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THE PRINCIPLE
OF SUFFICIENT
REASON

A REASSESSMENT

ALEXANDER R. PRUSS

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The Principle of Sufficient Reason

The Principle of Sufficient Reason (PSR) says that all contingent facts must have explanations. In this volume, the first on the topic in the English language in nearly half a century, Alexander Pruss examines the substantive philosophical issues raised by the PSR, which currently is considered primarily within the context of various cosmological arguments for the existence of God. Discussing several forms of the PSR and selected historical episodes from Parmenides, Aquinas, Leibniz, Hume, and Kant, Pruss defends the claim that every true contingent proposition must have an explanation against major objections, including Hume's imaginability argument and Peter van Inwagen's argument that the PSR entails modal fatalism. Pruss also provides a number of positive arguments for the PSR, based on considerations as different as the metaphysics of existence, counterfactuals and modality, negative explanations, and the everyday applicability of the PSR. Moreover, Pruss shows how the PSR would advance the discussion in a number of disparate fields, such as metaethics and the philosophy of mathematics.

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A Reassessment

ALEXANDER R. PRUSS

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For my father and mother

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Part One

The Principle of Sufficient Reason and the Causal Principle

1

Introduction

Nothing happens in vain, but everything for a reason and under necessitation.

– Leucippus (Diels and Kranz, 1985, 67B2)

1.1. THE SIGNIFICANCE OF THE PSR

An airplane crash is investigated thoroughly. No cause for the malfunction is found. The investigative team reports that the plane crashed for no cause. We naturally object: “You mean, it crashed for no *apparent* cause.” But the team insists that in fact there was no cause.¹ Of course we might question the epistemic bona fides of this finding. After all, there could always be some cause beyond our ken. But can we do more? Can we insist that there *must* have been a cause?

The Principle of Sufficient Reason (PSR) claims we can. Everything that is the case must have a reason why it is the case. Necessarily, every true or at least every contingent true proposition has an explanation. Every event has a cause. The PSR in various guises is as old as philosophy. Parmenides used it to argue that there was no such thing as change. St. Thomas proved the existence of God with a version of it apparently based on his distinction between being and essence. Spinoza’s version implied that there is no contingency. Leibniz attacked Newtonian absolute space for violating it and, together with Spinoza, used the PSR as part of an argument against libertarian free will. Kant grounded a phenomenal version of it in the causal nature of time and, arguably, based his transcendental idealism on a noumenal version (cf. Rescher, 2000b).

1 This example is taken from Rescher (1995, p. 2).

In late-twentieth-century Anglo-American philosophy the PSR was primarily the preserve of the philosopher who, following St. Thomas, came up with increasingly rigorous cosmological arguments for the existence of God. There must be an explanation of why there exist contingent beings at all, and this explanation, at the pain of vicious circularity, cannot itself essentially involve the existence of a contingent being, so there must be a first cause whose existence is itself necessary. Indeed, despite some notable dissent, it now appears generally established that once one grants an appropriate version of the PSR, it follows that there is a necessary first cause of the cosmos, that is, of the aggregate of all contingent beings. This leaves two issues for the cosmological arguer to settle: whether this first cause can be identified with the God of traditional theism and, more basically, whether the PSR is true. And much of the twentieth-century discussion of the formulation and truth of the PSR took place in this context.

But it would be a philosophical mistake to leave the PSR to purely theological uses. Philosophy starts in wonder, and wonder impels us to find reasons for things. As the opening example shows, scientists and ordinary people do presume events to have causes, though they do not always reflect on whether the PSR is exceptionless and necessary. But even a PSR contingently true and only true most of the time calls for reflection. What kind of a reason do we have to believe in the PSR even to this extent? And is it not then a puzzling fact about the universe that the PSR is in fact true in as many cases as it is? Does this fact itself have an explanation, or is this fact itself one of the exceptions to the PSR?

On some accounts of scientific practice, the scientist makes an inference to the best available potential explanation. Philosophy of science has not given us a fully satisfactory account of how we are justified in assuming that the best available potential explanation is in fact true. Does this problem become any more pressing if one allows for the possibility that not only the best available potential explanation is not true, but in fact there is no true explanation?

Quantum mechanical indeterministic transitions are often taken to be reasons to reject the PSR. But at the very same time, the indeterminism, and hence the apparent violation of the PSR, motivates some, perhaps even some as brilliant as Einstein, to prefer deterministic theories.

