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VOLUNTARISM AND EARLY MODERN SCIENCE

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The notion that divine voluntarism played a central role in the development of the empirical sciences is now commonplace amongst historians of the early-modern period. In a 1934 issue of *Mind*, M. B. Foster first proposed a link between the voluntary activity of God, the contingency of the created order, and the requirement that science be empirically based.[1] In the 1960s, in what was the first of a number of influential articles on the significance of medieval voluntarism, Francis Oakley also drew attention to the impact of this view of the Deity on the natural and political philosophy characteristic of modernity. At that time Oakley made this observation about certain developments in medieval theology: "This was the beginning of that fruitful stream of *voluntarist* natural law thinking, which, although it made its way with profound effect into the ethical, political and scientific thought of the modern world, has attracted less than its due share of attention from the historians of these subjects."[2] Since then, a number of historians have taken up Oakley's challenge and elaborations of his thesis are to found in many authoritative accounts of early modern science.[3] So firmly entrenched has this thesis become that in a recent review article the historian John Bossy defers to the widespread view that "the fathers of science depended on a nominalist and voluntarist natural theology", confidently declaring that "the story about the Ockhamist *revanche* first expounded by Francis Oakley ... has surely now sufficiently established itself".[4]

There are a number of elements to the 'voluntarism and science' thesis, and several different ways of characterizing divine voluntarism. Most versions of the thesis, however, discern a common logic in the position of early modern empiricists and their medieval forbears: from the concern to preserve the freedom of the Deity follows the claim that none of his creative acts is necessitated; from the unconstrained activity of the Deity follows the contingency of the natural order; from the contingency of the natural order follows the requirement that nature be investigated empirically.[5] The plausible logic of this position is reinforced by establishing the trajectory of this line of thought and identifying the relevant historical actors. Thus the origins of voluntarism are located amongst the medieval 'nominalists', whence it is said to have found its way into early modern thought through the theology of the Protestant Reformers. Those seventeenth-century figures thought best to exemplify the thesis, on account of their dual commitments to voluntarism and to the empirical investigation of nature, are typically Pierre Gassendi, Robert Boyle, Isaac Barrow, and Isaac Newton.

In this paper I will suggest that the voluntarism and science thesis is attended with numerous difficulties. First, there were significant early modern voluntarists who were not empiricists. Second, the central categories 'voluntarism', 'necessity',

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and 'contingency' are used with such imprecision and ambiguity as to render many versions of the thesis virtually meaningless. Third, the now familiar story about the impact of various forms of medieval voluntarism on the thought of the early modern period is in much of its detail simply wrong. Fourth, close examination of the expressed positions of a number of those early-modern empiricists thought to exemplify the thesis shows that they were not voluntarists in any significant sense of word. Finally, voluntarism is inconsistent with the physico-theological motivations of most early modern natural philosophers, and in particular those usually mentioned in connection with the thesis. In short, the voluntarism and science thesis is fatally flawed and its major contentions should be abandoned. The bulk of this paper will be given over to making this case. However, I also hope to demonstrate that there are important insights in the thesis, and in the final section I will briefly sketch out an alternative proposal for the influence of theological conceptions on the development of experimental philosophy in which these more important insights are preserved.

1. VOLUNTARISM, INTELLECTUALISM, AND THE EMPIRICISM

In its most straightforward sense, 'voluntarism' is that view of the Deity that elevates his will over his intellect. Thus understood, 'voluntarism' may be contrasted with 'intellectualism'. The Spanish Jesuit Francisco Suárez (1548–1617), for example, while he does not use the term 'voluntarist', distinguishes the Thomists, who believe that law is an act of the intellect, from those who consider law to be an act of the will. The latter include Henry of Ghent, Gabriel Biel, William of Occam, Bonaventure, Joannes Medina, Gregory of Rimini, and Duns Scotus.[6] In general terms, those identified as medieval voluntarists argued that the will is more noble than the intellect, and that the will commands the intellect in both God and the human soul.[7]

