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In What Sense are God of the Gaps Arguments Fallacious or Legitimate?

Theistic arguments which appeal to gaps in our scientific knowledge are frequently labelled 'God of the gaps' (GOG). While many regard such arguments as obviously fallacious (an argument from ignorance), some disagree. Drawing on critics and defenders, this article examines the logical validity of GOG, stated in two distinct formulations: (1) It is not proven that 'God is active in this corner of nature' is false; therefore God is indeed here; (2) it is not proven that 'there is a natural cause for this event' is true; therefore there is no natural cause or explanation. The difference is more than semantic; while the perceived wisdom mostly targets the first version, recent advocates match the second more closely. Neither formulation of GOG is fallacious once the logical structures and implicit premises are identified; the first version is best categorized as an assertion of burden of proof, and the second an instance of denying the consequent. As their merits are assessed against well-known objections, the second version is found to be considerably stronger than the first. It can be a solid argument, assuming that its empirical premises are supported by strong evidence.

Keywords: God of the gaps, argument from ignorance, denying the consequent, logical fallacy, miracles, intelligent design, Darwinism, methodological naturalism, scientific progress

In science and religion debates, we sometimes encounter arguments labelled 'God of the gaps' (GOG). The term is decidedly pejorative. It often means 'God of the gaps fallacy' and is identified as a kind of argument from ignorance.[1] More generous critics may spare the word 'fallacy'; nevertheless, they readily reject gap arguments as risky and ineffective at best.[2] A casual review of both relatively neutral reference texts and more polemical works (from theists and atheists) readily reveals that dismissal is the majority stance toward GOG.[3]

1 Menuge, A. 'God of the Gaps', in Copan, P. et al. (ed) *Dictionary of Christianity and Science*, Grand Rapids: Zondervan (2017), p.333. Also Albright J. 'God of the Gaps', in Runehov, A. & Oviedo, L. (ed) *Encyclopedia of Sciences and Religions*, Dordrecht: Springer Netherlands (2013), p.955.

2 Simmons, E. 'God of the Gaps', in van Huysteen, W. (ed) *Encyclopedia of Science and Religion*, New York: Macmillan Reference USA (2003), pp.382-83.

3 Collins, F. *The Language of God: A Scientist Presents Evidence for Belief*, London: Simon &

However, new appeals to gaps continue to appear despite hostile reception, and they have had some confident defenders over the decades. Thus, the alleged fallacy in God of the gaps is perhaps not so obvious. Robert Larmer, who famously asked whether there is anything wrong with GOG reasoning, complained that 'exactly wherein the fallacy lies and whether those who defend the claim of divine intervention… are really guilty of such reasoning gets little discussion' when the GOG label is employed.[4] Larmer proceeded with precisely this discussion and concluded that GOG is not a fallacy.[5] But despite such efforts, the defenders have not gained widespread attention; nor have they succeeded in changing the perceived wisdom to avoid GOG.

This article seeks to develop a fresh look at the disputes. First, I will discuss what GOG arguments are. There are two similar but still distinct versions, corresponding to the two major formulations of argument from ignorance. The critics of GOG seem to have one version in mind (GOG-1), while recent advocates follow the other version (GOG-2); so unsurprisingly neither side is convinced by the other. I will propose some logical structures for these two variants and—if such structures are already proposed—refine them.[6]

Next, I will evaluate whether GOG arguments are fallacious. The short answer is no. While GOG is an argument from ignorance, it needs not be a fallacy since it is often qualified by additional premises.[7] To assess the merits of GOG, I will point out what the implicit premises are, what kind of reasoning is engaged at key transitions, where potential fallacies can occur, and how each rational transition is (or is not) vulnerable to well-known objections. In doing so, I hope to clarify what the advocates of GOG are saying and what the objections are really about. I conclude that GOG-2 is notably less vulnerable than GOG-1 to the popular critiques; depending on the particular case—what gaps we are appealing to and how much we know around the gaps—GOG reasoning

Schuster UK Ltd. (2006), pp.92-96, 193-95. Dawkins, R. *The God Delusion*, Boston: Houghton Mifflin Co. (2006), pp.151-55.

4 Larmer, R. 'Is there anything wrong with "God of the gaps" reasoning?', *International Journal for Philosophy of Religion* (2002) 52, 129-42 (p.129).

5 *ibid*., p.138.

6 Here, 'logic' refers to a specific mode of reasoning, where we identify the forms of certain arguments and assess whether the conclusions reasonably follow from the premises. In contrast, the terms 'reasoning' or 'arguments' should be broadly understood. It is entirely possible that some proposed logical forms fail to describe GOG arguments well, or that some GOG arguments are meant to be informal.

7 Here, 'fallacy' refers to an error in reasoning; the conclusions do not follow even if the premises are true. I will include 'informal' failures (e.g. begging the question, straw man, *ad hominem*, irrelevance, self-defeat), since a strict distinction of formal vs. informal fallacy is unnecessary. A 'legitimate' or 'reasonable' argument is one that is free from fallacies; however it can still be a bad argument because a given premise is false, a necessary condition is never met, or a conclusion is inductively weak. A 'good' argument is one that deserves serious consideration.

can offer strong arguments.

What Is God of the Gaps?

To begin, we must find out what GOG arguments really are. Unfortunately, this is more easily said than done. Although frequently found among theistic arguments,[8] the GOG label can be applied to rather diverse cases, such as the apparent design of biological features, apparent fine-tuning of the laws of physics, the origin of first life, advanced human cognitive faculties, the origin of morality, records of miracles, reports of mystical experiences, and use of religious concepts such as sin, grace, and beauty.

Furthermore, GOG appears in diverse contexts. It may or may not feature a strong apologetic focus; it is not exclusively used to convince sceptics of theism. It can be presented as science ('here is an explanation of our observations using supernatural forces') or theology ('our investigation of these miracles allows us to discern certain divine attributes'), or both.[9] GOG is also found within many debates, such as the design inference, methodological naturalism, divine action, conception of God and world (hence 'nature'), boundaries of science, scientific progress, and the science-religion conflict thesis. Even if not explicitly stated, gap arguments represent an elusive issue lurking everywhere in science and religion.

At this point, some commentators give up at defining GOG and proceed by talking about particular cases which often receive the GOG label. In this way, GOG has received considerable scholarly attention, but it is usually addressed as a secondary issue to clear ground for a main thesis. Intelligent design (ID) is an obvious example, since 'God of the gaps' is quite frequently a pejorative title for design arguments that are deemed unappealing to serious and advancing science.[10] Disputed miracles offer another example.[11] Cosmic fine-tuning is yet another.[12] Advocates of GOG also tend to be defenders of design, miracles, or other cases where God plays some special role in our world. But such a case-by-case approach does not capture the whole picture; behind these cases there seems to be something about GOG that is widely understood and shared, but

8 Here, 'theism' refers to classical theism, exemplified by Christianity. 'Theistic arguments' should be broadly understood; they certainly include but are not limited to arguments in support of the existence of God.

9 William Paley's (in)famous project of natural theology is a present example.

10 Larson, R. 'Revisiting the God of the Gaps', *Perspectives on Science and Christian Faith* (2009) 61, 13-22 (p.16).

11 Collins, J. 'Miracles, Intelligent Design, and God-of-the-Gaps', *Perspectives on Science and Christian Faith* (2003) 57, 22-29 (pp.22-23).

12 Hawthorne, J. and Isaacs, Y. 'Misapprehensions about the Fine-Tuning Argument', *Royal Institute of Philosophy Supplement* (2017) 81, 133-55 (pp.139-42).

that 'something' is poorly articulated.[13]

Others try to understand GOG by locating it in the larger discourse between science and religion. Here, GOG is presented as the necessary result of certain ill responses from Christians to the challenge of science, namely 'a clinging to the past',[14] or the result of certain bad patterns for relating science and faith, as if 'science has destroyed Christian theology'.[15] Thus, if we adopt a different view of science and religion—say a complementarian stance[16]—then we are rationally compelled to reject the 'the old "God of the gaps"';[17] and if we are accused of GOG, we must quickly explain why we are not guilty of this charge.[18] Here, GOG is not really a type of argument but a component of a more general strategy; the perceived strategy is then debated so that we can decide to accept or reject GOG. While this approach has considerable value, I fear that it over-commits us to issues which are steps removed from the rational core of GOG.

Considering our confusion surrounding GOG and the danger of distraction by many volatile controversies, I am of the opinion to treat gap arguments as what they are: arguments, which are subject to ordinary philosophical scrutiny.[19] Then, let us regard the advice to avoid GOG also as arguments—arguments trying to demonstrate why GOG is wrong or unconvincing. A rigorous demonstration calls for specific reasons, which in turn can be checked for relevance, assessed for merit, refuted by some critics, and improved by others.[20]

13 What comes the closest to a central theme is methodological naturalism (MN), which is consistently problematized by the defenders of design, miracles, etc. This is a sensible move, but how MN relates to GOG still requires articulation. Dembski, W. *Intelligent Design: The Bridge Between Science & Theology*, Downers Grove: InterVarsity Press (1999), pp.238-45, 252-60. Also Moreland, J.P. 'Theistic Science and Methodological Naturalism', in Moreland J.P. (ed) *The Creation Hypothesis: Scientific Evidence for an Intelligent Designer*, Downers Grove: InterVarsity Press (1994), pp.46-51, 59-60.