One of the most powerful arguments against traditional Humean regularity theories of laws of nature is that mere regularities are not

explanatory: that *As* are always followed by *Bs* does not explain why a given token of *A* is followed by a given token of *B*. If the PSR is accepted, one then has reason to reject regularity theories, since then the things that we normally think have causal explanations do not in fact have causal explanations. But if the PSR is false, then the Humean can simply accept the charge that mere regularity is not explanatory, but continue to talk with the vulgar by using a stipulative notion, *explains**, such that a token of *A* being followed by a token of *B* is explained* by *A*'s always being followed by *B*. A decision on the PSR is, thus, *prima facie* most relevant to the debate on laws of nature.

In the philosophy of mind, the PSR would allow the objector to property dualism to make the following opening gambit: The property dualist needs to explain why it is that in fact the beings that have such-and-such physical states – for example, the physical states we have in virtue of having human brains – also have such-and-such mental states. If the PSR were not true, the property dualist could simply insist this is a brute contingent fact about our universe, one not having any explanation.

But there are cases in which bringing in the PSR could conclusively clinch an argument. There is a discussion since the time of Molina, motivated by concerns of providence, grace, and free will, about whether there are any nontrivially true conditionals about what a person would freely do in nonactual circumstances. The question is particularly vexed in the case in which the person in question is herself nonactual. Are there any contingently true conditionals of the form, “Were there to exist a person *x* satisfying *C*, then *x* would freely do *A*,” where *freely* is understood in the libertarian sense and where no person identical with a person satisfying *C* exists? Alvin Plantinga insists that there are. David Manley, in conversation, offered basically the following refutation. By the PSR (perhaps in some limited form), such a conditional would have to have an explanation. But there is nothing in terms of which the conditional could be explained in a world in which the agent does not exist. For instance, there cannot be a nomological explanation, since that would require a law of nature that persons satisfying *C* do *A*, which would vitiate the supposed libertarian freedom of the agent. Nor can there be an explanation in terms of the action of any person, since the only possible candidate for such a person would be the nonexistent *x*, as it is inconceivable how anybody else could bring it about that such a conditional would hold without thereby vitiating the hypothetical freedom of *x*.

This is an instance of a general argument form:

- (1) The proposition F is such that if it were contingent and true, then its obtaining could not be explained.
- (2) But all contingent true propositions have explanations.
- (3) Therefore, F is necessary or false.

For another case, consider the following argument against Hartry Field's view that mathematical objects do not exist but *could* have existed. If the PSR is true, then there must be an explanation of *why* mathematical objects do not in fact exist, and if the PSR is *necessarily* true, then in the possible world at which mathematical objects exist, there must be an explanation of why they exist. On the plausible assumptions that the explanations of the existence or nonexistence of contingent objects are necessarily causal and that mathematical objects cannot stand in causal relations,² we see that Field's philosophy of mathematics is incompatible with the PSR. Similarly, we may argue on the basis of the necessity of the PSR that mathematical truths, including unprovable ones such as the ones Gödel showed to exist, are all necessary. For what could explain, were it a contingent truth, why a mathematical proposition, especially an unprovable one, in fact holds? Descartes did think mathematical truths could be given a causal explanation in terms of divine causality. But the notion of causing a mathematical truth to be the case is most dubious.

Another example would be the following argument for the necessity of moral truths. Specifically, the thesis to be argued for is that there is no world just like ours in its non-moral features but in which there are different deontic truths – say, torturing the innocent is a duty. Therefore, if C is a complete description of the non-moral properties of our cosmos, and p is any true deontic proposition, the proposition $C \supset p$ is a necessary truth. Moreover, this is true in every possible world. Thus, necessarily, any deontic proposition p is a necessary truth when the circumstances of application are sufficiently elaborated. Alternately, this can be put by

2 Field himself holds that mathematical objects cannot be *causes* and therefore would not impinge on our consciousness if they existed. This is in fact a part of his reason for thinking that they do not in fact exist. But it is hard to see what reason there is for thinking that they could not be causes that is not based in general considerations according to which they are the sort of being that simply cannot stand in causal relations at all. Moreover, if in fact mathematical objects could be *caused*, then there would be a possibility that somehow our minds might be capable of causing them to exist, and thus that we could know their existence through our intentional knowledge – our knowledge of that which we intentionally bring about. If this were so, then Field's argument for the nonexistence of mathematical objects would be weakened.

saying that the deontic features of our world supervene on the non-moral ones.³

How to argue for a claim like this? The idea of a possible world just like this one non-morally but where torturing the innocent is a duty seems absurd. One might try to argue by simply saying: “Don’t you see the evil of torture? Once you see it, you will see that torture *couldn’t* be right.” But there is a more metaphysical argument. If the PSR is a necessary truth, we can explain what is absurd about worlds differing in deontic features but not in other features: We simply cannot see what could *explain* such a difference. If contingent truths are ultimately to be explained causally, then this is particularly clear. What could *cause* it to be the case that torturing the innocent is a duty? The very idea of causing a deontic proposition to be the case, other than by causing the non-moral circumstances of its application, seems to be absurd. If we were utilitarians, we might say that if evolution caused it to be the case that somehow torturing the innocent were to cause them extremely intense pleasure ten years later, then torturing the innocent might increase utility. But this difference in deontic features would be achieved precisely through a difference in non-moral features.