This sense of the term has been preserved in recent discussions. Margaret Osler, for example, writes that "Voluntarists stress the primacy of God's will over his intellect, and intellectualists emphasize God's intellect over his will".[8] As it pertains to the moral law — and this is the primary sense in which the distinction is used in Suárez — voluntarism provides this answer to the question posed originally by Socrates in the *Euthyphro*: God does not command things because they are good, rather they are good because God commands them.[9] It is generally thought to follow that moral laws cannot be known *a priori*. Some knowledge of divine will is required, and access to such knowledge is gained through revelation. As voluntarism pertains to 'laws of nature' — and it is this application that is distinctive in the early modern usage — it is assumed to establish the contingency of those laws and the need for an empirical approach to nature. In short, because God might have instituted any natural order he desired, nature must be directly consulted in order to determine which specific laws he actually promulgated. As Foster explained in his seminal article: the "*voluntary* activity of the Creator (i.e. that in his activity which exceeds determination by reason) terminates on the *contingent* being of

the creature.... But the contingent is knowable only by sensuous experience. If, therefore, the contingent is essential to nature, experience must be indispensable to the science of nature."[10]

While Foster exerted little effort in identifying individuals whose combination of theological and scientific commitments exemplified the thesis, this task has been taken up by his successors. Most commonly identified as voluntarist-scientists in the more recent literature are Pierre Gassendi, Isaac Barrow, Robert Boyle, and Isaac Newton. These individuals are the standard exemplars for the thesis on account of their commitment to the empirical investigation of nature on the one hand, and their putative theological voluntarism on the other. One of the difficulties with this catalogue of characters lies in its omissions. Conspicuously absent from the list is René Descartes.[11] The French philosopher was both a radical voluntarist, and at same time famously committed to the possibility of *a priori* knowledge of the laws of nature. Descartes's claim to be listed amongst the voluntarists lies in his remarkable assertion that necessary truths were initially willed to be true by God. In a much-discussed letter to Mersenne written in 1630, Descartes stated that when God formed the creatures he also created eternal truths — matters of logical necessity, essences, truths of mathematics, the laws of nature: "the mathematical truths, which you call eternal, were established by God and totally depend on him just like all the other creatures."[12] Such truths are therefore contingent in the sense that they depend on the divine will, yet in practice are eternal and unchanging, as is God himself.[13] This position was publicly restated in a long passage in the *Objections and replies*:

> It is self-contradictory to suppose that the will of God was not indifferent from eternity with respect to everything which has happened or will ever happen; for it is impossible to imagine that anything is thought of in the divine intellect as good or true, or worthy of belief or action or omission, prior to the decision of the divine will to make it so.... For example, God did not will the creation of the world in time because he saw that it would be better this way than if he had created it from eternity; nor did he will that the three angles of a triangle should be equal to two right angles because he recognized that it could not be otherwise, and so on. On the contrary, it is because he willed to create the world in time that it is better this way than if he had created it from eternity; and it is because he willed that the three angles of a triangle should necessarily equal two right angles that this is true and cannot be otherwise; and so on in other cases.[14]

It is difficult to resist the conclusion that Descartes was an extreme voluntarist. This is probably the strongest statement of voluntarism in the seventeenth century. That Descartes's position did not issue in an equally radical empiricism need hardly be stated. At first sight at least, Descartes's voluntarism constitutes an embarrassment for the voluntarism and empirical science thesis.

It has been argued, such passages notwithstanding, that Descartes was not really a voluntarist. Margaret Osler, while cognizant of Descartes's position on

eternal truths, mounts an impressive case to the effect that Descartes was in fact an intellectualist.[15] But it is difficult to see how such a view can be sustained. The Cartesian position contrasts with the intellectualist stance of Aquinas, for whom the creation has a purpose and is constrained by God's goodness.[16] Moreover, if we consider the lists drawn up by Suarez, Descartes is clearly aligned with those who reject the Thomist position.[17] (Admittedly, if by voluntarism is meant *doxastic* voluntarism, it might be conceded that Descartes is not a voluntarist in this sense.[18] However, doxastic voluntarism is at best indirectly related to the voluntarism and science thesis.) The issue here is whether for Descartes God's will is constrained by his reason and goodness. Patently the Cartesian view is that God's willing is prior to both goodness and the laws of nature. His position was well known, notorious even, amongst his contemporaries.[19] He is considered to be a voluntarist by virtually all recent commentators.[20]

