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Natural Theology and the Uses of Argument

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Abstract: Arguments in natural theology have recently increased in their number and level of sophistication. However, there has not been much analysis of the ways in which these arguments should be evaluated as good, taken collectively or individually. After providing an overview of some proposed goals and good-making criteria for arguments in natural theology, we provide an analysis that stands as a corrective to some of the ill-formed standards that are currently in circulation. Specifically, our analysis focuses on the relation between the veracity of the premises and their relation to the conclusion of an argument. In addition to providing a clearer account of what makes an argument good, an upshot of our account is that there remain positive contributions for "weak" arguments, especially within cumulative case arguments in ramified natural theology.

The recent resurgence of natural theology has produced a wealth of arguments, deductive and inductive, for the existence of God.[1] The level of logical rigor in the development and analysis of these arguments has probably never been higher. But there has been relatively little attention paid to the question of what makes a deductive argument *good*, and the application of probabilistic analyses to ramified natural theology—the extension of the project of natural theology, which starts with public data, into the realm of historical argumentation to produce a case for the detailed claims of a particular religion—is still a relatively unexplored area.[2]

In this paper, we explore some existing criteria of goodness for deductive arguments and develop some tools that permit a broader evaluation of the uses of argument in natural theology and elsewhere. In particular, we pay close attention to the question of the relation between the credibility of the premises of a deductively valid argument and the credibility of its conclusion and show that some claims made about the circumstances under which one ought to accept the conclusion of such an argument have been inaccurately formulated. We go on to suggest, however, that there are more uses for what one might term "weak" arguments than are generally appreciated, particularly in the context of a cumulative case argument for the existence of God. Finally, we show how a probabilistic model enables us to appreciate the contribution that each distinct line of evidence makes to such an argument.

Some Goals of Theistic Arguments

What should a *good* theistic argument do? This apparently simple question has elicited surprisingly diverse answers, and it is worth trying to clarify the question before we embark on any detailed analyses.

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[1] See Craig and Moreland, eds., *The Blackwell Companion to Natural Theology* (Malden, MA: Blackwell, 2009); Richard Swinburne, *The Existence of God*, 2d. ed. (Oxford: Oxford University Press, 2004). Rodney Holder, *God, the Multiverse and Everything* (Burlington, VA: Ashgate, 2004).

[2] See Richard Swinburne, "Natural Theology, Its 'Dwindling Probabilities' and 'Lack of Rapport,'" *Faith and Philosophy* 21 (2004), pp. 533-35.

Writing in his recent book *Arguing About Gods*, Graham Oppy articulates an extremely high standard:

> When should we say that an argument for a given conclusion is a successful argument? I defend the view that, in circumstances in which it is well known that there has been perennial controversy about a given claim, a successful argument on behalf of that claim has to be one that ought to persuade all of those who have hitherto failed to accept that claim to change their minds.[3]

Oppy acknowledges that this view "sets the bar very high," and he subsequently qualifies it by restricting the relevant class to "reasonable people." But his expression of the upshot—that "it is not easy for one rational person to persuade another rational person who already holds an opinion on a given matter to revise that opinion"[4]—still owes a great deal more to his definition than to the putative deficiencies of the arguments in question. When Oppy proceeds to defend the thesis of weak agnosticism, "that it is *permissible* for reasonable persons to suspend judgment on the question of the existence of an orthodoxly conceived monotheistic god," he does so by appealing to a principle of doxastic conservatism, namely, that "*one is rationally justified in continuing to believe that* p *unless one comes to possess positive reason to cease to do so*."[5] Given the difficulty of meeting his standard for a successful argument, however, it is very difficult for a *rational* person—who, by Oppy's definition, is bound to have "numerous related beliefs that support either the rejection of the claim that *p* or the suspension of judgment about whether *p*"[6]— to come to possess a positive reason to cease to believe almost anything.

Oppy considers, and sets aside as largely irrelevant, the possibility that there might be more uses for argument than he has articulated.[7] But not all philosophers agree. In his book *God, Reason, and Theistic Proofs*, Stephen T. Davis lists five possible purposes for which one might use an argument for the existence of God.[8] The purpose of such an argument might be:

1. to show that theists are rational in their belief in the existence of God;
2. to show that it is more rational to believe that God exists than it is to deny that God exists;
3. to show that it is more rational to believe that God exists than to be agnostic on the existence of God;
4. to show that it is as rational to believe in God as it is to believe in many of the things that atheist philosophers often believe in (for example, the existence of 'other minds' or the objectivity of moral right and wrong); or
5. to show that it is irrational not to believe that God exists (that is, it is irrational to be either an atheist or an agnostic).