We might, of course, admit some cases of noncausal explanation of contingent propositions. Thus, if p and q are contingent propositions with p true and q false and with the disjunction p or q itself contingent, we might want to say that the disjunction is explained by p ’s being true. But ultimately we still will want a causal explanation: for instance, we may want to get to a causal explanation of p ’s being true, unless p is itself disjunctive. Likewise, if p is reductively explained by q , say the metal’s being hot by its molecules moving rapidly, we will still want a causal explanation for q or for something that q is in turn reductively explained by, and it appears that an endless chain of reductive explanations, with nothing ultimate that things are reduced to, is explanatorily unsatisfactory.

The idea of something’s directly *causing* a moral truth, without causing some set of non-moral circumstances to be actualized, seems absurd. Moral truths, properly qualified in the form $C \supset p$ where C is a sufficiently precise description of the non-moral circumstances, just do not seem to be the sort of thing one can cause. The one example on the books of such causal interaction is a divine voluntarism: God directly brings it

3 This claim is quite close to that which occurs at the *locus classicus* of the notion of supervenience, which is the claim that goodness supervenes on non-moral properties (Hare, 1964, p. 80ff).

about that some actions are duties, some are impermissible, and some are neither, even though he could have brought it about differently. He does not do this by engaging in some speech act such as engraving “Thou shalt not murder” on a clay tablet, but by directly bringing about some moral propositions. One is likely to be puzzled by this kind of a view precisely because deontic properties just do not seem to be the sorts of properties that can be caused except by causing the non-moral circumstances of application of a moral truth. Once we admit that the deontic properties of this world if not supervenient on the non-moral properties could not be explained, then, given the PSR, we have good reason to hold to the thesis that deontic truths, when properly qualified in terms of non-moral circumstances, are necessary truths. This is not a knock-down argument. But it shows where the discussion should be focused: What would deontic facts have to be like if they were contingent and capable of being brought about not through bringing about non-moral facts? It at least seems likely that something like divine voluntarism would have to be true were moral facts to be contingent.⁴

Neither does it really help here to note that causal explanations need not have the state of affairs reported in the explanans causing the state of affairs in the explanandum: the relationship can be more complicated. For instance, that *E* caused *F* is a paradigmatic explanation of why *F* occurred. But *E*’s causing *F* does not cause *F*. This is a case of a causal explanation, but for categorial reasons we do not want to say that the state of affairs reported by the explanans causes that reported by the explanandum. Similarly, an agent- or substance-causation account can provide an explanation, but there is no state of affairs causing anything at all there. When we say that some event happened because Fred, a substance, caused it, there is no causal relation, except perhaps as a *façon de parler*, between any state of affairs or event and an event: the whole point of the theory is that the relation is between a substance and an event. There may be more complicated relations. For instance, I will argue in Chapter 7 for the *prima facie* strange claim that it makes sense to say that in

4 Observe that social constructivism would not be a counterexample here. Either social constructivism is an error theory about morality that says that there are no moral truths but only moral “truths,” or else social constructivism thinks that there are moral facts but they are produced by society. The first view does not provide a counterexample. But on the second view, the social constructivist does not hold that society *directly* brings about certain moral truths. Rather, society brings about moral truths, given social constructivism, through engaging in certain speech acts. The occurrence or nonoccurrence of such speech acts can be thought of as part of the circumstances.

some cases it could be self-explanatory that an agent freely chose something. This is a causal explanation in the sense that causation is invoked – the agent freely chose something. But since nothing can be *causa sui*, this is another case in which what is reported in the explanans does not cause what is reported in the explanandum. Nonetheless, none of these other kinds of causal explanations seems to help us explain an allegedly contingent moral claim.