The example of Descartes breaks the inexorability of the logic of a connection between voluntarism and empiricism. Voluntarism combined with other commitments could give rise to an *a priori* approach to nature. The reason that voluntarism does not issue in empiricism in Descartes's scheme of things is that God, having created the eternal truths by his sheer will, then proceeded to stamp them onto the human mind. We can know the laws of nature without recourse to empirical investigation because these truths are in our minds.[21] It was for this reason that Descartes believed that human minds could "recognize effects in their causes", or, what is the same thing, offer "*a priori* demonstrations of everything that can be produced in this new world".[22] In the case of Descartes, then, it is not speculations about the operations of the divine will alone that inform his approach to our knowledge of nature, but rather this in combination with certain ideas about the capacities of human minds.

It is tempting to dismiss Descartes as a single aberration. After all, his position is idiosyncratic, and logicians are still puzzling over what he might have intended by his doctrine of the creation of eternal truths.[23] Yet it is not difficult to imagine other commitments which, when combined with voluntarism, might also yield non-empirical approaches to nature. If we reconsider voluntarism as it was thought to apply to *moral* laws, one implication was that the individual is thrown back upon divine revelation for knowledge of good and evil. The position with respect to *natural* laws directly analogous to this would be the same: for knowledge of the operations of nature resort must be had to divine revelation. On the assumption that God had revealed himself in nature this might promote an empirical natural philosophy. However, it was the assumption that legitimate knowledge of God could be gleaned from the study of nature that both medieval voluntarists and Protestant reformers found uncongenial. Other sources of revelation were the Judaeo-Christian scriptures and other revered writings, or special individuals thought to have been divinely inspired. These latter options were taken seriously in the sixteenth and seventeenth centuries, and neither could be regarded as paradigm cases of empiricism.

Robert Fludd, for example, argued that Moses "conversed with God and obtained the key to both types of understanding (natural and supernatural) by divine assistance and illumination of the most Holy Spirit".[24] This would imply that both scripture and divine inspiration would provide sources of natural knowledge. Helmontian and Paracelsian natural philosophers held that "God discloses to men the great mystery of chymistry by good angels, or by nocturnal visions", as Robert Boyle put it.[25] Bacon wrote of how the Paracelsians had attempted to found "a system of natural philosophy on the first chapters of Genesis".[26] Cartesian philosopher Pierre Poiret proposed mystical experience — direct participation in the mind of the Deity — as means of gaining knowledge of nature.[27] If such appeals to various forms of divine revelation appear seem to be somewhat marginal in the larger historical picture, it is because with the benefit of hindsight it can be seen that they do not occupy a central place in the genealogy of the modern sciences. Yet even figures now regarded as central to the development of seventeenth-century natural philosophy were not invariably hostile to such positions.[28]

The stance of Descartes and these others makes it difficult to argue for a strong link between voluntarism and empiricism. Perhaps the best that can be salvaged from this is the claim that voluntarism was a necessary but insufficient condition for empiricism. It could be conceded that while not all voluntarists were empiricists, all empiricists were voluntarists. This is a somewhat weaker claim, which as we shall see is also problematic, for not all empiricists were voluntarists, not even those who are usually so identified.

2. CONTINGENCY AND THE CREATION

While voluntarism is primarily a doctrine about the divine will, certain implications are usually thought to follow. One such implication, central to the voluntarism and science thesis, is the contingency of the created order. 'Contingency' in these discussions is used in a number of ways. For Foster, as we have seen, that which God creates is contingent because God's creative act was not necessitated. Contingency is thus opposed to necessity. The case of Descartes suggests that there may be difficulties with this line of reasoning, in the specific instance that God freely creates necessary truths. It is also worth briefly pointing out that the nature of the logical opposition between necessity and contingency is not a simple one.[29] It is often supposed that the modal properties contingency and necessity are contradictories, but they are not. The contradictory of 'necessary' is 'non-necessary', and of contingent is 'non-contingent'. To say that some thing is contingent may mean that it is possible, or that it is not necessary. But necessary things are possible. In short, the realm of possibility includes both the contingent and necessary.[30]