14 Coulson, C. *Science and Christian Belief*, London: Oxford University Press (1955), pp.26-42.

15 Bube, R. *Putting It All Together: Seven Patterns for Relating Science and the Christian Faith*, Lanham: University Press of America (1995), pp.55-70.

16 J.P. Moreland offers an apt description of the complementarian view and demonstrates why GOG is deeply problematic here. Moreland, J.P. 'Science, Miracles, Agency Theory & God-of-the-Gaps', in Geivett, D. & Habermas, G. (ed) *In Defense of Miracles: A Comprehensive Case for God's Action in History*, Downers Grove: InterVarsity Press (1997), pp.133-37.

17 Peacocke, A. *Creation and the World of Science*, Oxford: Clarendon Press (1979), pp.77-79.

18 Collins, F. *op.cit.*, p.204, also, pp.197-206, 227-34.

19 Hence Larmer's question: Is there anything wrong with GOG reasoning? A few others have also offered their assessment. Ganssle, G. '"God of the Gaps" Arguments', in Stump, J.B. & Padgett, A.G. (ed) *Blackwell Companion to Science and Christianity*, Hoboken: John Wiley & Sons (2012), pp.130-39. Reynolds, J. 'God of the Gaps: Intelligent Design & Bad Apologetic Advice' in Dembski, W. (ed) *Mere Creation: Science, Faith & Intelligent Design*, Downers Grove: InterVarsity Press (1998), pp.313-29. Also Kojonen, E. 'The God of the Gaps, Natural Theology, and Intelligent Design', *Journal of Analytic Theology* (2016) 4, 291-316.

20 A not very specific reason is Henry Drummond's famous rhetoric: 'Positively, the idea of

So, what is GOG? An easy start is to look at how the 'God of the gaps' label is used: it has consistently been used as a critique since its appearance. The critics will object to an idea by denouncing it as another variant of GOG reasoning; the defenders will argue why their position has nothing to do with it or—if it does involve God *and* gaps—why the critics are wrong to dismiss it. Let us, therefore, investigate what is being rejected—the anti-'God of the gaps' arguments (AGOG)[21]—as a means toward an understanding of GOG.

What, then, are the main reasons to avoid GOG? First, we can divide AGOG into theoretical objections and pragmatic concerns. The former means that if an objection is true, then all GOG arguments of the targeted type(s) are exposed as unreasonable and can be rejected. The latter means that even if the rational core of GOG is acceptable, making such arguments is usually an ineffective or even counterproductive approach due to external factors.

I see four objections in the theoretical category:

(1) Logical objection: GOG involves a logical fallacy, which is most often identified as an argument from ignorance fallacy, though other fallacies may be involved. More simply, 'GOG is an argument from ignorance, and this is fallacious.'

(2) Metaphysical objection: GOG mistakenly asserts gaps in nature, whereas these are merely gaps in our knowledge and are nevertheless knowable in principle. This objection is shared between atheists ('there is no God, meddling or not') and deists ('the creation has absolute autonomy'). That is, 'GOG is based on gaps, and there are no real gaps.'

(3) Methodological objection: Searching for God in nature is not the proper task of science according to methodological naturalism (MN), although it may be legitimate—and even successful—elsewhere. Thus, 'GOG uses God as a convenient gap-filler, and that is bad science to be avoided by all scientists.'

(4) Theological objection: GOG leads to theological ideas which we independently know to be false. It may portray an incompetent creator who cannot do his work right, limit God's action to the gaps, or reduce God to a part of creation (e.g. a secondary cause). It may imply failed approaches to natural theology or elevate aspects of creation into intellectual idols (e.g. 'proofs' for reasoning our

an immanent God, which is the God of Evolution, is infinitely grander than the occasional wonder-worker, who is the God of an old theology.' However, the rest of his chapter reveals his main concern to be the old theology's implication that God *only* works in the gaps. Thus, whether (and in what way) GOG excludes God from nature is the relevant question. The theological question of 'which God is better' can wait. Drummond, H. *The Ascent of Man*, New York: James Pott & Co. (1895), pp.426-27.

21 Snoke, D. 'In Favor of God-of-the-Gaps Reasoning', *Perspectives on Science and Christian Faith* (2001), 53, 152-58 (p.152). Snoke offers a summary of AGOG, which overlaps with Kojonen's list; my list expands upon their main points. Kojonen, *op.cit.*, p.292.

way up to God). In short, 'GOG is filling gaps in creation with God, and this is bad theology'.

Pragmatic AGOG arguments include:

(5) Objection from scientific progress: Even if gap arguments are sound and true now, they may be undone by further research in science. This is different from the metaphysical objection (2) in that it does not insist a gapless nature. The problem is that our understanding of nature changes, including the gaps in our knowledge. Therefore, GOG is only conditionally successful ('as far as we know now…'); since they can be overturned at any moment, let us not make such arguments. Thus, 'GOG is based on gaps, and these gaps are shrinking'.

(6) Objection from Duhemian science (or the *pragmatic* reason behind MN): Clearly, not all scientists agree on metaphysical questions; then let us avoid such issues so that science can be as public and inclusive as possible to encourage collaboration.[22] That is, 'GOG involves metaphysics, and this is a sectarian science stopper.'

(7) Objection from apologetic value: Although GOG arguments can, in principle, succeed, they are not apologetically effective today. A present reason may be the widespread pejorative use of GOG; so if the same case can be made without attracting the swarms of objections, why complicate the matter? Plus, even theists often disagree on GOG-related issues (e.g. miracles); it is surely wise to bypass avoidable disagreements and present a united front.

Below, I will primarily respond to the logical objection (1) with the aim to answer whether GOG is fallacious and if so where the fallacy really lies. The impression of GOG as an argument from ignorance fallacy is widespread; if this is true then there is not much point in further consideration. I will bring existing assessments of GOG into a synthesis and arrive at some rational formulations of GOG which I consider to be the most representative of what its critics and defenders are actually thinking.

Most other objections (2-5) will be introduced as they become relevant to the logical structure of GOG. Although these are prominent issues worthy of greater attention, my treatment of them here will serve to clarify what kind of reasoning is employed in GOG and whether each logical component is vulnerable to the AGOG objections, so as to assess the merits of a proposed structure. The last objections (6-7) will be entirely omitted.

While attempting a formal account, we must bear in mind that GOG arguments need not be formal.[23] For example, Pascal's wager could be seen as a

22 Plantinga, A. 'Methodological Naturalism?', *Perspectives on Science and Christian Faith* (1997) 49, 143-54 (p.150-52).

23 As a parallel, the design debate is different depending on whether we approach design as

GOG argument: God is infinite, and we finite creatures are deeply ignorant of the nature of infinity; yet we must decide—what do we do?[24] Taken formally, this argument can be seen as absurd as it demands decision out of ignorance and suppresses 'honest scepticism'.[25] Alas, that is not how Pascal approaches the question. If we read more of Pascal, we can perhaps interpret him differently: given God's hiddenness and our epistemic incompetence to grasp divine mysteries, when confronted with such a state of uncertainty, which group is more sensible, the theists or the atheists? If the former, then we may as well join the theists in their gatherings, and gradually God will help us to see the light. I suspect that when a mediaeval mystic or a Pentecostal pastor makes appeals to our ignorance of God's awesome and mysterious power (i.e. gaps), she has in mind something similar to Pascal's reflections, which are not 'religious explanations' in the modern sense of the term.[26] Epistemic humility is rather different from the decision-making strategies of the economic man under incomplete information. Informal interpretations of GOG should be taken seriously, but they must be omitted here.

A Formal Account of God of the Gaps

Let us consider the most popular objection: GOG is in some way illogical. What is wrong? Larmer summarizes it thus:

> The charge… [of] fallacious reasoning seems to be grounded in the view that the evidence taken to justify talk of divine intervention must be based on the existence of gaps in our scientific understanding of nature. To consider such gaps… takes our ignorance of how nature works as evidence for supernatural intervention… [GOG] is thus an example of the fallacy of *argumentum ad ignorantiam*, i.e. an appeal to ignorance.[27]

Next, we must consider what an argument from ignorance is and whether it is reasonable. Now, this supposed fallacy is usually formally stated in two ways:[28]

formal argument or informal discourse. Plantinga, A. *Where the Conflict Really Lies: Science, Religion, and Naturalism*, New York: Oxford University Press (2011), pp.236-64.

24 Pascal, B. *Pensées*, New York: E.P. Dutton & Co. (1958), Sect.3 'Of the Necessity of the Wager', pp.52-71 (fragments 184-241). For the core wager argument, see fragment 233.

25 Dawkins, *op.cit.*, pp.130-32.

26 Barr, S. *Modern Physics and Ancient Faith*, Notre Dame: University of Notre Dame Press (2003), pp.4-18.

27 Larmer, *op.cit.*, p.129.

28 Walton, D. *Arguments from Ignorance*, University Park: The Pennsylvania State University Press (1996), pp.25-27, 60-62. Also Gensler, H. *Introduction to Logic*, Abingdon: Taylor & Francis Group (2010), p.60.