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[3] Graham Oppy, *Arguing About Gods* (New York: Cambridge University Press, 2006), p. 1.
[4] Oppy (2006), p. 13.
[5] Oppy (2006), p. 15.
[6] Oppy (2006), p. 12.
[7] Oppy (2006), p. 14.
[8] Stephen T. Davis, *God, Reason and Theistic Proofs* (Grand Rapids: Eerdmans, 1997), pp. 189-90. Davis speaks of such arguments as "proofs," but we have retained the more general term "arguments" in order to avoid the connotations of certainty sometimes associated with the notion of proof.

Davis suggests that 1 is a fairly modest purpose and is in fact met by a number of theistic arguments, at least for certain people. It does not follow, however, that if 1 is met, 5 is also met. For 5 is roughly equivalent to Oppy's standard, and given that people approach the question of God's existence with such widely divergent background beliefs, that standard is very difficult for any single line of argument to meet. An argument that makes it rational for one person to believe in the existence of God may not make it irrational for another person (who is, perhaps, aware of weightier arguments that may be given against theism) to persist in disbelief.

Purpose 2 is still fairly modest: it might be that, in the face of a certain body of evidence, belief is more rational than disbelief, but that suspension of belief (agnosticism) is the most rational response of all. This is why 3 is a bit stronger than 2: since it is difficult to see how agnosticism could be the least reasonable alternative, any argument that satisfies 3 will satisfy 2 *a fortiori*.

Purpose 4 is not directly comparable to the others; to make it so, we would have to introduce a further assumption to the effect that it is, in fact, rational to believe in the existence of other minds or the objectivity of morality. Since many people, including many atheists, do take such beliefs to be rational, an argument that successfully meets the standard set in 4 will be persuasive to many people. Among recent philosophers, Alvin Plantinga has done the most with this line of approach.[9]

Corresponding to each of these purposes is a sense in which one might claim that an argument is successful—successful at showing that theists are rational in their belief, successful in showing that it is more rational to believe in the existence of God than to deny it, and so forth.

If we represent reasonableness of a belief in terms of probabilities, then we can express the relations among these different purposes of argument in mathematical terms. Let it be rational for someone to believe that B, given evidence E, just in case, relative to background information K the conditional probability $P(B|E \,\&\, K) \geq r$ for some fairly high value of r, such as 0.9. Then an argument that satisfies 1 will be an argument such that, $P(B|E \,\&\, K) \geq r$. But for those who do not share the same background, the probability of B may be quite different and in some cases much lower. An argument that satisfies 2 will be one for which $P(B|E \,\&\, K) > P(\neg B|E \,\&\, K)$, which is equivalent to saying that $P(B|E \,\&\, K) > 0.5$; but if $P(B|E \,\&\, K) = 0.500001$, then arguably agnosticism about B would be a more reasonable stance than belief in B. And the caveat about those who do not share background K still holds. Criterion 3 is a little harder to quantify, but at a first rough approximation we might define it as a case where $P(B|E \,\&\, K)$ is closer to 1 than it is to 0.5, so $P(B|E \,\&\, K) > 0.75$. Criterion 4 can be thought of in comparative terms: $P(B|E \,\&\, K) \geq P(X|E \,\&\, K)$ for some specified, widely accepted proposition X. And 5 can be thought of in terms similar to 1, with the added condition that for any alternative background knowledge K* that a rational being *could* have, $P(B|E \,\&\, K^*) \geq r$.[10]

[9] See particularly *God and Other Minds: A Study of the Rational Justification of Belief in God* (New York: Cornell University Press, 1990). On the other hand, a substantial portion of the work is taken up with detailed arguments that belief in other minds is not, in the classical sense of the term, *justified* by other things we know; Plantinga's position is that we are rational in believing these things *without* having reasons to support those beliefs—and *mutatis mutandis* for believing in the existence of God.