Of more direct relevance is the tendency among a number of writers when speaking of voluntarism in the early-modern context to use the term in a sense that does not oppose it to necessity, but rather to mean something like 'dependency'. Betty Jo Dobbs writes that: "For the voluntarist the world is always contingent upon the will of God."[31] Similarly, Lisa Sarasohn describes Gassendi's voluntarism as the

view that "the world is absolutely contingent on God's will which is 'most free'". Margaret Osler also speaks of contingency in this sense: "Briefly, voluntarism is the view that creation is absolutely dependent upon God's will."[32] On the basis of these identifications, voluntarism becomes more a view about the relation of the creation to the Deity than a thesis about what, if anything, determines the divine will. Accordingly, the language of radical dependency is taken either as a sign of voluntarist commitments or as constitutive of those commitments.

It is clear that utterances expressing the dependence of the world on the divine will are common in the writings of a number of figures committed to the experimental philosophy. Gassendi declared that "the world would be reduced to nothing if God were to cease supporting it".[33] Isaac Barrow, first Lucasian Professor of Mathematics at Cambridge and Newton's immediate predecessor in that famous chair, stated in his mathematics lectures that "the efficient Cause of all Things is God".[34] In his government of the world God relies upon no intermediaries, Barrow thought, for in all his actions "God uses no other means, instruments or applications in these productions, than his bare word or command".[35] Newton himself spoke in similar terms of God's "creating, preserving, and governing of all things according to his good will".[36] The Newtonians Samuel Clarke and William Whiston used the same language about the operation of the divine will in the natural order. According to Clarke, "the *Course of Nature*, cannot possibly be any thing else, but the *Arbitrary Will and pleasure of God* exerting itself and acting upon Matter continually".[37] Whiston also thought that the "Providence of God in the Natural World is not meerly a Conservation of its being, or a Non-annihilation thereof; but a constant, uniform, active influence or Energy in all the Operations done in it".[38] Statements such as these are often regarded as evidence of voluntarism.

As has already been suggested, however, to make such an identification relies on a subtle conflation of two senses of contingency: 'contingent' as it stands in opposition to 'necessary'; 'contingent' as a synonym for 'dependence'. These two meanings are quite distinct, as we shall see. Perhaps more seriously, it is problematic to use 'contingent' in this second sense and thus to equate voluntarism with the view that the operations of nature are directly dependent upon the will of God, simply because this latter view is a straightforward implication of classical theism. Christian theologians, almost without exception, held that God's relations with nature involve an original creative act and the continuous sustaining of the created order (or as it was sometimes expressed, God's initial creation and his ongoing acts are dual aspects of a single creative act). At any rate, the dependence of the created order on the will of God is something which no traditional theist would have denied.[39] The new emphasis on the *immediate* dependence of the world on God, however, is significant, but this view was not exclusive to voluntarists.

We shall not be surprised to learn, then, that Descartes elaborated in detail just such a view of the moment-by-moment dependence of the created order on the divine will: "If anyone attends to the immeasurable greatness of God he will find it manifestly clear that there can be nothing whatsoever which does not depend on

him. This applies not just to everything that subsists, but to all order, every law, and every reason for anything's being true or good."[40] Nicolas Malebranche also argued for the direct dependence of the world on God: "As the universe is derived from nothing, it depends to such an extent on the universal cause that, if God ceased to conserve it, it would necessarily revert to nothing."[41] Elsewhere he stresses (in spite of his rejection of voluntarism) that it is the divine will that the creatures are dependent on: "creatures are not at all necessary emanations from the divinity ... they are essentially dependent on a free will of the creator."[42]