(1) It is not proven (or we do not know) that p is false; therefore p is true.

(2) It is not proven (or we do not know) that p is true; therefore p is false.

In other words, a proposition is accepted or rejected based on gaps in our knowledge. GOG, no doubt, appeals to gaps in a non-trivial way and thus can be seen as a variant of argument from ignorance.[29] Is this fallacious? On the surface, the answer must be yes. Anything of the gaps is a *non sequitur*; ignorance is simply ignorance and nothing (least of all, God!) can come out of nothing. When there is no strong evidence either way, the best we can offer is either silence or mere speculation.

Or is this the case? A trivial truth does not get us very far. Few (if any) people in real debates directly adopt the logical structure above, arguing solely on the lack of proof; usually there are additional, implicit premises thanks to which some positive knowledge does come out of ignorance.[30] Even if not conclusive, many close variants of argument from ignorance are generally accepted as reasonable, including in scientific endeavours.[31] Consider some examples:[32]

(1) The presumption of innocence in legal proceedings: 'It is not proven that A is guilty; therefore A is innocent.'

(2) Argument from silence in historical research: 'An important event B is never mentioned by ancient author C, who was otherwise knowledgeable of such events and made references often. Therefore, this event B—if it happened—postdates the life of C.'

(3) Negative evidence in everyday reasoning: 'I looked for object D in this room but saw no signs of D; therefore I know that D is not there.'

(4) Negative evidence in scientific studies: 'We exposed numerous test subjects to this chemical E and there are no adverse effects; therefore E is safe.'

If we are willing to accept these arguments, it is unjustified to categori-

29 A common response from theists is to regard an argument from ignorance as clearly fallacious, but then quickly distance themselves from it; new theistic arguments are supposedly immune to AGOG because they are not really based on gaps. Example: Collins, F., *op.cit.*, p.204. Also Meyer, S. 'The Explanatory Power of Design: DNA and the Origin of Information', in Dembski, W. (ed) *Mere Creation: Science, Faith & Intelligent Design*, Downers Grove: InterVarsity Press (1998), pp.138-39. Larmer adopts this strategy 'in line with common usage' and argues that GOG is not an argument from ignorance; he is followed by Ganssle. See Larmer, *op.cit.*, p.139; Ganssle, *op.cit.*, pp.133-35. To minimize semantic confusion, I join the other party who readily concedes that certain theistic arguments are indeed (literally) gap arguments but contests that they are fallacious simply because they appeal to gaps. See Larson, *op.cit.*, pp.13-22; Collins, J., *op.cit.*, pp.22-29.

30 Larmer, *op.cit.*, p.130; Walton, *op.cit.*, p.139; Kojonen, *op.cit.*, p.293.

31 Walton, *op.cit.*, pp.17-21.

32 Examples are adapted from Walton's discussion of the same; *ibid.*, pp.16, 31-33, 65-69.

cally reject all gap arguments. Gaps can be reasonable grounds of knowledge, depending on how the gaps are used and—as it is often the case—how they are juxtaposed with positive knowledge.[33] Can GOG be a reasonable variant of argument from ignorance if we expand it with appropriate premises? The defenders of GOG answer affirmatively. Of course, even if GOG is rational, it may still be unscientific, which is a separate issue.[34]

Again, argument from ignorance has two forms:

(1) It is not proven that p is false; therefore p is true.

(2) We do not know that p is true; therefore p is false.

Which one is GOG? What is the proposition in each form? Past discussions of GOG have largely ignored this issue, perhaps assuming that the difference is semantic only. I disagree. GOG can be stated in both ways, yet the two options are not equivalent—they frame the landscape differently and guide subsequent discussions in diverging directions.[35] I suggest that the critics and the defenders of GOG are talking past each other; the critics often focus their attention on the first form, but current gap arguments are better understood with the second form. The objections also bear different weights depending on how GOG is conceived. We will consider the two versions separately.

God of the Gaps According to Its Critics (GOG-1)

Consider Richard Dawkins' charge that the creationists are guilty of 'the worship of gaps': 'Creationists eagerly seek a gap in present-day knowledge or understanding. If an apparent gap is found, it is assumed that God, by default, must fill it.'[36] We can interpret the passage thus:

(1) It is not proven that 'God is/was active in this corner of nature' is false;

(2) Therefore God is/was indeed there.

As for the 'corner of nature', we can replace it with the physical constants of the laws of nature, the origin of life, creation of a human soul, crossing of the Red Sea, and so on.

Again, based on premise (1) alone, conclusion (2) does not follow. Fortu-

33 *ibid.*, pp.137-39.

34 Some critics suggest that GOG reasoning is fallacious because it is unscientific. Example: Dawkins, *op.cit.*, p.151-55. But this works only if 'rational' and 'scientific' are coextensive. See Ratzsch, D. *Nature, Design and Science: The Status of Design in Natural Science*, Albany: State University of New York Press (2001), p.47.

35 Consider being and non-being, or life and death. The latter is the negation of the former, but they are not equal opposites like T's and F's in an abstract truth table.

36 Dawkins, *op.cit.*, p.151.

nately, this case of GOG is quite similar to the use of argument from ignorance in judicial decisions. Substitute 'God is/was active in this corner of nature' with 'the accused was involved in this crime'. The key issue is the burden of proof.[37] The accused is justly acquitted because we have independent reasons to place a high standard of proof upon the prosecution. An established burden of proof makes the appeal to ignorance asymmetrical; it only becomes fallacious when one's reasoning proceeds in the wrong direction.[38]

Of course, we can dispute how good these independent reasons are and, after rigorous examination, they may be exposed as false or irrelevant, in which case judicial reforms should follow. More mundanely, after a lengthy investigation, further evidence may be found or old evidence may be challenged, resulting in a new verdict from a higher court. Let us be clear, however, that in these scenarios, it is either the rejection of the stated premise (that there is insufficient evidence) or the rejection of the implicit premise (the presumption of innocence) which overturns the verdict—*not* the identification of potentially closable gaps. Pointing out a lack of evidence is simply acknowledging the very premise which has been there all along; surely it cannot expose a fallacy.[39]

Following the analogy, 'God is there until we know otherwise' is not fallacious if additional reasons are offered to explain why God is given priority over the alternatives. Now there are two premises in GOG:

(1) It is not proven that 'God is/was active in this corner of nature' is false.

(1a) God's activity in nature is principally accepted until proven otherwise.

(2) God is/was indeed there.

Are there reasons to support (1a)? I will list a few examples. An obviously bad example is 'God is omnipotent and can do anything—including filling gaps in nature'.[40] Even if we accept the claim to be true, there is still a long way be-

37 Walton, *op.cit.*, p.48-52.

38 Examples include the McCarthy trials and 'Zero Tolerance' policies; *ibid.*, p.3-7, 56-60.

39 Granted, it will be prudent to suspend our judgment until the investigation is well under way; but this is separate from the rationality of our judgment.

40 Many critics are under the impression that God's omnipotence provides an easy (lazy?) escape for theism (*deus ex machina*), and theists routinely filled gaps in nature with God until the scientific revolution. Examples: Simmons, *op.cit.*, p.381; Theopedia, 'God of the Gaps', accessed 5 August 2022 (www.theopedia.com/god-of-the-gaps); BioLogos, 'Are gaps in scientific knowledge evidence for God?', updated 19 January 2019, accessed 5 May 2022 (https://biologos.org/common-questions/are-gaps-in-scientific-knowledge-evidence-for-god). For scholarly comments, see Barr, *op.cit.*, pp.4-5; Bube, *op.cit.*, pp.13-16, 55-58. I do not find this impression historically accurate, except within particular contexts such as the Enlightenment. Even here, it is plausible that GOG advocates were only proposing a (later falsified) scientific theory within their contemporary paradigms of science. See Reynolds, *op.cit.*, pp.326-28; Snoke, *op.cit.*, p.154. Also McGrath, A. *Dawkins' God: Genes, Memes, and the Meaning of Life*, Oxford: Blackwell Pub-

fore we can establish God as the default explanation. 'God can fill this gap, if he so chooses' only supports divine action as a rationally *permissible* candidate of investigation; it does not entail 'let us fill such gaps with God whenever we see them'. If this reason for burden of proof is seriously advanced, then this is where the fallacy really lies.[41]

Here are some better alternatives: We may argue that religion is natural to humans in terms of our cognitive development and thus an intuitive part of us; it continues to stay despite numerous attempts to debunk it by supposedly more reliable ways to truth, namely science.[42] Or, we may argue that theistic beliefs, unlike formal propositions in mathematics, have a more basic, common sense means of justification, similar to perception: I am justified to believe that there is tree simply because I see one, unless I have substantial reasons to defeat this belief—say, it turns out that I am drugged.[43] Or, we may want to be embedded (again) in an enchanted world of spirits, demons, moral forces, and meaning, where the divine is not an option to be weighed and decided but is everywhere embodied in and signified by ourselves, the society around us, and the entire cosmos.[44]

Granted, even if we expand the additional premise (1a) into a sub-argument and incorporate it into GOG, we may very well fail. Locating the burden of proof is not a straightforward matter outside some very specific applications such as law.[45] A proposed reason to establish God as default may turn out to be weak; it may also contain fallacies of its own. Or the original premise (1) may just be falsified by new evidence. Then, the conclusion of 'God is/was there' is rightly denied. But it is not denied because our fallacy detectors have discovered an appeal to a lack of evidence—that has always been an integral component of GOG. Thus, I conclude that GOG is indeed based on gaps, and it is not fallacious—not because of the gaps.

lishing (2005), pp.60-72.

