was appointed to the position. How does this square with Mahner’s demand that science needs to start from an ON position? Is there any noticeable difference in the work output coming from a scientist following the principles of MN, as opposed to researchers having adopted ON as their precept?

The simple answer is no. Francis Collins, Ken Miller and Theodosius Dobzhansky are just three examples from a long list of religious scientists who reject ON and adopt MN as the guiding principle in their work. A belief in God – and the consequent rejection of ON - therefore does not contradict success in science.

To summarise, the compatibility of science with supernatural beliefs is rejected by some scientists (see for example Dawkins 2006, Provine 1988, Coyne 2016) and philosophers (for

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<sup>51</sup> The corresponding figures for the general US public were 83 and 12%, respectively (Pew Research Centre 2009). On the other hand, 41% of scientists claimed not to believe in God or a higher power, while the poll of the public found that only 4% of Americans share this view. Interestingly, a survey conducted in 1914 showed very similar results (ibid.).

example Mahner 2012, Boudry 2015, Forrest 2000). They claim that belief in the supernatural is not genuine in cases of religious scientists. However, given the above discussion, the onus is on them to show that ON is a necessary presupposition for the practice of science. In order to claim better knowledge of someone's genuine beliefs than the person themselves, there must be very strong evidence indeed.

My aim at the outset of this Chapter was to show that MN is a stable position which does not slide one into a rejection of supernaturalism. Every single one of Mahner's six key arguments for ON as a presupposition in science could be refuted. Then there is the obvious fact that there are religious scientists. We have seen that the demand of ON functioning as the bedrock for science is unwarranted. For this reason, the claim of the radical atheist that MN, which is tied to the practice of science, slides one into ON is unfounded.

## Summary and Conclusions

This thesis discusses the claim that the practice of science, which is traditionally tied to MN, leads one to the rejection of any belief of the supernatural (ON). Although the supernatural is not necessarily linked to religious belief, I do make this connection, because the alleged slide from MN to ON is commonly tied to religious arguments. For this reason, I distinguish between radical and moderate, theists and atheists.

Moderate theists and atheists generally accept the concept of MN as necessary and sufficient in the methodology of the working scientist (sufficient in the sense that ON is not required). MN simply does not allow supernatural causation to feature in any scientific explanation of observed phenomena. Alleged supernatural events (e.g. miraculous healings) are open to scientific investigation, however, the verdict must be a natural cause, or the case under investigation will be summed up as 'unexplained'. The moderate theist is free to believe that events, which have found a satisfactory naturalistic explanation, have been guided by a supernatural deity (e.g. biological evolution).

Moving to the radical camps, we find that radical atheists will see no place for any belief in the supernatural. In the scientific enterprise MN is an unnecessary concession to supernaturalism and should be replaced by ON. Some go as far as demanding that ON becomes a prerequisite for conducting science. I use Martin Mahner's arguments to show that ON is not an a priori requirement for the conduct of science. Nevertheless, even if ON is not strictly necessary, it is often regarded as a logical consequence stemming from many centuries of scientific progress during which supernatural explanations have been progressively and, in the end, totally eliminated. Many scientists, as well as non-scientists, equate science with progress and religion with superstition. It should come as no surprise that there is a strong pull from the ontologically neutral but ontologically ambivalent position of MN towards the more settled perspective of ON.

The radical theist will agree with his radical atheist counterpart that the overwhelming successes of science provide a strong pull towards a comprehensive naturalistic worldview (ON). However, this pull needs to be resisted. The radical theist will point to the never-ending chain of unresolved problems in science and proposes to allow for supernatural causation to resolve seemingly intractable scientific issues. One prime example is abiogenesis, the question of the origin of life. Like his atheistic counterpart, the radical theist considers the neutral position of MN as untenable and recommends a type of theistic worldview which cements a supernatural ontology. I show that any admission of

supernatural causation into science entails numerous problems. The two main issues are the 'god-of-the-gaps' problem, which is more detrimental to religion than to science, and the 'science-stopper' problem that kicks in once we assign a supernatural cause to a particularly refractive scientific puzzle.

The concept of MN seemingly evolved as science matured over the last three centuries. Beliefs in supernatural causation have been steadily replaced by naturalistic explanations. This ostensibly adds to the pull towards a fully comprehensible naturalistic worldview of ON. However, history indicates that the concept of MN arose during the Middle Ages out of theistic thinking. This again weakens the argument of the radical theist, who claims that modern science is leaning towards atheism.

The concept of MN does not prevent science from investigating alleged supernatural phenomena; it only prohibits the scientist of claiming supernatural causation. Nevertheless, the radical theist claims that science has a deep-seated bias against the supernatural. In order to counter this perceived prejudice, Maarten Boudry coined the term 'provisional' MN which takes the sharp edge off the alleged intolerance of science against the supernatural: supernatural explanations are 'provisionally' allowed, but then quickly shown not to be supernatural after all.

The discussion of 'provisional' MN highlighted the importance of a clear demarcation between what we call 'natural' and the 'supernatural'. A number of criteria are discussed to define 'natural', namely the commonly assumed spatiotemporalness of the natural world and its amenability to the physical sciences. Another indicator is the lawfulness of observed natural phenomena, which is contrasted to supernatural events, that are commonly not associated with lawful behaviour. Goal directedness is identified as another important attribute of the supernatural. However, there seems to be no clear-cut demarcation to precisely identify supernatural causation.

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