It can be allowed that the seventeenth century does witness the emergence of an extreme version of the doctrine of the dependency of the world upon God. In its purest form, this emphasis upon the contingency (in the sense of dependence) of the world leads to the claim that God is the immediate cause of all events. This position is, of course, occasionalism. P. M. Heimann, whose "Voluntarism and immanence" represents an early articulation of the voluntarism and science thesis, seems to make this equation. Heimann characterizes Newton's insistence of the world's dependence on God as the "voluntarist doctrine of divine omnipotence: everything in the world ... is subordinate to him and subservient to his Will". Heimann goes on to claim that for voluntarists God's will is "the only causally efficacious agency in nature".[43] However, this seems to conflate voluntarism and occasionalism, with the consequence that such Cartesian philosophers as Malebranche and Cordemoy, and possibly Arnauld, La Forge, Clauberg and even Descartes himself are admitted to the circle of voluntarists on account of their occasionalist credentials.[44] These individuals, it need hardly be said, did not uniformly embrace empiricism, and this characterization of voluntarism hardly serves the thesis well.

Voluntarism (a doctrine about the divine will) ought not to be equated with occasionalism (a doctrine about causation). Occasionalism, moreover, is quite consistent with intellectualism. Thus, Malebranche, the most thoroughgoing occasionalist of them all, vehemently opposed the voluntarist understanding of the Divine will: "everything is inverted if we claim that God is above Reason and has no rule in his plans other than his mere will. This false principle spreads such blanket darkness that it confounds the good with the evil, the true with the false."[45] The doctrine that places God as the direct cause of what takes place in nature is thus independent of a voluntarism according to which the divine will is above reason.

None of this is to deny that ideas about the dependence of the world on the will of the Deity could play a significant role in the development of the modern conception of natural law. The assertion of the immediate dependence of the world upon God calls for the elimination of those active principles which for the scholastics mediated between God and nature. This in turn, paradoxically, led to the disenchantment of nature. The idea of a divine legislator whose rule is directly imposed upon matter underpins the very idea of laws of nature, central to the development of modern science.[46] The insight that this view of the radical dependence of the world on God

played this important role is thus basically correct.[47] The association of this position with voluntarism and empiricism, however, is confused.

A second paradoxical consequence of this view is that the assertion that the world is 'contingent' (in the sense of being directly dependent on the will of God) will on most understandings of the divine nature yield the view that there are no contingent events in the world (in the sense of 'contingent' which opposes it to 'necessary'). If God's will is considered immutable, as it most usually was, then this immutability will guarantee the causal necessity of everything which takes place in nature. Martin Luther, for example, insisted that "All things happen by necessity". This is because God "forsees, purposes, and does all things by an immutable, eternal, and infallible will".[48] As we shall see, this implication was widely recognized in the seventeenth century, and was used to legitimate both deductive and inductive approaches to the natural world. The lawfulness of the cosmos could only be guaranteed, however, on the assumption of a Deity whose willing was in fact constant and immutable. Some have suggested that it is precisely this assumption of divine immutability that voluntarists rejected. In this caricatured view, voluntarism requires that God's willing is at times arbitrary, capricious, and variable. While God usually operates in a rational predictable fashion, exercising his 'ordained power', at times he breaks through the ordained order of events in an exercise of 'absolute power'.

3. THE ABSOLUTE AND ORDAINED POWERS OF GOD

Advocates of the link between voluntarism and early-modern science often identify voluntarism with a specific interpretation of the medieval distinction *potentia dei absoluta et ordinata* — a distinction between God's absolute power and God's ordained power.[49] In its classical formulation, as found for example in Aquinas, the medieval power distinction helped preserve divine omnipotence in an ordered cosmos.[50] Thus, while God considered in terms of his absolute power might have instituted any number of states of affairs, in fact he had ordained only the present one. Understood in this sense, God's absolute power (*potentia absoluta*) was never exercised, it represented only a range of theoretical possibilities that God might have actualized, but did not. Everything that took place in the world, including the unusual and miraculous, took place as a consequence of God's ordained power (*potentia ordinata*).[51] Some later medieval thinkers, it is claimed, came to understand the distinction in a different way. For them, it was an implication of divine omnipotence that God would not be limited by the particular order he had ordained. In other words, God reserved for himself the possibility of cutting across the ordained order of events through an exercise of his absolute power. Thus, in contrast to *classical* understanding of the distinction, this *operationalized* understanding is said to be typical of certain late medieval voluntarists.