41 Perhaps contrary to popular impression, intelligent design (ID) is not guilty of this fallacy. The dispute is whether the intuitive appearance of design is or is not an illusion produced by evolution, a naturalistic process without intention or agency. It does not appeal to divine omnipotence as a brute fact. See Kojonen, *op.cit.*, pp.293-96.

42 McCauley, R. *Why Religion Is Natural and Science Is Not*, New York: Oxford University Press (2011). McCauley's 'religion' refers to popular religion as opposed to sophisticated schools of theology. His account is far more nuanced than my generalization, which is only a thought experiment here. The same applies below.

43 Plantinga, A. *Warranted Christian Belief*, New York: Oxford University Press (2000). Philip Johnson's famous 'trial' of Darwinism follows the same principle; see Kojonen, *op.cit.*, p.294. Also Johnson, P. *Darwin on Trial*. Downers Grove: InterVarsity Press (1993).

44 Taylor, C. *A Secular Age*, Cambridge: Harvard University Press (2007), pp.29-41, 54-59, 146-151.

45 Walton, *op.cit.*, p.56.

But if so, why is there universal outcry against GOG from both theists and atheists? Surely there is something wrong, even if it is not a flagrant fallacy? It is because this way of speaking of God and nature quite naturally leads us to ask: What disproves God? What can let us know that God is not there?

This is quite rational if we accept an implicit requirement that the proposition ('the accused was the culprit' or 'God is active here') can be potentially true or false. If we are to appeal to a lack of evidence, the gaps should be such that they can, in principle, be closed had there been evidence. If we argue 'God is here until proven otherwise' but the case can never be proven otherwise—say, we take a highly allegorical approach to religious claims—then we are getting nowhere, because premise (1) will be always and trivially true.

It is also a reasonable step to nominate science as the appropriate tool to examine the evidence, as science studies nature and has made impressive discoveries in many of its corners. If we want to know what is really going on, let us take a look. Combined with the sensible request that the premises be potentially false, this leads us to think that God's action in nature is falsifiable by science.

This line of thinking, therefore, opens the possibility of placing science and God against each other—at least in the realm of efficient causes—even if we insist that science and God are not ultimately at odds.[46] Scientific investigations do sometimes lead to successful naturalistic answers without any reference to God or gods—to anything not a part of nature as 'a closed system of physical cause and effect'.[47] When this happens, God's role is disproven under the GOG 'principle' of 'God is here until science tells us otherwise'.

Of course, it does not prove that God is entirely absent (unless we adopt a parallel 'naturalism of the gaps'). Still, GOG problematizes God's place in a given corner of nature in the face of naturalistic alternatives. Divine action is a sort of current champion, to be challenged by young, ambitious warriors one after another. To present God as the undefeated champion (so far) can backfire to the detriment of theism.[48] This is especially so when the argument form is accepted as *legitimate*, but the conclusion is found to be *false*—the match is agreed upon, but the mighty has finally fallen. Then surely science has triumphed over ignorance and revealed a clockwork universe with few (if any) exceptions; and naturalism is right?[49]

46 McGrath, *Dawkins' God*, p.58-60. Charles Coulson discerned the same 'challenge from scientific thinking' when he coined 'God of the gaps'; Coulson, *op.cit.*, pp.17-42.

47 Barr, *op.cit.*, p.20.

48 Collins, F., *op.cit.*, pp.93, 193.

49 McGrath, *Dawkins' God*, p.62. Note that the conclusion against divine action holds so long as the naturalistic explanations are successful, regardless of whether there is a trend of closing gaps. This should not be confused with the objection from scientific progress. Consider an

I argue that GOG-1 is troublesome not because it is fallacious but because such 'tournaments' can work and have worked in the past. This is why theists, with GOG-1 in mind, worry about limiting divine activity to the gaps and pushing God out of the picture; the objection is frequently raised despite that defenders—also theists, but with GOG-2 in mind—readily clarify that they have no intention to limit God's activity to the gaps.[50] Classical theists can agree that GOG-1—even if it works—operates under the framework of 'an anemic, watered-down semi-deism';[51] although it allows God to act sometimes in nature, it shares deistic assumptions such as the universe is governed by prescriptive laws and divine action must belong to 'an area in the cosmos not governed by natural law'.[52] Moreover, science, whose object of inquiry is nature, becomes the arbiter of the dispute especially when science is perceived as highly successful, and scientism is lurking nearby. Fortunately, GOG-1 is historically contingent and is not representative of Christian theology as a whole.[53]

The objection is a *theistic* one: GOG is unacceptable to classical theists because it is compromised by deism. Although theologically driven, it has grounding in the rational structure of GOG; it should be taken seriously by fellow theists. We should distinguish this objection from *deistic* objections: let us avoid GOG because miracles never happen or, if they do, they do not befit God: 'God must be conceived as acting through history rather than intervening in history';[54] a God who interrupts nature is an unskilled creator who cannot do his work right the first time—or worse, a deceiving, manipulative magician who 'sneaks in through the loopholes, cheating both us and nature with His disguised "room for maneuver"'.[55] Defenders of GOG are right to point out that some AGOG arguments are really 'a variation on early Deistic arguments against miracle';[56] but this is not applicable to all theological objections.

Apart from particular objections, there is a more general motivation behind AGOG. When speaking of science disproving God's presence in a corner of nature, the once (still?) powerful myth of the conflict between science and religion, where God retreats wherever science takes over, readily comes to

analogy: the accused is to be judged guilty if enough evidence is presented by the prosecutor, regardless of whether the prosecutor has a reputation for high rate of conviction.

50 Moreland, 'Science, Miracles, Agency…', p.136; Larmer, *op.cit.*, p.132.

51 Plantinga, 'Methodological Naturalism?', p.149.

52 Reynolds, *op.cit.*, p.317. Full deism and atheism deny that there is any such area not governed by law.

53 McGrath, *Dawkins' God*, pp.60-72. Also McGrath, A. *The Dawkins Delusion?* London: SPCK (2007), pp.10-12.

54 Larmer, *op.cit.*, p.133, using Paul Davis as a representative of this thought.

55 Coulson, *op.cit.*, p.34. Coulson then gives his verdict: 'Either God is in the whole of Nature, with no gaps, or He's not there at all.' See *ibid.*, p.35.

56 Larmer, *op.cit.*, pp.133-34.

mind. Since much of science and much of theology are still responding to the supposed conflict, new GOG-sounding arguments can be seen as a legacy of the conflict thesis; striking these arguments down as GOG becomes an attempt at conflict resolution.[57] This is essentially a complementarian approach to science and religion, involving a two-step strategy:

First, to avoid embarrassment where God is asserted and then disproven, we must take science seriously and rethink God and creation in light of the scientific account of the world: 'He [God] cannot be the old "God of the gaps"… Natural science is autonomous and does not need the hypothesis of God to explain individual events and relationships… We have had to learn that God is not in the gaps in the nexus of events but is somehow in the whole process.'[58] Or, 'God is neither a secondary cause operating on the same level as natural forces nor a means for filling gaps in the scientific account'—and we have LaPlace and Darwin to thank for this insight.[59] Is God entirely absent? By no means—and all the more reason for a new natural theology without GOG.[60] Perhaps God can be found in areas such as aesthetics and morality.[61] Perhaps God works in empirically undetectable ways—say, in indeterministic areas such as the quantum world and chaotic systems, so the universe is causally open to God without intervention.[62]

While we celebrate the success of science, how do we counter certain bold claims that all theistic arguments will fail like GOG arguments in the past? What if some atheists make a jump from 'science does not require divine intervention' to 'science has disproven God altogether'? This is where we contemplate the limits of science. God cannot be threatened by science; God and, indeed, many

57 Speaking of 'possible responses to the contentious interaction between the theory of evolution and faith in God', Francis Collins presents four 'options': (1) atheism and agnosticism—'where science trumps faith', (2) creationism—'where faith trumps science', (3) intelligent design—'where science needs divine help', and (4) theistic evolution—'science and faith in harmony'. Collins, F., *op.cit.*, pp.158-59, 171, 181, 197.

58 Peacocke, *op.cit.*, pp.77-79, 132.

59 Barbour, I. *Religion and Science: Historical and Contemporary Issues*, London: SCM Press (1998), p.73.

60 McGrath, A. *The Open Secret: A New Vision for Natural Theology*, Oxford: Blackwell Publishing (2008), pp.238-40.

61 *ibid.*, pp.261-313. Evaluating such proposals is beyond our present goal.