Similar things could be said in favor of other supervenience claims, such as that of the aesthetic on the nonaesthetic or of epistemic statuses on things other than epistemic statuses. Consider the latter case. If the PSR were false, we could give a very simple epistemology, which the attentive reader will notice is a straw-man version of Plantinga's Reformed epistemology. Some belief-forming processes just happen to be "properly functioning" and "truth directed." There is no explanation as to which processes have one or both of these properties – this is just a brute, unexplained contingent fact. Any true proposition delivered by properly functioning truth-directed belief-forming processes is knowledge. No counterexample can be given to this theory. Suppose you give me some case where it seems that knowledge arose not from a truth-directed belief-forming properly functioning process. Then I can just say that the process in these particular circumstances *happens* to be truth directed and properly functioning. Or if you give me a Gettier-type case where a truth-directed properly functioning process delivers a true belief that is not a case of knowledge, I can say that appearances notwithstanding, in these circumstances the process *happened* not to be truth directed and properly functioning.

You might criticize my naive epistemology on the grounds that the contingency involved is contrary to our modal intuitions. We have the modal intuition that there is no world like ours in terms of features other than epistemic statuses but in which peering into a crystal ball on some particular occasion, and only on that occasion, delivers knowledge of the distant future. But I can explain your intuition as simply based on our firm knowledge – that is, the deliverance of a truth-directed properly functioning process – that *in our world* crystal-ball peering is not a properly functioning truth-directed process. And if you do not accept this, then I can just make a modal move. Yes, indeed, crystal ball peering is *necessarily* not a properly functioning truth-directed process in a world with laws of nature like those of our world. But I refuse to give you a criterion for which processes are necessarily like this – there just is no explanation for the fact that some processes are necessarily properly functioning and

truth directed and others are not. Given a sufficiently strong PSR, one can reject this whole line of reasoning. If there is no explanation as to why some processes have this epistemic status (contingently or necessarily) and others do not, then it cannot be a fact that some have it and others do not. However, the version of the PSR invoked here is stronger than the one defended in this book – a PSR for necessary truths would be required to make this argument go through, while I will defend one only for contingent truths. Nonetheless, this should motivate us to investigate the PSR in general.

Finally, observe that while the PSR does not solve the problem of skepticism, it may let one at least infer that if one's perceptions are contingent, then they have causes, and this at least takes us to some extent beyond our perceptions. If the PSR is true, and if our perceptions are contingent, then they cannot be all there is. There must be an explanation of why we have these perceptions and not others. Thus, were the PSR self-evident, it could be the start of a climb out of skepticism.

1.2. A RESTRICTION TO CONTINGENT TRUTHS

The PSR that I will defend will not be general enough for *all* of the preceding applications. I will only defend the claim that, necessarily, every contingently true proposition has an explanation. The restriction to contingent propositions is natural and forced by the current state of the art. We simply do not have a good handle on the nature of explanations of necessary propositions.

Aristotle's account of science supposes there are such. In Aristotelian scientific explanations we start with propositions that are "in themselves" more understandable and proceed to propositions that are less understandable in themselves, though of course in the order of knowledge we first know these less understandable propositions, say, that there are rainbows, and proceed from them to the more understandable ones, say, the laws of optics, to give a contemporary example. Thus, if we could identify which *necessary* propositions are "more understandable" or "objectively more basic," for instance which mathematical propositions are more properly considered as axiomatic, then we might have hope of an Aristotelian account of mathematical explanation.

Unfortunately, given the plethora of different logically equivalent axiomatizations for a single mathematical theory, it is not clear which axiomatization counts as objectively more basic, and the PSR is, after all, concerned with *objective* explanations. We could include among the

other axioms of Euclidean geometry the parallel postulate that given a line and a point not on the line there is a unique parallel line through the point and derive the Pythagorean theorem. Or we could instead make the Pythagorean theorem among the other axioms and derive the parallel postulate. Which is the genuine explanation? Traditional geometry used the former approach, but a mathematician accustomed to thinking in Cartesian ways might start with the Pythagorean theorem, which lays down a Euclidean metric on the plane, and proceed from there.

While the mathematician Paul Erdős talked of some “proofs from the Book,” where the Book was the imaginary heavenly book of the optimal proofs for each theorem, no one knows exactly what it means for a proof to be “from the book.” At the same time, we know that some proofs are more explanatory than others. A proof of a geometrical fact that is done in a Cartesian algebraic fashion will sometimes quite “obscure” the geometrical issues, while a different such proof will, the mathematician may say, “clarify” the issues where a “geometrical” proof would obscure them beneath the complexities of a diagram covered with myriad lines. The Four Color Theorem, that every map can be colored by using only four colors without countries that share a border ever having the same color, was proved by a computer checking over a thousand different cases (Appel and Haken, 1989). The proof could in principle be written out, but the proof thus written out would no doubt be quite unenlightening to us. It is not an *explanatory* proof to us. For all we know, the proof might be quite enlightening to a smarter being who could understand all the cases at once. What counts as an explanation in the sphere of mathematical necessary propositions, thus, may paradoxically be quite contingent and mind dependent, in a way in which the explanation of contingent propositions is not. On the other hand, Thomas Sullivan (conversation, 2002) might be right in thinking that when we subsume a number of mathematical theorems under a single more general theorem, we *do* explain things, by showing how such-and-such results follow from such-and-such general properties of mathematical.