Early modern voluntarists, it is argued, also subscribed to this operationalized understanding of the absolute power of the Deity. The absence of the medieval terminology from the writings of early-modern natural philosophers is usually

accounted for by claiming that they substituted for the scholastic expression the terms 'ordinary' and 'extraordinary providence'. Eugene Klaaren's *Religious origins of modern science*, for example, has an extensive section on "The development of a voluntarist theology of creation" in which he stresses the influence of the medieval power distinction on the subsequent development of voluntarism:

> Yet because of His absolute power God could suspend His ordinary work, the contingency of the creation was at once established and dramatically reinforced by the dialectic of His *potentia ordinata* and *absoluta*.... The *potentia absoluta* became God's power to reverse the natural order in miracles, for example. God was not held to be obliged to obey natural or moral law, and creation itself, including its order, came to be regarded as miraculous.[52]

The power distinction, writes Klaaren, while never explicitly mentioned by English writers, was nonetheless "often articulated as ordinary and extraordinary Providence".[53]

The view that the medieval power distinction reappears in the modern period under the guise of the distinction between ordinary and extraordinary providence is supported by J. E. McGuire, Betty Dobbs, Francis Oakley, and others. McGuire, for example, claims that "there is abundant evidence to show that seventeenth-century thinkers adhered to [this distinction] which we can trace to the thought of William of Ockham". Seventeenth-century writers, he notes, "usually characterize this distinction by referring to God's extraordinary and ordinary concourse".[54] Reformation voluntarism, agrees Dobbs, "produced discussions of *potentia dei ordinata et absoluta* that continued throughout the seventeenth century, often under the rubric of 'ordinary' and 'extraordinary providence'".[55] Francis Oakley likewise suggests that the equivalent distinction is found in the seventeenth-century expression "ordinary and extraordinary providence".[56] Oakley also notes that the distinction was important for Newton and his contemporaries, citing Dobbs to this effect: "there appears to be a growing disposition amongst historians of science to embrace the idea that 'the theological framework of *potentia dei absoluta et ordinata* guided Newton and many of his contemporaries when they inquired into the relationship between God and the world'."[57]

Most proponents of the voluntarism and science thesis identify the Protestant Reformers as the conduit through which the operationalized version of the power distinction found its way into the modern age. This, then, becomes a component of the more general thesis which associates Protestantism (or Puritanism) with the rise of modern science. Voluntarism, according to Klaaren, entered the English theological tradition owing to the influence of Calvin.[58] The power distinction, says Betty Dobbs, "was restated by Luther, Zwingli, and Calvin, among the great reformers, elaborated in England by both Puritan and Anglican divines and by members of the Royal Society as well".[59] Francis Oakley likewise suggests that restatements of this distinction were common amongst puritan writers (although not in Calvin himself).[60] In sum, a common view about early-modern science and voluntarism is that seventeenth-century voluntarism relies on an operationized

version of the power distinction expressed in the terminology of 'ordinary' and 'extraordinary providence', and that this view has its historical precedents in late medieval nominalism and in reformation theology.

Close attention to the history of the power distinction, however, makes much of this difficult to sustain. With regard to the specific views of all of those medieval thinkers enrolled in the ranks of the voluntarists, and in particular on the question of who exactly subscribed to an operationalized understanding of the power distinction, it is perhaps sufficient to point out that the commentators remain divided. Oakley, for example, reads Ockham's position thus: "It is true that, of his ordained power (*potentia ordinata*) God condescends to work within the framework of the moral law which he has already established, and to which right reason is the infallible guide, but of his absolute power (*potentia absoluta*), by which he can do anything that does not involve a manifest contradiction, he could abrogate that order entirely."[61] This view was in keeping with the readings of such commentators as Gordon Leff and Irwin Iserloh, for whom God's absolute power could operate within the present order, thus threatening to suspend or nullify the ordained state of affairs on any occasion.[62]

This, however, is by no means the only reading of the medieval voluntarists. William Courtenay writes that the meaning of the medieval power distinction "has been frequently misunderstood". According to Courtenay, Ockham's use of the distinction of the powers of God is a natural outgrowth of the thirteenth-century use, not a contradiction of it. The same is true, he argues, for later 'nominalists' for whom "the distinction excludes the idea of a capricious arbitrary God who might change his mind and reverse the established laws that obtain in the orders of nature and salvation".[63] It is precisely the possibility of such a reversal of established laws that those who link an operationized absolute divine power with early-modern voluntarism wish to allow for, often on the mistaken assumption that only this position allows for miracles.