62 Polkinghorne, J. *Science and Theology: An Introduction*, London: SPCK (1998), pp.89-90. This is the quest for causal joint in the divine action project. Alas, the non-interventionist theories of divine action, under a 'reverse GOG' of ensuring congruence with science, tend to encounter problems analogous to the old GOG. See Ritchie, S. *Divine Action and the Human Mind*, Cambridge: Cambridge University Press (2019), pp.189-200. Some reference entries thus list such scientific theories of divine action as another kind of GOG which 'represents a lack of the possibility of falsification'. Albright, *op.cit.*, pp.955-56.

other important issues are simply beyond the capacity of science.[63] Science is not everything; 'there remains… a fundamental "gulf" between the scientific description of the world and an overall account of reality… that "gulf" between science and "the rest of life" must be bridged.'[64] Theologians and Christian scientists can be of service here, offering valuable insights based on their knowledge, not gaps. Theists, after all, have good reasons to uphold the unity of reality and harmony of knowledge: God and his world cannot be at odds with each other (save human pride and ignorance); we can hope and thrive for 'an intellectually and spiritually satisfying synthesis of *all* great truths'.[65]

Therefore, the strongest critics of GOG are scientific materialists and science-religion complementarians. There are good reasons to resist GOG-1, even if such reasons do not address the rational legitimacy of GOG. However, there is at least one other interpretation of GOG, based on the alternative form of an argument from ignorance:

(2) It is not proven (or we do not know) that p is true; therefore p is false.

While familiar outcries against GOG are potent against 'God is in this part of nature until proven otherwise by science', recent arguments from the defenders of design, miracles, and religious concepts (e.g. soul) usually follow the second type:

(2a) It is not proven that 'there is a naturalistic explanation for this event or phenomenon' is true; therefore there is no naturalistic explanation for this phenomenon. Or, more briefly:

(2b) We do not know that there is a natural cause for this event; therefore there is no natural cause for this event.

Here, we ask whether we can identify supernatural causes in a given case; it does not establish a theologically driven burden of proof. The argument is a form of negative reasoning which attempts the transition from a gap in knowledge to a gap in reality. This is also why these defenders tend to find issue with MN, which excludes supernatural explanations from the start. We will unpack this form of GOG and its implications below.

63 Collins, F., *op.cit.*, pp.165-69. Also McGrath, *The Dawkins Delusion?*, pp.14-25.

64 Berg, C. 'Leaving Behind the God-of-the-Gaps: Towards a Theological Response to Scientific Limit Questions', in Herrmann, R. (ed) *Expanding Humanity's Vision of God: New Thoughts on Science and Religion*, Philadelphia: Templeton Foundation Press (2001), p.108.

65 Collins, F., *op.cit.*, p.234, emphasis original.

God of the Gaps According to Its Recent Advocates (GOG-2)

Let us first consider the premise:

(1) We do not know that there is a natural cause for this event or phenomenon.

How do we know that we do not know? This is fairly straightforward. We examine a naturalistic theory on offer; we find it inadequate at explaining some observation. We examine other naturalistic theories; yet none of them are satisfactory.

Is this an appeal to explanatory gaps? Yes. Is it an argument from ignorance fallacy? No. In fact, I do not consider this gap-searching step an argument from ignorance at all, fallacious or not. Exposing the explanatory inadequacies of an opponent's theory—and indeed, examining the inadequacies of one's own theory—is simply a regular practice in science. If Darwin can point out vestigial structures as problems under the special creation of species, or if Einstein can be persuasive because the Michelson-Moreley experiment represents a great mystery for his contemporaries,[66] 'then clearly, gaps in the explanatory power of an idea can legitimately be used to argue against the idea.'[67] Furthermore, if we find a theory wanting because of some serious gaps, this theory can be reasonably rejected even if there is no plausible alternative in sight. And if we indeed find a better alternative, we will be quite reasonably inclined to take it more seriously, even if it is not a perfect theory.[68]

This practice is found not only in science but also in many other areas of intellectual discourse. A present example is the debate between theism and naturalism. Theodicy is a well-known problem, and it has force precisely because it can be difficult to explain the presence of evil in a world ruled by an omnipotent, omniscient, and benevolent God; close contact with evil (say, the horrors of the Holocaust) sometimes uproots one's faith. There we have an explanatory gap for theism. Or perhaps we do not; theists can offer their explanations for evil. Some may even argue that evil exposes a much bigger gap for naturalism: our intuitive aversion to evil (again, consider the horrors of the Holocaust) and our having a cognitive faculty to detect values at all do not make much sense if evil is only 'a natural outgrowth of natural processes' like cancer or hair colour.[69] Whichever side we take, accusations of explanatory

66 Snoke, *op.cit.*, p.153.

67 Larson, *op.cit.*, p.17.

68 Snoke, *op.cit.*, pp.153-54, 156. Also, consider Plantinga's 'reduction test for defeat': once accepted as evidence, explanatory failures are good defeaters as they lead us to judge the target belief improbable; see Plantinga, *Conflict*, pp. 183-90, 164-78.

69 Plantinga, A. 'Two Dozen (or so) Theistic Arguments', in Walls, J. & Dougherty, T. (ed) *Two*

gaps are to be taken seriously; it is strange to dismiss some appeals to gaps as fallacious but then accept other theories without becoming distressed over all kinds of 'X of the gaps'.[70]

Some clarification is worth making here. We may and often do disagree on what constitutes a satisfactory explanation of an apparent mystery.[71] This is also a routine practice. Perhaps physicists can find an underlying naturalistic mechanism for the apparent fine-tuning of the fundamental constants. Perhaps not. Perhaps sociologists can find a successful evolutionary explanation for morality and religion. Perhaps not. To assess any gap (or gap-filling), we must become educated on what the theory states, examine relevant facts, and consider the implications. Through this process, gaps get exposed and filled; theories are improved or abandoned.

In other words, our confidence in our assessment is proportional to our knowledge of the issue at hand. This is why the ID theorists are not swayed by the charge that they are arguing from ignorance; comparing and contrasting the explanatory powers of rival theories is simply an inference to the best explanation.[72] Whether such theorists are right about their design inference, exposing gaps is not an argument from ignorance; thinking so is a conflation between everyday language and philosophical reasoning.

Of course, arguing against a theory does not directly prove an alternative theory. Even after an explanatory gap of a given theory—say, atheism—is confirmed, it does not mean that a rival theory—say, theism—is *therefore* true. This is the classic argument from ignorance fallacy.[73] Fortunately, few people reason like this without further context. For instance, a new theory may appear as a debunking argument against an otherwise intuitive belief, and we find the debunking argument unsuccessful. A fallacy can be avoided if we have additional premises to consider.

How do we move from identifying explanatory gaps in scientific theories to

Dozen (or so) Arguments for God: The Plantinga Project, New York: Oxford University Press (2018), pp.224-26. For similar cases, see Lewis, C.S. *Mere Christianity*, New York: HarperCollins Publishers (1952), pp.3-27. Also Nagel, T. *Mind & Cosmos: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False*, Oxford: Oxford University Press (2012), pp.105-16.

70 Nagel accuses 'the secular theoretical establishment… and the contemporary enlightened culture' to be guilty of 'materialism and Darwinism of the gaps'—a point familiar to many critics of scientific materialism; Nagel, *op.cit.*, p.127. Larson points out the inconsistency of Francis Collins, who rejects ID as GOG but is convinced by cosmic fine-tuning and Lewis' argument from moral law, unburdened by the naturalists' attempts at debunking them as 'cosmic design of the gaps' and 'moral realism of the gaps'; Larson, *op.cit.*, pp.14-15, 19; Collins, F., *op.cit.*, pp.11-32.

71 Snoke, *op.cit.*, p.153.

72 Meyer, *op.cit.*, pp.138-39.

73 Theism-atheism is a classic illustration; Walton, *op.cit.*, pp.25-28; Gensler, *op.cit.*, p.60.

the premise that 'no natural means we know of can explain this event'? Here, we simply examine all of the plausible naturalistic theories one by one. This is an inductive step, and the number of serious contenders on a given issue at a given time is surely finite.[74] It is also possible that multiple theories share similar tenets and suffer from similar explanatory failures. Therefore, we often use simplified binary frameworks, such as naturalistic vs. supernaturalistic or neo-Darwinian vs. design; but we can also evaluate additional theories as needed.

Consider some scientists' efforts at finding naturalistic explanations for miracles. Theory A is the 'traditional' theory, but it fails at explaining these key moments. Theory B is a recent improvement of A; it resolves some of the issues but opens other gaps. Theory C is a creative idea from this other perspective, but something is still missing… In the end, we may find a good naturalistic explanation, or we may realize that even our best explanation fails significantly, in which case our inability to explain the miracle should be admitted. The topic may be unusual, but the reasoning is routine. We only need to substitute miracles under known natural mechanisms with other questions in science—say, the apparent expansion of the universe under an eternal universe or the extinction of the dinosaurs under terrestrial geological forces.