[10] For ease of reading, we will drop the ubiquitous background term K from subsequent probability expressions in this paper.

Deductive Arguments and the Plausible Premise Criterion

In several recent works, William Lane Craig has claimed that we should accept the conclusion of a deductively valid argument just in case, for each premise of the argument, it is more reasonable to accept the premise than to reject it.[11] The natural way to model this situation probabilistically would be to say that, where A_n is a premise in the argument, $P(A_n) > P(\neg A_n)$. And since by the axioms of probability, $P(A_n) + P(\neg A_n) = 1$, and probabilities are always non-negative, this is equivalent to saying that for each premise A_n, $P(A_n) > 0.5$. We will call this the Plausible Premise Criterion, or PPC:

> PPC: If the premises of a deductive argument are more plausible than their denials, then the conclusion is more plausible than its denial.

One problem with the PPC is that it is too permissive: it is insufficient to guarantee that the probability of the conclusion, P(C), exceeds 0.5. Consider the following simple valid argument:

1. When I next roll this fair, six-sided die, I will roll a 1, 2, 3, or 4.
2. When I next roll this fair, six-sided die, I will roll a 3, 4, 5, or 6.

Therefore,

3. When I next roll this fair, six-sided die, I will roll a 3 or a 4.

The conclusion follows deductively from the premises, the probability of each premise is greater than 0.5, and the probability of the conclusion is less than 0.5.

The illusion to the contrary—that for each premise to be more probable than not suffices to make the conclusion more probable than not—may arise through a verbal slide from "... premises more plausible than their negations" to "... premises *the conjunction of which* is more plausible than its negation." These two expressions are not equivalent; the latter would suffice to meet criterion 2 articulated by Davis, but the former condition (that each premise *taken individually* is more plausible than not) does not suffice to guarantee the latter.

What, then, is the correct probabilistic analysis of deductively valid arguments with uncertain premises? The underlying theorem is most conveniently expressed in terms of the *uncertainty* of propositions in a probability distribution, where the uncertainty of φ, written $U(\varphi)$, is defined as being equal to $1 - P(\varphi)$. We also need to define a *simple* deductively valid argument: this is a valid argument in which each premise is required for the derivation of the conclusion. Now we are ready to write an important theorem, called the Uncertainty Theorem[12]:

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[11] See William Lane Craig, *Reasonable Faith*, 3d. ed. (Grand Rapids: Crossway, 2008), p. 55; William Lane Craig and J. P. Moreland, *Philosophical Foundations for a Christian Worldview* (Downers Grove, IL: InterVarsity, 2003), pp. 29-30. See also Craig's response to the "Question of the Week" on the Reasonable Faith website, http://www.reasonablefaith.org/apologetics-arguments.

[12] For a brief discussion of the theorem and some of its applications, see Ernest W. Adams, *A Primer of Probability Logic* (Stanford: CSLI, 1998), pp. 31-34.

If $\varphi_1, \ldots, \varphi_n \models \psi$ is a simple deductively valid argument, then $U(\psi) \leq U(\varphi_1) + \ldots + U(\varphi_n)$

For example, we can see the result of applying the theorem to a simple *modus ponens*:

Sentence	Probability	Uncertainty
P	.8	.2
$(P \rightarrow Q)$	.9	.1
Q	$\geq .7$	$\leq .3$

The Uncertainty Theorem makes no assumptions regarding dependence or independence, and generally the lower bound will be less than the probability resulting from the multiplication of the probabilities of the premises. When the sum of the uncertainties of the premises for such an argument reaches or exceeds 1, the argument does not, by itself, give any probability greater than zero to the conclusion.

For the purposes of assessing arguments in natural theology, the critical point is that the Uncertainty Theorem sets a lower bound on the probability of a conclusion of a simple deductively valid argument, given the probabilities of its premises, without setting an upper bound. An argument may have many premises with high uncertainty and yet have a very probable conclusion. We can illustrate this case with a simple argument. Let $P(A) = P(B) = 0.5$, and let $P(E) = 0.999$. Then the argument:

1. A
2. B

Therefore,

3. $((A \,\&\, B) \vee E)$

is deductively valid, each premise is required for the derivation of the conclusion, the sum of the uncertainties of the premises is 1, and yet the probability of the conclusion is at least 0.999.