It might be argued that the stance of fourteenth- and fifteenth-century nominalists is not directly relevant to the seventeenth century. Even if they did not adhere to an operationalized understanding of the power distinction, it might still be the case that the Reformers or later natural philosophers so misinterpreted them, or came independently to this understanding. However, if this were so, the thesis of an historical continuity would need to be abandoned. In any case, there is little evidence that either the Reformers or those natural philosophers who might have been influenced by them adhered to an operationalized understanding of the power distinction either. Thus, in spite of the fact that Calvin is frequently cited as one of the conduits through which the medieval power distinction found its way into early-modern thought, the Protestant Reformer explicitly rejected the notion of an operationalized absolute power on a number of occasions. For Calvin, such a notion was identified with the excesses of scholasticism: "with reference to the sentiments of the Schoolmen concerning the absolute or tyrannical will of God, I not only repudiate, but abhor them all, because they separate the justice of God from his

ruling power."[64] This hostility toward the notion of a presently active absolute power is repeated in the *Institutes*: "we do not advocate the fiction of 'absolute might'; because this is profane, it ought rightly to be hateful to us. We fancy no lawless god who is a law unto himself."[65] The situation with Luther is less clear, since he made only veiled references to the distinction. A general impression can be gleaned from his writings, however. In his comments on the *Sentences* of Peter Lombard, he rails against philosophers' "frivolous and useless distinctions about the divine nature".[66] The conclusion reached by Richard Desharnais, who has made a study of the medieval power distinction and the thought of Luther, is this: "Luther has definitely and clearly divorced himself from traditional scholasticism and in particular he urges his confreres to cease from following the lead of those who insist on guiding their thought according to the classic distinction between the divine absolute and ordained power."[67] None of this is suggestive of endorsement of an operationalized version of the power distinction on the part of the most influential of the Protestant reformers.

Subsequent Calvinist thinkers were also reluctant to make much of the distinction. Oakley himself notes that neither Calvin nor his friends and followers looked favourably upon the scholastic discussion, and that if it were allowed, it was always in the benign sense espoused by Aquinas.[68] While I have not conducted an exhaustive survey of Calvinist theologians on this issue, amongst those whom I have examined, none advocates a God who presently exercises absolute power. William Perkins, one of the most influential Puritan Divines of the late sixteenth century, sets out the classical understanding of God's operations in the world. God's power may be distinguished into "absolute and actuall", the former being "that by which hee can doe more then hee either doth or will doe", the latter, that "by which hee causeth all things to be, which he freely will".[69] God's actual power is thus *freely* willed, and his absolute power not exercised at all. William Ames, another Divine with impeccable puritan credentials, sets out the power distinction in a similar way: "Absolute power is that whereby God is able to doe all things possible, *although they never shall be* ... the ordinate power of God is that whereby he not only can doe that which he will, but also in very deed doth actually do whatsoever he will."[70]

Such sentiments are also reflected in the article on "God's Eternal Decree" in the Westminster Confession which states that "God from all eternity, did, by the most wise and holy counsel of His own will, freely, and unchangeably ordain whatsoever comes to pass".[71] One of the key terms here is "unchangeably" — the divine nature is immutable and what God wills does not alter from all eternity. It is also significant that what God *ordains* is equated with the Divine *decree*. In other words, the Calvinist vocabulary of 'decree' and 'election' are to do with God's ordained power, not his absolute power, as is often assumed to be the case. This may thus be a voluntarist position in the weak sense that anything that happens does so as a result of God's freely willing it, but this does not require any exercise of *potentia dei absoluta*.[72]