Now let us mention the elephant in the room. Let us say that a supporter of special divine intervention behind certain miracles—say, the Red Sea crossing—has surveyed the existing naturalistic theories A, B, C and concluded that we have no good naturalistic explanation. One may respond: what if explanations D, E, F come along later with new scientific facts and theories? Suppose that a new theory—say, Colin Humphrey's wind set-down theory, aided by major advances in meteorology and oceanography—is finally successful at filling the current gaps.[75] Then obviously our earlier inductive conclusion of 'no good naturalistic explanation' will be overturned.

This is the pragmatic objection to GOG from scientific progress—a classic component of why we should avoid gap arguments. Having gaps filled thanks to new scientific discoveries is entirely possible; this cautious voice, at its core, is a response to the uncertainties posed by the limits of induction; it cannot be conflated into the blind conviction that science will eventually figure everything out.[76] Our supernatural argument *was* a good argument, given what empirical

74 If we see this as an argument from ignorance, it will be a 'lack-of-knowledge inference' or negative reasoning from searching exhaustively through a finite knowledge base. See Walton, *op.cit.*, pp.72-75.

75 Humphreys, C. *Miracles of Exodus: A Scientist's Discovery of the Extraordinary Natural Causes of the Biblical Stories*, London: Bloomsbury Publishing (2003), pp.244-60. This example is used to minimize the distraction by more heated debates.

76 Without scientism, scientific progress itself is not a serious objection: 'Science can account for more now than it could some hundreds of years ago. But this is not surprising—we didn't forget what we figured out some hundreds of years ago, and we've figured out some more

knowledge we knew at the time, just as a one-color theory of swan heredity ('all swans are white') was a sound theory until we discovered black swans in Australia. After black swans are accepted by our biologists, it is possible that we discover green swans in Greenland, tan swans in Tanzania, or indigo swans in India. It is also possible that black feathers turn out to be the result of human intervention (say, via Australian natives' skilful breeding or ritually painting otherwise white swans); then the earlier theory will be re-instated. Does the possibility of future discoveries prevent us from updating our theories according to available evidence? Not usually. We will be wise, of course, to recognize the limits of evidence, assert conclusions cautiously, and embrace future revisions or even refutations; but this concern is no more problematic in GOG cases than what is intrinsic in the work of science at large.[77]

Let us go back to the main argument. We have expanded the premise 'We do not know that there is a natural cause for this event' into the following sub-argument:

(1) There is a proposed naturalistic explanation or cause for this event or phenomenon.

(2) The proposed theory fails to explain significant parts of the said event.

(1a) There is a second (third, fourth…) proposed naturalistic explanation.

(2a) The second (third, fourth…) theory also fails to explain significant parts of the event.

(3) All of the currently available naturalistic theories (or proposed natural causes) fail to explain some significant parts of the event under investigation.

(4) We do not know that there is a natural cause for this phenomenon.

Statement (2) is the result of exposing the explanatory gaps of a given theory, in light of our observations and experiences. (3) is an inductive conclusion based on our assessment of each of the proposed theories. (4) is a straightforward result of (3), assuming that the problem of induction is manageable. Now, consider the first major conclusion:

(5) Therefore there is no natural cause for this event or phenomenon.

The move from (4) to (5) corresponds to the second logical form of the argument from ignorance: 'We do not know that p is true; therefore p is false'

things since then. These facts do not, however, provide a plausible basis for an inference that atheistic science will eventually be able to account for everything. Dismissing the fine-tuning argument out of the blind conviction that it will fall apart eventually is epistemologically risible.' These well-said words apply to other theistic explanations as well. Hawthorne, J. and Isaacs Y., *op.cit.*, p.140.

77 Ganssle, *op.cit.*, p.133-34.

with p standing for 'there is a natural cause for this phenomenon'. This is the central argument from ignorance and it is the most important transition in the logical chain of GOG-2. We start with an epistemic statement—the failure of certain types of theories (in this case naturalistic)—and end with a metaphysical or ontological statement: there is (there exists) no natural cause in reality. We have discovered an actual gap in nature—something that nature cannot or would not do. Successful or not, the true goal of those who raise GOG arguments is to establish this 'gap on account of nature'; their pointing out epistemic gaps is simply a step along the way.[78] 'The gap… appealed to is a gap in our scientific knowledge. From a gap in the current state of our scientific knowledge, we infer a gap in reality. We argue for *a gap* in what naturalistic items *can* explain.'[79]

This is what the defenders did when they denied that GOG arguments are cases of *argumentum ad ignorantiam* fallacy.[80] Rather, they re-classified GOG arguments to be instances of *modus tollens*, or denying the consequent. Consider Larmer's Great Dane example:

> If my son tells me that there is a Great Dane in our bathroom and I go look and find no evidence of a Great Dane, I conclude that it is false there is a Great Dane in our bathroom. My lack of evidence for it being the case that there is a Great Dane in our bathroom is good evidence that there is not a great Dane in our bathroom because I have knowledge that if a Great Dane were there, there should be positive evidence to confirm its presence.[81]

This kind of reasoning is, no doubt, quite common and valid. This use of denying the consequent can be generalized thus:

(a) No X we know of can do Y.

(b) If there were an X which could do Y, we would probably know that this is the case.

(c) Therefore probably no X can do Y.[82]

The previously unstated premise (b) is what makes the argument deductively valid. This, I trust, easily maps onto the main GOG argument:

(4) We do not know that there is a natural cause for this phenomenon.

(4a) If there were a natural means to explain this event, we would probably know that this is the case.

(5) Therefore there is no naturalistic explanation for this event or phenom-

78 Collins, J., *op.cit.*, p.24; Kojonen, *op.cit.*, p.294.

79 Ganssle, *op.cit.*, p.131, emphasis added.

80 Larmer, *op.cit.*, p.131, 139; Ganssle, *op.cit.*, p.132.

81 Larmer, *op.cit.*, p.131.

82 Ganssle, *op.cit.*, pp.131-33.

enon.[83]

Does this argument depend on the absence of knowledge or proof (i.e. ignorance) in a non-trivial way? Yes, the confession of our ignorance, which is premise (4), is indispensable. Does this argument *solely* rely on ignorance? By no means. Note that our conclusion—if the premises are sound—is a reasonably confident 'no', not a 'we do not know'. What we have is a contrast between available proof and the absence of proof, together leading to a point of positive knowledge—even though its content features a negative conclusion. Most importantly, the inference is made on the basis that we know enough about the event or phenomenon; in fact, the more we know or the harder we have searched, the more confident our answer of 'no' will be.[84] This is the crucial step which popular impressions of GOG have missed.[85] Since denying the consequent is widely used and clearly reasonable, this *modus tollens* transformation is a legitimate way to appeal to ignorance.[86] The absence of proof is not necessarily the proof of absence *until* we can establish a link between them.

Let us consider more closely the additional premise (4a), regarded as the key to the GOG argument by its defenders. If the premise is improbable, then the inference of a gap in nature (and all subsequent conclusions)—though not fallacious—will be weak.[87] The advocates of GOG then spend most of their effort defending this premise from anticipated attacks. What are some ways to undermine the premise 'that enough can be known about the operation of natural causes to make it reasonable to conclude that at least some gaps… are evidence for supernatural intervention'?[88] The 'shrinking gaps' concern, or the pragmatic objection from scientific progress, is addressed more or less by all defenders of GOG.[89] Other attacks include theological, philosophical, and methodological objections—indeed, the whole lot of AGOG arguments.[90]

While I agree that the usually implicit premise (4a) is a necessary step in our chain of reasoning, I find the great emphasis placed on it rather exaggerated and potentially misleading. To me, this premise simply expresses confidence in our scientific investigations, which in turn is rooted in a common-sense confidence in our general epistemic faculties. There is a mind-independent reality, and our epistemic faculties can reliably track entities and events out there in the world. If something was at a given place, then we would be able to detect it;

83 *ibid.*, p.133.

84 Larmer, *op.cit.*, pp.132, 136-37.

85 Bube summarizes the matter aptly when he introduces GOG; Bube, *op.cit.*, p.57.

86 Walton, *op.cit.*, pp.133-39.

87 Larmer, *op.cit.*, pp.131-32; Ganssle, *op.cit.*, p.133.

88 Larmer, *op.cit.*, p.132.

89 *ibid.*, p.136. Also Ganssle, *op.cit.*, p.133-35; Snoke, *op.cit.*, pp.155-56.

90 Larmer, *op.cit.*, pp.132-36; Moreland, 'Science, Miracles, Agency…', pp.136-37; Ratzsch, *op.cit.*, pp.47-49, 118-20; Dembski, *op.cit.*, pp.238-45, 252-60.

if something was not there, then we would not be able to detect it, and we would reasonably conclude against its existence. Depending on what we are studying, sometimes we can arrive at a definite answer after a quick look (e.g. searching for a Great Dane in the bathroom), and sometimes our answer requires systematic investigation (e.g. testing for harmful effects of a new medicine).

Systematic investigation, of course, can and often does become complicated and the results may have considerable uncertainty. Perhaps we have not searched everywhere or gathered *all* of the relevant factors. Inferences based on empirical observations often suffer from such constraints; it may be simply impossible to arrive at definitely true or false judgments, compelling us to speak in terms of probabilities. Our epistemic faculties are certainly not omnipotent or infallible.