Perhaps more worrying is that given Gödelian unprovable mathematical truths, it is not clear what could explain *those* truths,⁵ whereas it seems unlikely that they are self-explanatory. Thus, the PSR extended to them might be false, unless of course mathematical truths are grounded in something deeper yet, say, the nature of modality itself (i.e., whatever

5 This argument is due to the father of Joanna Tamburino, an undergraduate student of Richard M. Gale.

it is that in virtue of which it is impossible for there to exist a concrete counterexample to a mathematical truth) or the nature of God's mind.

All this suggests that there may be a significant difference between the cases of contingent and necessary propositions with respect to explanation, and hence the restriction of the PSR to contingent propositions is not ad hoc, in the way that a restriction to single events would be.

Nonetheless, there is some reason to think that we have a commitment to a PSR for necessary truths. Defense of such an argument is beyond the scope of this book, but we may sketch a possibility. Consider a certain species of the phenomenon of refusal to philosophize. The species in question refuses to move to general principles behind judgments. Yes, our interlocutor claims, it is necessarily wrong to kill brown-eyed people but it is never wrong to kill blue-eyed people. Our request for the principle behind this is rebuffed. "That's just the way it is! Brown eyes – good, blue-eyes – bad." What about people with one brown eye and one blue eye? "That depends on which eye is brown and which is blue. If it is the left one that is blue, killing is good but supererogatory. If the right one is blue, killing is prohibited." What if someone had four eyes, two brown and two blue? "I have no view about this case."

There is obviously something irrational about this attitude. One sort of irrationality here has to do with *warrant*. How could our interlocutor justify her moral beliefs? But she might well justify then on the basis of testimony. She might claim that she witnessed great miracles of prediction of the future that made it likely that an infallible supernatural being was speaking to her, and this being told her these things. Or she might claim that she had a very clear moral intuition, of the same sort that we may have with regard to the wrongness of torturing babies. We could dispute an epistemology that allows for such clear moral intuitions, but one feels there is something more deeply wrong here than just lack of warrant.

A version of the PSR is just what we need to solve the problem. There must be an explanation of the moral truths. The proposition, *p*, that it is right to kill the blue-eyed and wrong to kill the brown-eyed certainly would not be self-explanatory, the way Bentham would claim the proposition that pain is bad to be self-explanatory, even if, *per impossibile*, *p* were necessarily true. Nor can we possibly see how the proposition could be derived from self-explanatory moral truths, because we would not likely accept a moral truth as self-explanatory if it treated brown-eyedness (or some other property entailed by it but not by blue-eyedness, say) as significantly morally different from blue-eyedness, as a moral truth that entails

p would have to. Thus, by a PSR applied to necessary propositions, p cannot be true.

One might think that there is a different way of arguing against p . One might argue that it is a basic moral truth which we know through some sort of moral intuition that there is no morally significant difference between blue-eyedness and brown-eyedness. But is not our use of the concept of a “morally insignificant difference” itself dependent on the PSR? Is not a “morally insignificant difference” just the sort of difference that cannot *explain* a difference in appropriateness of treatment, so that absent the PSR, we are still no further ahead?

Or perhaps we might argue against the irrational view on the grounds that we have a clear moral intuition that killing innocent people is always wrong. However, the example can be modified. Take some difficult case in which we do not have a clear moral intuition, and imagine someone claiming that the answer depends entirely on the eye colors of the persons involved but again refusing to philosophize or adduce any principles.

We have here a refusal to philosophize, a refusal we all see in less extreme forms in various cases. A different example would be the naive epistemology discussed in Section 1.1, where it is a brute fact about which processes are warrant conferring and which are not. Much of philosophy rests on a rejection of these kinds of views, and we see the Socratic dialogues, in which Socrates seeks definitions of concepts and refuses to accept lists of items falling under the concepts, as cases of this rejection. We call views that refuse to philosophize as in the naive epistemology or in the moral case “ad hoc.” Admittedly, in some cases we can criticize the views on the grounds that our interlocutors happen not to be warranted in believing them. But that surely is not the whole story.

There might, thus, be a PSR for necessary propositions. However, investigating such a PSR will have to await an advance in our understanding of the concepts of mathematical and philosophical explanation.