With the Uncertainty Theorem in hand, we can assess not only Craig's criterion but also some plausible criticisms of Craig's method of argument. For example, consider this simple deductively valid argument:

1. If (A & B), then C
2. A
3. B

Therefore,

4. C

Assume for the sake of the argument that the first premise has probability 1 and that premises 2 and 3 each have probability 0.6. A superficial analysis might lead someone to conclude that the conclusion has probability 0.36, a number obtained by multiplying the premises.[13] But this analysis is mistaken in two ways. First, multiplication is appropriate only if the premises are probabilistically independent. Without that information, the only conclusion we are entitled to draw is that P(A&B) lies between 0.2 and 0.6. Second, we must not confuse P(A&B) with P(C). Unless C is the logically strongest conclusion that can be derived from these premises, even an upper bound on the probability of the conjunction of the premises (here, given the stipulated numbers, 0.6) is not an upper bound on the probability of the conclusion.

The upshot for natural theology is this: for deductive arguments, modest conclusions that set any positive lower bound for the conclusion without also setting an upper bound are an acceptable way to move the discussion forward. It follows that a modest defense of the premises, though it may not suffice to underwrite the conclusion of the PPC, can do significant dialectical work. In a two-premise argument like the standard formulation of the Kalam Cosmological Argument, if both premises can be defended as even moderately more probable than not, then the conclusion is on the map for discussion: it cannot be discarded as something so ridiculously improbable as to be unworthy of serious consideration. If both premises have a probability of (say) 0.6, then the conclusion that follows directly from them has a probability of *at least* 0.2. Further arguments, proceeding from other bodies of evidence, may raise that lower bound. This is one way to build a cumulative case in natural theology using deductively valid arguments with merely probable premises.

Non-Deductive Arguments and the Cumulative Force of "Weak" Evidence

When we shift from deductive arguments with probabilities assigned to the premises to non-deductive arguments, a whole new class of problems and possibilities opens for cumulative case building and ramified natural theology. Here, the premises will not logically entail the conclusion, but taken together they will have a positive impact on the conclusion's probability.

The sort of reasoning we have in mind is most perspicuously modeled by the odds form of Bayes's Theorem:

$$\frac{P(H \mid E)}{P(\neg H \mid E)} = \frac{P(H)}{P(\neg H)} \times \frac{P(E \mid H)}{P(E \mid \neg H)}$$

In brief terms, what this equation says is that the ratio of the probability of a hypothesis H to its negation, taking evidence E as given, is equal to the product of two ratios: the ratio of the prior probability of H to that of its negation, on the one hand, and the ratio of the likelihoods, on the other.

The strength of a non-deductive argument of this sort is not measured by the probabilities of the premises; those are taken, for the purposes of the inference to be unproblematic.[14] Rather, it is measured by the magnitude of the likelihood ratio

[13] This set of confusions is, in fact, on display in the question that prompted Craig's response noted above.
[14] When there is uncertainty regarding the facts driving the inference, this state of affairs can, under certain very general conditions, be represented at the cost of some modest increase in the complexity of the mathematical

$$\frac{P(E\,|\,H)}{P(E\,|\,\neg H)}$$

If the numerator and denominator in this fraction are equal, the evidence E makes no difference to the probability of H; if they are unequal, the posterior odds will be shifted by an amount measured by the likelihood ratio. A likelihood ratio in which the numerator is many orders of magnitude greater than the denominator is the hallmark of an extremely strong non-deductive argument.

Strength, here, does not translate directly into any particular posterior probability for the hypothesis H that E is invoked to support. Such arguments are, in Richard Swinburne's terminology, C-inductive rather than P-inductive:[15] they show how much the evidence E *confirms* H, but they need not push the *probability* for H above any given threshold.[16] On inspection, the reason for this result is obvious: the ratio on the left of the odds form is a product of two ratios that are independent of one another. From the value of just one of those ratios, we cannot assess the value of their product.