But this well attested fallibility only calls into question the stated premise: 'No X we know of can do Y.' Perhaps there is an X which can do Y after all—say, a naturalistic explanation for a supposed miracle—and we are about to discover it, thus rendering the premise false. This is an inductive step, vulnerable to future scientific discoveries. But cases of previous mistakes—of once dearly held conclusions overturned upon new knowledge—will not invalidate the unstated premise: 'If there were an X which could do Y, we would probably know.' If they do invalidate it, then we need to question many things, including every possible X (naturalistic or not) which seems to be able to do Y—that is only an appearance, after all, which could be overturned at any minute! We shall be trapped in a loop of scepticism; the best thing we can do, then, is to withhold judgment.[91]

It is possible, of course, that premise (4a) is false. Perhaps some kind of idealism is true, and our observations and experiences will *never* tell us about whether there are gaps in nature. This, however, is a high price to pay. I rather think that (4a)—'if there is a natural means to explain a phenomenon, we would probably know it'—is usually hidden precisely because it is widely assumed to be true; this realist stance is shared by both those making GOG arguments and those insisting on naturalistic explanations. Thus, (4a) is not problematized and needs not be defended.

Since Larmer organizes his defence of GOG around (4a) and his work has been influential among discussions of the rational legitimacy of GOG, I will address some of the issues raised by Larmer here. The theological objections—which Larmer addresses first—are more effective against GOG-1 presented earlier. Assuming God's action as the default until proven otherwise by science leads, quite reasonably, to many theological questions about whether God acts in nature and how God is related to the world. This is not a problem for

91 Ganssle, *op.cit.*, p.133.

GOG-2 based on negative reasoning of what nature cannot do, which in turn is based on what we know of what nature ordinarily can do. In other words, this formulation does not begin with any particular theology. It does begin with a particular reported event (e.g. miraculous healing), observed phenomenon (e.g. appearance of design), or common experience (e.g. moral judgments). Its inference that 'a miracle occurred' or 'God was involved here' is made when strong signs are available; but such signs are not necessary requirements for God to act, nor are they the only reasons to affirm divine presence.[92]

Consider this theistic objection: '[GOG implies that] we think that it is possible to say of some events or objects, "God made this," and of the natural ones, "God did *not* make this." The doctrine of providence… affirms that the products of secondary causes are every bit as much direct divine action as the miraculous events.'[93] While this may be a serious problem for the earlier GOG-1, it is irrelevant here. Our chain of reason does not imply that God made this *but not* that. Rather, we are saying of some events or objects, 'this is where we can confidently tell that God made this', and of other ones, 'we cannot tell one way or the other based on available evidence—although we may have other reasons to say that God made this too (theists) or God did not make this (naturalists).'[94] Again, this version of GOG argument is, at its core, an inference of a nature gap from a knowledge gap.[95] Larmer's defence of divine action is laudable but unnecessary.

Continuing his defence of (4a), Larmer addresses the challenge from MN: 'If [GOG] explanations are to be rejected as in principle scientifically illegitimate it must be solely on the basis of their inferring a supernatural cause…'[96] This is, no doubt, a frequently contested point in debates involving the GOG label (design, miracles, etc.).

I will not be able to settle this debate, nor do I find it particularly important to my present purposes. Scientific legitimacy is not the same as rational

92 Ratzsch points out that while *contra-nomic* supernatural agency offers strong signs of design, it is perfectly possible that the supernatural is working without causing anything contrary to the regularities of nature (supernatural *nomic* agency), or that divine activity is entirely invisible. In the latter cases, design inference is less straightforward, though it may still be possible. See Ratzsch, *op.cit.*, pp.51-60.

93 Collins, J., *op.cit.*, p.24. This objection is quite different—indeed opposite—from the deistic objections questioning God's acting in nature as a secondary cause, which are what Larmer spent most of his effort refuting. See Larmer, *op.cit.*, pp.132-33.

94 Our GOG argument is strengthened if we have independent theological reasons to expect God to act in ways leaving behind signs which we do observe. Ganssle, *op.cit.*, pp.135-38. Moreland, 'Science, Miracles, Agency…', pp.137-46.

95 Collins, J., *op.cit.*, p.24.

96 Larmer, *op.cit.*, pp.135.

legitimacy;[97] even if MN is true and sound, it only means that a scientist cannot entertain supernatural entities when working as a scientist—but he could discuss the supernatural in his 'free time';[98] then if he is a rational human being who is also knowledgeable about relevant topics, his views on the supernatural should nevertheless gain a serious hearing, even if outside 'science'. So… Francis Collins, Michael Behe, Richard Dawkins, Stephen Jay Gould, Paul Davis, and Alister McGrath are not acting as scientists; they are philosophers drawing rational conclusions from scientific findings. This sounds like a semantic difference to me.[99]

Instead, the relevant question is: What does MN have to do with premise (4a), that if there is a successful naturalistic explanation or cause for something then we would know it? The answer is that MN poses no challenge to this premise. If anything, MN presumes (4a), else there is no reason for the supporters of MN to invoke the success of science, to highlight its empirical nature, and to commend a naturalistic methodology in the first place. The more we trust our ordinary investigations of nature, the more confident we will be in spotting what nature would not do—a real gap with no naturalistic explanation—when we see something strange.[100]

But perhaps MN could be an issue if MN's agreement with (4a) is conditional. While we are able to reliably detect an X which can do Y (if there exists such X), this reliability only applies to certain things—things within our ordinary senses and hence subject to scientific study—and God is not part of this category. In this case, agnosticism ('we know that we cannot know') is the sensible response. In contrast to 'only MN science is proper science'—which plunges us into the notoriously difficult task of defining science—this 'God cannot be studied by scientific investigation' seems to be a better formulation of the

97 Ratzsch, *op.cit.*, p.47-48.

98 Menuge, A. 'Who is Afraid of ID?', in Dembski, W. & Ruse, M. (ed) *Debating Design: From Darwin to DNA*, New York: Cambridge University Press (2004), p.32. Also McMullin, E. 'Plantinga's Defense of Special Creation', *Christian Scholar's Review* (1991) 21, 55-79 (p.57).

99 Plantinga counters Michael Ruse's support for MN, who attempts to define and demarcate science. Plantinga, 'MN?', pp.145-46, quoting Ruse, M. *Darwinism Defended*, Reading: Addison-Wesley (1982), p.322. For another parallel, see Dembski, *op.cit.*, pp.256-59.

100 There is no disagreement between the supporters and the skeptics of MN over the empirical nature of science and its general legitimacy. The wise advice to be cautious and to 'keep digging' when we encounter anomalies is largely irrelevant, in that our question is not whether anomalies exist—they clearly do—but whether we should (1) always profess ignorance indefinitely or (2) conclude in cases of a persistent and serious gap that 'it is not possible to explain this naturalistically'. MN supporters advise the former and dismiss the latter as 'God of the gaps'. MN skeptics disagree. See Torrance, A. 'The Possibility of a Theology-Engaged Science: A Response to Perry and Ritchie', *Zygon* (2018) 53(4), 1094-1105 (pp.1095-97). Also Perry, J. and Ritchie, S. 'Magnets, Magic, and Other Anomalies: In Defense of Methodological Naturalism', *Zygon* (2018) 53(4), 1064-93 (pp.1074-78).

methodological objection to theistic arguments such as intelligent design.[101]

Does this objection carry weight? I think not. Even if MN is true, it is essentially a restriction of the evidence base.[102] This does not pose a rational defeater to theistic scientists who have a larger evidence base which includes natural causes but is not limited by MN.[103] If science is "restricting itself to a more manageable kind of fact" than God,[104] then we will consider both what is available naturalistically and what is beyond MN. Furthermore, critics with this objection seem to have overlooked that the difficulties involved in studying the supernatural are precisely why we resort to negative reasoning about the natural—that which can be more easily perceived and investigated—and we mobilize all available means to do so. It has been the central theme of GOG all along. The transcendent is elusive, so let us see what we can discern from the book of nature; to do so we must assume that 'nature [is] a legitimate, authorized, [though] limited pointer to the divine', rendering natural theology an empirical discipline.[105]

Now, consider conclusion (5): there is no natural cause for this event or phenomenon. This—rather than premise (4a)—is the true target of some of the objections to GOG. As Larmer has realized, 'Those espousing methodological naturalism insist that non-natural explanations of physical phenomena are to be resisted… this insistence seems clearly *a priori*. Proponents of supernatural intervention… are dismissed not on the basis that they have failed to produce enough evidence, but on the basis that such evidence is *in principle impossible*.'[106] There are simply no gaps in nature, thus no amount of gaps in our knowledge can ever lead us to assert a gap in nature. This seems to be the theoretical impulse behind MN.[107]

101 Ratzsch, *op.cit.*, pp.105-10. Also Halvorson, H. 'Why Methodological Naturalism?', in Clark K. (ed) *The Blackwell Companion to Naturalism*, Chichester: John Wiley & Sons (2016), pp.136-49. Halvorson's 'theistic rationale for MN' (pp.142-45) is based on a humble or limited aim of science that constructs mathematical models.

102 Haught, J. 'Darwin, Design, and Divine Providence', in Dembski, W. & Ruse, M. (ed) *Debating Design: From Darwin to DNA*, New York: Cambridge University Press (2004), pp.234-35.