1.3. WHY ACCEPT THE PSR?

These observations, together with the distinguished history of the PSR, suggest that, indeed, whether the PSR is true is highly relevant to a number of disparate fields of philosophy. But while a significant amount of work in the twentieth century was put into discussions of attempts to disprove the PSR, whether by counterexample or by reduction to absurdity, with some notable exceptions there has been surprisingly little done to

motivate the PSR. One explanation of this is that those philosophers who accept the PSR typically do so because they take it to be *self-evident* and hence in need only of refinement and defense from attempts at disproof, but not in need of proof. Moreover, some take the PSR to be a first principle in the Aristotelian sense, and if it is such, then any valid noncircular argument for the PSR will have to make use of premises less evident than the PSR itself.

The claim that a principle is self-evident tends to be a dialectical dead end inviting the response “But it’s not evident to me!” or, worse, “But its falsity is evident to me!” And this is an unnecessary dead end, since the philosopher who accepts the PSR as self-evident can take the Aristotelian line that even if the PSR is in and of itself self-evident, it need not be self-evident to everyone, and one might still construct dialectical arguments based on principles that are, in themselves, less self-evident than the PSR but which the PSR’s opponent accepts. Or, alternately, a principle can be justified in terms of its theoretical utility, much as David Lewis (1986, Section 1.1) justified his theory that every possible world exists as a concrete physical universe by citing the many apparent philosophical benefits of this account.

A different explanation of the paucity of arguments for the PSR can be found in the view widely held by contemporary philosophers that we have good reasons to think the PSR to be false. Specifically, there are two reasons that appear to be quite common. First, with greater intellectual respectability, it is claimed that quantum mechanics on its leading interpretations is incompatible with the PSR, and hence the PSR is empirically seen to be false. Second, there is a fear that acceptance of the PSR will force one to accept various theological conclusions. This sort of a fear is only a good reason for denying the PSR if in fact (a) the existence of a first cause can be shown to follow from an appropriate version of the PSR, and (b) there is evidence that that kind of first cause does not exist. Note for instance that the argument from evil against the existence of God is only relevant as an argument against the PSR if one can show that a first cause would have to be omnipotent, omniscient, and perfectly good. But while there is a long philosophical tradition of thinking that this can be shown, one suspects that the philosophical atheist is unlikely to give credence to the arguments of this tradition – even if, as I think, the arguments are defensible – and hence she is unlikely to be able to use the argument from evil justifiedly as an argument against the PSR. Since the history of late-twentieth-century philosophy of religion strongly suggests that it is the argument from evil that is the only truly interesting

positive argument against the existence of God, theophobia is no excuse for rejecting the PSR.

I will begin by sketching five episodes in the history of the PSR: Parmenides, Aquinas, Leibniz, Hume, and Kant. The survey will show a variety of forms that the PSR has taken, for instance, as a causal principle in Aquinas or as a principle of the existence of explanations in Leibniz, and will naturally lead us to distinguish several forms of the PSR. I will argue that we should see the best of these as embodying the insight that contingent propositions always have explanations, though some of the forms are arbitrarily restricted, say, to the explanation of those contingent propositions that make certain existential claims. One of the central claims defended there will be that as soon as we accept even a relatively weak version of the principle, such as that *ex nihilo nihil fit* (nothing comes from nothing), we should for the same reason accept the stronger one that every contingent proposition has an explanation. This will allow us to harness the intuitions behind the *ex nihilo nihil fit* principle and arguments specifically tailored to this principle as evidence for the full PSR once we move on to giving arguments for the PSR.

After having discussed the PSR itself, we will need to defend it against attack. The two main objections that will be considered will be the already discussed argument from quantum mechanics and Peter van Inwagen's *modus tollens* version of Spinoza's PSR-based argument for modal fatalism, the view that there are no contingent truths: the PSR entails modal fatalism, modal fatalism is necessarily false, and hence so is the PSR. In doing this, we will need to discuss the interplay between the PSR and libertarian notions of free will.

From responses to criticisms, we will move to a clarification of the notion of self-evidence. We will see that the fact that the PSR is under dispute is not an objection against the thesis of self-evidence: other plausibly self-evident principles such as the Law of Excluded Middle share this feature with the PSR.

But if an interlocutor does not or will not see the PSR as self-evident, self-evidence will be a dialectical dead end for the PSR's defender. Hence, we will need to move on to giving a positive cumulative argument for the PSR. We will examine Thomas Aquinas's being-essence argument from his *De Ente et Essentia*, Kant's arguments based on his theory of time, as well as some contemporary modal arguments for the PSR. Furthermore, a better modal argument will be offered: I will show that, on plausible and non-question-begging assumptions about the logic of counterfactuals, if it is possible that γ has a cause, then in fact γ has a cause.