What happens when we need to take account of multiple pieces of evidence, each of which has a bearing on the hypothesis? The proper representation of this for two pieces of evidence is an extension of the odds form:

$$\frac{P(H\,|\,E_1\,\&\,E_2)}{P(\neg H\,|\,E_1\,\&\,E_2)} = \frac{P(H)}{P(\neg H)} \times \frac{P(E_1\,|\,H)}{P(E_1\,|\,\neg H)} \times \frac{P(E_2\,|\,H\,\&\,E_1)}{P(E_2\,|\,\neg H\,\&\,E_1)}$$

But in the fairly common case where the relevance of E_2 to H is independent of the truth or falsehood of E_1, we may simplify this formula by omitting "... & E_1" in the final term:

$$\frac{P(H\,|\,E_1\,\&\,E_2)}{P(\neg H\,|\,E_1\,\&\,E_2)} = \frac{P(H)}{P(\neg H)} \times \frac{P(E_1\,|\,H)}{P(E_1\,|\,\neg H)} \times \frac{P(E_2\,|\,H)}{P(E_2\,|\,\neg H)}$$

The generalization of this formula to more than two independent pieces of evidence is straightforward:

$$\frac{P(H\,|\,E_1\,\&\ldots\,\&\,E_n)}{P(\neg H\,|\,E_1\,\&\ldots\,\&\,E_n)} = \frac{P(H)}{P(\neg H)} \times \frac{P(E_1\,|\,H)}{P(E_1\,|\,\neg H)} \times \ldots \times \frac{P(E_n\,|\,H)}{P(E_n\,|\,\neg H)}$$

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formula. For a discussion of the epistemic issues involved, see Timothy and Lydia McGrew, "Foundationalism, Probability, and Mutual Support," *Erkenntnis* 68 (2008): 55-77.

[15] Swinburne, *The Existence of God* (2004), p. 6

[16] Since the ratio of the posterior probabilities, $\frac{P(H\,|\,E)}{P(\neg H\,|\,E)}$, is a ratio of terms that sum to one, we can recover P(H|E) directly from the ratio; if $\frac{P(H\,|\,E)}{P(\neg H\,|\,E)} = \frac{a}{b}$, then $P(H\,|\,E) = \frac{a}{a+b}$. Thus, if the ratio of the posteriors is 1000 to 1, then $P(H|E) = \frac{1000}{1001} \approx 0.999$.

This last formula is the key to the construction of a cumulative case using non-deductive arguments, for it demonstrates how pieces of independent evidence that are themselves of relatively little weight may be combined—multiplied—to create a powerful C-inductive argument. Twenty independent pieces of evidence, each of which yields a modest multiplicative ratio of 2 to 1 in favor of H when taken by itself, will combine to create a C-inductive argument with a force of more than a million to one.

Application to Ramified Natural Theology

The combination of multiple factors in a cumulative C-inductive argument is vitally important for ramified natural theology, where the evidence—from prophecy, from testimony to the miraculous, and so forth—virtually never logically entails the conclusion that God exists. Although it is possible to cobble together a deductively valid argument from any evidence for any logically consistent conclusion by adding additional conditional premises, such deductive constructions generally do not represent well the relevance of the individual pieces of evidence to the argument. In the compound odds form of Bayes's Theorem, each piece of evidence finds its place.

Here, again, arguments that would on some criteria be judged individually weak may be combined to produce arguments that on any reasonable standard are very strong indeed. This is a point articulated well by Joseph Butler in his classic work, *The Analogy of Religion*:

> [T]he truth of our religion, like the truth of common matters, is to be judged of by all the evidence taken together. And unless the whole series of things which may be alleged in this argument, and every particular thing in it, can reasonably be supposed to have been by accident (for here the stress of the argument for Christianity lies); then is the truth of it proved; in like manner, as if in any common case, numerous events acknowledged, were to be alleged in proof of any other event disputed; the truth of the disputed event would be proved, not only if any one of the acknowledged ones did of itself clearly imply it, but, though no one of them singly did so, if the whole of the acknowledged events taken together could not in reason be supposed to have happened, unless the disputed one were true.[17]

The Uses of Argument Revisited

One of the many advantages of a probabilistic representation of the sort developed in the preceding section is that it enables us to see a much wider range of uses for arguments than even Davis envisages. Here we will briefly note three of these as they pertain to natural theology.