103 Plantinga, *Conflict*, pp.168-78. Also Plantinga, 'MN?', pp.143-45, 153; Torrance, A. 'Should a Christian Adopt Methodological Naturalism?', *Zygon* (2017) 52(3), 691-725 (pp.704-19).

104 Halvorson, *op.cit.*, p.147.

105 McGrath, *The Open Secret*, pp.5-12. Certainly, how we proceed from empirical observations can be questioned; particular arguments (e.g. those of Paley) can be replaced by other ones (e.g. McGrath's arguments, pp.262-313).

106 Larmer, *op.cit.*, p.140, emphasis added.

107 While MN is by itself a method of investigation, we do not choose our method arbitrarily. There are still theoretical reasons of why we believe a given method is appropriate in a given discipline. Plantinga, 'MN?', pp.146-48; Moreland, 'Science, Miracles, Agency…', pp.136, 146-48. Both primarily respond to Van Till, H. 'When Faith and Reason Cooperate', *Christian Scholar's Review* (1991) 20, 33-45. Also Torrance, A. 'Should a Christian Adopt Methodological Natural-

Here, I cannot settle whether causal closure is true.[108] We should note that whether there are gaps in nature is a metaphysical position about how nature really is; it is not an empirical claim.[109] Those who insist on 'the functional integrity of nature', no doubt, expect a continuous and gapless landscape; and if we see some gaps, these are only blind spots in our knowledge.[110] We know that (5) is false because we are bringing independent reasons to bear (external rational defeaters), not because we see a fallacy in the argument. The inference of a gap in nature *would have been* valid if we did not already know that such gaps do not exist. This is what the metaphysical challenge amounts to in GOG-2.

Advocates of GOG recognize the possibility of real gaps in nature—that (5) may be true, while it is falsifiable depending on the strength of its premises. Then, to GOG defenders, the decision that (5) is always false is no different from a commitment to deism or naturalism; refuting GOG thus without explaining the commitment is question-begging.[111] We need to first discuss whether gaps are at all possible; if no, then no amount of arguments for divine activity (GOG or not) will work.[112] I will leave the matter here.

We return to our main argument:

(4) We do not know that there is a natural cause for this phenomenon.

(4a) If there were a natural means to explain the event, we would probably know that this is the case.

(5) Therefore there is no natural cause for this event.

The new premises to consider are:

(6) There is an explanation for the event of interest.

(7) Every explanation (or every cause) is either natural or supernatural.

And we conclude:

(8) Therefore there is a supernatural explanation of the said event.[113]

This step is relatively uncontroversial. The only ambiguity, I think, is found in premise (7). Could this be guilty of false dichotomy? Not if the 'natural' and 'supernatural' are clearly defined: supernatural explanations involve super-

ism?', *Zygon* (2017) 52, 691-725.

108 Sarah Ritchie offers an apt analysis; Ritchie, *op.cit.*, pp.201-08.

109 Collins, J. *op.cit.*, p.25.

110 The term is coined by Howard Van Till; Van Till, *op.cit.*, p.42.

111 Dembski, *op.cit.*, pp.240-42; Larmer, *op.cit.*, pp.133-35, 138.

112 Lewis, C.S. *Miracles: A Preliminary Study*, New York: The Macmillan Company (1947), pp.7-10, 16.

113 Ganssle, *op.cit.*, p.130.

natural agents, and the 'natural' simply covers all explanations not involving supernatural persons.[114] This pair is intended to be a true dichotomy. Granted, this is still a bit circular, since 'nature' is not yet explained. I will borrow C.S. Lewis' definition:

> The Natural is what springs up, or comes forth, or arrives, or goes on, *of its own accord*… Each particular thing… is what it is because other things are what they are; and so, eventually, because the whole system is what it is. All the things and events are so completely interlocked that no one of them can claim the slightest independence from 'the whole show'.[115]

This is the causal closure principle: nature is one coherent, interlocking whole; then a naturalistic cause or explanation is that which depends only on other parts of nature. The naturalist affirms this; even if supernatural entities exist, they are irrelevant to us.[116]. The supernaturalist, on the contrary, affirms that there is something else apart from nature. This premise, I believe, is widely accepted—consistent with GOG critics' insistence that God is not a secondary cause and should be found in the whole of nature,[117] also consistent with the defender's focus on 'contra-nomic agency' contrasted with the ordinary capacities of material systems.[118] There is a dichotomy alright, but the dichotomy is reasonable.

Now, let us consider the final steps in GOG-2. While negative reasoning about what nature can or cannot do is the central argument, it is possible that we bring additional knowledge to bear. Perhaps we have good, independent reasons to expect supernatural activity in this corner of nature (a theological argument), *while* we suspect that nature alone cannot produce the event or phenomenon of interest (an argument from ignorance).[119] This comes in the form of an additional premise, resulting in the strengthening of the overall argument:

(7a) If there were a supernatural agent at work here, we would expect something like the observed event or phenomenon.[120]

For example, what may be the explanation of intelligent beings like us, who are conscious, having apparent agency to make decisions, capable of rationally deliberating over our decisions, and having a sense of right and wrong? Thomas Nagel argues that neo-Darwinian, materialist theories are explanatorily inad-

114 *ibid.*, p.138.
115 Lewis, *Miracles*, pp.11-12.
116 Bar, *op.cit.*, p.20.
117 Peacocke, *op.cit.*, pp.77-78; Brooke, *op.cit.*, p.162; Coulson, *op.cit.*, p.35.
118 Ratzsch, *op.cit.*, pp.41-46; Reynolds, *op.cit.*, pp.326, 328.
119 Ganssle, *op.cit.*, p.137.
120 *ibid.*, p.136.

equate—it is highly improbable that we would be here if such theories were true.[121] This is our GOG argument using denying the consequent. Intelligent beings like us, however, are not really surprising to Christian theists: 'Given a Christian understanding of the overall plan of God in creation and redemption, we have grounds to expect that God would be especially interested in the creation of beings that have specific capabilities.'[122]

Since the Christian theists' evidence base is wider than that afforded by naturalism, this allows us to bring additional knowledge (e.g. theological knowledge) into consideration.[123] While the truth of premise (7a)—whether we should expect supernatural activity in a given case—can be debated, enlisting premise (7a) is not an unreasonable move: 'Indeed… surely the rational thing is to use *all* that you know in trying to understand a given phenomenon.'[124] The negative reasoning (based on gaps in nature) and the positive reasoning (based on our knowledge about the supernatural) are two separate arguments—one does not entail or require the other—and the two work together to arrive at a strengthened case. This, I think, is a much better interpretation of how God and his 'signs and wonders' are invoked by most theists in science and philosophy.

Conclusion: A Formal Account of God of the Gaps

Here is the second and more successful form of GOG (GOG-2) as an argument from ignorance in its entirety, with numbers adjusted:[125]

(1) There is a proposed naturalistic explanation or cause for this event or phenomenon.

(2) The proposed theory fails to explain significant parts of the event under investigation.

(1a) There is a second (third, fourth...) proposed naturalistic explanation.

(2a) The second (third, fourth...) theory also fails.

(3) All of the current naturalistic theories (or proposed naturalistic causes) fail to explain some significant parts of the event under investigation.

(4) We do not know that there is a natural cause for this phenomenon.

(5) If there were a natural means to explain the event, we would probably know that this is the case.

121 Nagel, *op.cit.*, pp.3-12, 127-28.

122 Ganssle, *op.cit.*, pp.137-38. This is based on the doctrine of the image of God.

123 Plantinga, *Conflict*, pp.167-68, 178-83.

124 Plantinga, 'MN?', p.144.

125 For previous formal structures, see Reynold, *op.cit.*, p.328; Ganssle, *op.cit.*, p.136.

(6) Therefore there is no natural cause for this event.

(7) There is an explanation or cause for an event.

(8) Every explanation is either natural or supernatural.

(9) If there were a supernatural agent at work here, we would expect something like the observed phenomenon.

(10) Therefore there is a supernatural explanation of the event or phenomenon.

The truth of premises (2), (3), and (9) are clearly contingent on the particular event or phenomenon under investigation. A pragmatic objection from scientific progress can sometimes challenge premise (4). The transition from (4) to (6) is an example of denying the consequent, which is a special form of an argument from ignorance. There may be independent, metaphysical objections to premise (6). Premise (9) may be the centre of heated theological debates.

As a whole, the truth (or probability) of the final conclusion (10) will very much depend on the specific gaps involved. At least for theists, there can be strong GOG arguments; though we must keep in mind that there are also weak GOG arguments, and even currently strong arguments are not infallible. The structure of the argument, however, is valid—the conclusion will follow if the premises are true.

Our current dismissive stance towards 'God of the gaps'—especially among theists—is to a large degree caused by our failure to differentiate different kinds of GOG. The critics and the defenders are not really addressing the same issue. Given the intricacies of an argument from ignorance, there is, in fact, no 'knock-down' refutation of GOG; some objections are irrelevant, while others are effective against the first but not the second form of GOG examined above. Therefore, the talk of 'God of the gaps fallacy' can rest in peace.

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