I will, further, argue that an attractive Aristotelian account of the nature of possibility entails the truth of the PSR. Moreover, we will look at how far scientific practice assumes the PSR. For instance, I will argue that on an Aristotelian conception of the laws of nature, taking the PSR, as we empirically must, to be a merely contingent and only for the most part true proposition is not a feasible option: it is just too unlikely that the PSR should be true as often as it is if it is not in fact necessarily true. Obviously an argument of this form will have to be very carefully defended.

The PSR is a powerful tool in philosophy. PSR-based considerations may well get used in a covert way in much philosophical analysis. Is not all philosophical research itself a quest for explanation? Once we see that the PSR is itself capable of defense, there will be no need to be ashamed of it and to hide our use of it behind other labels. We will not need to say that Hartry Field's theory is "incomprehensible": we will simply be able to say that it posits uncaused contingent beings. We will not have to express our discomfort with epiphenomenalism by saying that it posits an excessive ontology: dislike of the theory may well be caused by a puzzlement as to what could explain the correlation between the realm of the mental and that of the physical.

At the same time, the version of the PSR that I will be defending will be a limited one, and hence one that will not be sufficient for every application in which someone may wish to make use of it. I will end up restricting the PSR to the explanation of contingent true propositions, and not requiring that the explanation have any teleological component. Whether stronger versions of the PSR hold is a fruitful subject for investigation and, as we have seen in the case of the naive epistemology, one that has philosophical application. But we will have our hands full with the more limited version.

1.4. WHAT ARE WE TALKING ABOUT?

Throughout we will be using the notions of explanation and of a cause, but nowhere will the reader find an analysis of these notions. Rather, through the investigation as a whole, we will learn more about what explanation and causation are like. Pace Socrates, we do not need a definition of a commonly used notion in order to make use of it. We know many things about explanation and causation. We know that explaining *A* by *B* and then *B* by *A* is viciously circular. We know that that the apple was dropped and gravity was operative explains why the apple fell. We know that it is

both true that I am the cause of this book and that my writing this book caused this book to come to exist.

At the same time, more needs to be said about the notions to make clear argumentation later and to make explicit some assumptions. Explanation is always a relation between two facts, that is, two true propositions (I will stipulatively use the word *fact* to mean a true proposition, unless stated explicitly otherwise). Thus, necessarily, if p explains q , then the explanans p and the explanandum q both hold. As the preceding examples show, the notion of explanation does not, however, require that the explanation be *final* or *ultimate* in the sense that no mystery remains. An ultimate explanation is one in which the explanans itself does not call out for further explanation because it is either self-explanatory or necessary or both.

However, we will usually require explanations to be *full*. This notion requires some explication. An explanation is full provided that it does not allow a puzzling aspect of the explanandum to disappear: anything puzzling in the explanandum is either also found in the explanans or else explained by the explanans. It would not do to explain why John is sad and excited by saying that he was made sad by the death of his dog, Fido. That would miss out on a part of the explanandum, namely, why he is also *excited*. One way to give a full, though not ultimate, explanation is to say that John is made sad by the death of his dog, Fido, and excited by a job offer he has received.

But there are other ways to give a full explanation that do not require that one actually explain *both* conjuncts. For instance, one might simply say that John is excited *and* the death of his dog saddened him. This does not give an explanation of all of the explanandum, but it also does not let a part of the explanandum slip from grasp. In fact the PSR ultimately will require that every contingent conjunct have an explanation. For we can apply the PSR again: Why is it that his dog died and he is excited? Either we will generate an infinite chain of explanations with no ultimate explanation or we will have come to the ultimate explanation. If we have an ultimate explanation, then we must have arrived at something self-explanatory or necessary. Since the claim that John is excited is neither, it follows that along the way we must have explained why John is excited. On the other hand, as we shall see in Chapter 3, the PSR is not compatible with an infinite chain of explanations that has no ultimate explanans. Thus, proceeding chainwise, it does not matter whether we insist that a full explanation explain every conjunct, as long as whatever puzzling aspects remain unexplained in the explanandum are carried over into the explanans.

If a full explanation explains every contingent aspect of the explanandum, then I will call the explanation *complete*.