First, a substantial C-inductive case can shift the burden of proof in a discussion. A theist, and *a fortiori* a Christian, bears a reasonable burden of proof for the remarkable claims he makes. The converging lines of a cumulative case may create a formidably top-heavy likelihood ratio,

$$\frac{P(E_1 \mid H)}{P(E_1 \mid \neg H)} \times \frac{P(E_2 \mid H)}{P(E_2 \mid \neg H)} \times \ldots \times \frac{P(E_n \mid H)}{P(E_n \mid \neg H)}$$

[17] Joseph Butler, *The Analogy of Religion* (London: J. M. Dent & Co., 1906), Part 2, ch. 7, p. 232.

that could be overbalanced only by an extremely pessimistic selection of prior probabilities for the existence of God or the truth of Christianity. It is a fair dialectical move to ask on what basis the prior probabilities should be set so low as to offset the cumulative weight of the evidence.

Second, a single piece of evidence or a single line of argument, though in itself insufficient to bring about a rational change of belief, may sufficiently unsettle someone's atheism or agnosticism to make it worth his while to open (or reopen) the investigation of theism. Investigation is a process, not a static epistemic state, and reasonable people constantly make both explicit and tacit decisions as to which propositions are too improbable to be worth investigation. If the design argument, for example, were to put theism "on the table" for serious investigation, that fact could itself mark a significant stage in someone's intellectual development. For just opening the inquiry is often a psychologically crucial step. It is easy to screen out minor details that do not fit in with one's preconceived opinions, to treat things that have (by themselves) *little* relevance as though they had *no* relevance. If an argument or a piece of evidence can open someone's eyes to the serious possibility of theism, then he is in a position to notice, perhaps for the first time, a whole cascade of other pieces of evidence. This phenomenon occurs surprisingly frequently.

Third, the cumulative weight of individual pieces of evidence can have a stabilizing effect on someone who already believes in God. In his *Elements of Logic*, the Oxford logician Richard Whately shrewdly describes

> the *Fallacy of objections; i.e*. showing that *there are* objections against some plan, theory, or system, and thence inferring that it should be rejected; when that which *ought* to have been proved is, that there are *more*, or *stronger* objections, against the receiving than the rejecting of it. This is the main, and almost universal Fallacy of anti-christians; and is that of which a young Christian should be first and principally warned. They find numerous 'objections' against various parts of Scripture; to some of which no satisfactory answer can be given; and the incautious hearer is apt, while his attention is fixed on these, to forget that there are infinitely more, and stronger objections against the supposition, that the Christian Religion is of *human* origin; and that where we cannot answer all objections, we are bound, in reason and in candour, to adopt the hypothesis which labours under the least.[18]

There is no better inoculation against the fallacy of objections than a vivid appreciation of the force of a cumulative argument.

In a moving letter to one of his parishioners, the nineteenth century minister Richard Cecil responds to a question about dealing with doubts with an eloquent testimony to the value of a broad knowledge of the evidences of Christianity:

> But you ask, "Do you never feel a shake after all this inquiry and experience?" I answer, Now and then an unexpected and malignant blast meets my mind, and obliges me to have recourse to my usual method. Perhaps, after what I have known and felt, I ought to repel it instantly as a temptation. Perhaps, at my standing, I ought not to honour such an assault with

[18] Richard Whately, *Elements of Logic*, 9th ed. (London: Longmans, Green, Reader, & Dyer, 1870), pp. 144-45.

any examination at all. But I am not telling you what may be my *duty*, but what is my *practice*. Moreover, such is the frame of my mind, that I fear no other method than that which I take would satisfy it. As soon, then, as an alarm is given, I cast the eye of my mind over the leading evidences of the Scriptures, of which I have an habitual recollection, and which I need not particularize in their order to *you*. I likewise contemplate *facts* and *experience*, and soon obtain repose. Like a man who is told that the foundation of his house is in danger, I call for the key of the vaults on which my dwelling stands. I light a candle, walk down stairs, and pass very deliberately through the arches: I examine very particularly the arch suspected; and, after having satisfied myself that the foundation remains perfectly safe, I walk up again, lock the door, hang up the key, put out the candle, and quietly go about my business, saying as I go, "*They may raise an alarm, but I find* ALL IS SAFE."

"Have you had occasion," say you, "often thus to go down?" Not very often. "Did you always return satisfied?" Always.[19]

[19] Richard Cecil, "Reasons for Repose," in *The Works of the Rev. Richard Cecil: With a Memoir of His Life*, vol. 2 (New York: Robert Carter, 1845), pp. 150-51.