We will not make any scientific assumption that science is the ultimate arbiter of what is an explanation or of what is a cause. Scientific explanation is one species of explanation, with deductive-nomological explanation, where the initial conditions and laws of nature are cited as an explanation of a later state of affairs that is entailed by these initial conditions and laws, as a distinguished subspecies. But there are other species. There is mathematical explanation, for instance, which we have touched on already. And there is personal explanation, as when we explain an event by saying that a person freely brought it about. It is *prima facie* possible that some forms of explanation can be reduced to others. Thus, an occasionalist thinks scientific explanation can be reduced to theistic personal explanation. A reductive physicalist thinks personal explanation can be reduced to scientific explanation. Spinoza thinks all explanation can be reduced to something very much like mathematical explanation. But no such reductionist assumptions will be made, and indeed it will be tacitly assumed that Spinoza is wrong because there really is contingency.

A guiding intuition to be kept in mind is that there are close connections among explanation, wonder, and mystery. One commonsensical way to look at explanation is as a removal or transfer of puzzlement or mystery. If knowing that q does not leave rational room for puzzlement about why p holds, then q explains p . Of course there will be a different puzzlement as to why q holds, unless q is an ultimate explanation.

The opponent of the PSR may argue that this is a problematic notion of explanation, for the concept of a puzzle or mystery entails the existence of a solution. To see this, suppose we have some contingent proposition that lacks an explanation, say, the proposition that this plane crashed. Then once one knows that there is no explanation, one thereby has removed all room for puzzlement about why the plane crashed. Thus that there is no explanation for the crash explains the crash on this view of explanation, which is truly absurd. Note that the proponent of the PSR might accept this as a *reductio ad absurdum*, though not of this notion of explanation but of the possibility of the denial of the PSR (if there were no explanation, then saying that there is no explanation would remove all puzzlement; but if all puzzlement were removed, an explanation would thereby be given; hence if there is no explanation, there is an explanation). But both the opponent and the proponent would be wrong, for were one to learn that the airplane crashed for no reason, the mystery would not thereby be removed – it would deepen, if anything.

Likewise, no analysis of causation is offered. However, it is assumed that causation is non-Humean. That *As* are always followed by *Bs* is neither sufficient nor necessary for *A*'s causing *B*. There can be single-instance causal relations and it is quite possible that *As* should be followed by *Bs* merely coincidentally. There is a possible world with the same laws of nature as ours but in which, completely by chance, no shaman has ever clapped his hands except immediately before a rainstorm. All clappings by shamans are followed by rainstorms in that world, then, but it does not follow that the clappings cause the rainstorms.

No prior assumptions are made about entailment relations between explanans and explanandum or between the fact of the occurrence of the cause and the fact of the occurrence of the effect. Hume thought that the connection in the latter case was always contingent, but that is not obvious. That Jones's intentionally brought it about that *E* happens causes *E*, even though it also logically entails that *E* happens. Many think that the explanans should entail the explanandum, but we will see in Section 6.3 that this condition is dispensable, even if we are talking of full explanations.

One might object that one cannot investigate the PSR and claims such as that all events have causes without a prior investigation of the notions of explanation and causation. But this is mistaken, I take it. At the same time, the various arguments I will end up making concerning explanation and causation will in the end be constraints on which accounts of explanation and causation are plausible. But to draw out such conclusions would be the task of another work. Aquinas thought that we could know *that* God exists, though our knowledge of exactly *what* God is like is quite shaky. Likewise, one might know *that* all contingent events have causes, while not knowing *what* exactly causes are. After all, do we not *all* know at least that some events have causes, while few if any of us know what causes are?

2

Reflections on Some Historical Episodes

Let us begin with some instructive historical episodes. Of these, Parmenides and the truthmaker principle will be crucial at important points in the book. Aquinas is important historically and we will eventually extend his metaphysical ideas to provide Thomistic arguments for the PSR. Leibniz is probably the most famous proponent of the PSR, but we shall, alas, see that he does not seem to give us a sufficient argument for it. Hume's argument against the PSR is still one of the most powerful. And, finally, Kant's arguments for the Causal Principle will give us an example of an original and interesting argument that simply fails.

2.1. PARMENIDES

2.1.1. Truthmakers and the First Argument for the ex Nihilo Nihil Principle

The PSR first shows itself clearly in Parmenides' second argument against becoming. If something comes to be, it does so from something or from nothing. It is against this second possibility that the PSR is ranged. Parmenides asks: "[W]hat need would have driven it later rather than earlier, beginning from the nothing [*tou mêdenos arxamenon*], to grow?" (Fr. 8, 9–10).¹ If we have a state where nothing exists, and then something comes to exist – think of a universe as a whole to make the argument particularly forceful – why did it come to exist when it did, rather than, say,

1 Throughout, the translation of Parmenides will be based on that in Kirk, Raven, and Schofield (1990), with occasional modifications, perhaps at times inspired by the commentary of Sider and Johnstone (1986).