A possible source of confusion here is the term 'arbitrary', frequently used by Calvinists in reference to God's will or to the divine decree. The exercise of an arbitrary will is clearly redolent of the notion of a Deity wielding absolute power in a way not bound by any lawful considerations. The frequent references we encounter in the seventeenth-century literature to God's 'arbitrary' decree make it sound rather as if the divine manner of operation is capricious, random, even irrational. In short, this sounds like the vocabulary of an operationalized version of the power distinction. However, we are influenced by recent connotations of the word. 'Arbitrary' in this context denotes the fact that the decision is made by God's free choice. In these matters God is the arbiter, and is not bound by considerations external to him.[73] Thus Hobbes: "arbitrary, namely, to depend on the will of the legislator."[74] God's will or decree is arbitrary in the sense that it is the source of moral or natural law. The Cambridge Platonist Ralph Cudworth, a strong opponent of voluntarism, who denied that moral truths depend solely on God's will, could nonetheless speak without embarrassment of the "arbitrary will and pleasure of the Deity".[75] 'Arbitrating' will might be a better expression for late modern minds, for what is usually meant in this context is that God's will is the source of the laws.

When we turn to another question of terminology we also discover that the commonplace amongst historians of seventeenth-century science — that at this time the operationalized version of the power distinction came to be synonymous with the distinction between God's extraordinary and ordinary providence — is not supported by any direct evidence. On the contrary, a number of writers who invoke the power distinction proceed to make a further, and separate distinction between ordinary and extraordinary providence.

Thus some Puritan writers make reference to the two sets of distinctions, making it clear that they were not merely different verbal descriptions of the same thing. As we have already noted, William Ames distinguishes between *potentia dei absoluta* and *ordinata* in his discussion of the attributes of God. Subsequently, however, he proceeds to make a further distinction between two types of divine providence: "The Providence of God is either Ordinary and usuall, or Extraordinary and unusuall." The "ordinary providence" of God, Ames explains, is "that order in things which was appointed from the beginning ... the Law of nature ... arising from the force and efficacy of that never to bee revoked Word of God given in the beginning".[76] "Extraordinary providence is that whereby God provideth for things beyond the usuall, and appointed order of them, in which manner whatsoever is effected, is ... called a Miracle. A Miracle is an operation above the order appointed."[77] The reasonable conclusion is that for Ames these two sets of distinctions refer to quite different things, with both ordinary and extraordinary providence falling within *potentia dei ordinata*.

John Norton, another Divine of strong Calvinist convictions, also makes two sets of distinctions: "The power of God is either absolute, and unlimited; by it he is able to do all things that are possible, though he never do them: or ordinate, and

limited by his Decree, and revealed Will: according to which God having freely bounded himself, changeth not, being immutable.... Though God can do whatsoever he pleaseth, yet God is not pleased to do whatsoever he can."[78] Norton goes on to point out that God's ordinary and extraordinary providence fall within his ordained power, limited by his decree: "God before time by one free, Eternal, and constant immanent Act, decreed the futurition of all things: so God in time, by many transient Acts, doth exactly execute the same." Providence, Norton goes on to explain, is means by which God upholds the created order in keeping with his original decree, that is "the immutable counsel of his own Will". Ordinary and extraordinary providence, likewise, fall within this original plan: "God ordinarily governeth the creature according to the Law of Nature; extraordinarily, according to his good pleasure, above the course of nature; *i.e.* answerable to the Decree, but not according to the Law of Nature, as in the case of Miracles and Monsters."[79]

The jurist Matthew Hale also uses the terms 'ordinary' and 'extraordinary' in a manner that seems redolent of voluntarism and an operationalized absolute power. "The Will of the First Cause is the Cause of all beings and operations in the World", he insists. The "Course of Nature", moreover, may be interrupted: "Hence it is that extraordinarily the Ordinary Rule of Nature intermitted." Yet for all this, Hale insists that "in reality there is nothing in the World Contingent, because every thing that hath bin, is, or shall be, is praedetermined by an Immutable Will of the First Being", that is, by what God ordains.[80] There is, in short, an immutably ordained pattern of events which includes those events in which the ordinary course of nature is interrupted. This seems to have been the position adopted by many philosophers of the late seventeenth century.[81] For each of these thinkers it is the "law of nature" or "ordinary course of nature" together with the unusual or extraordinary that comprise the totality of God's ordained plan. Hale also reinforces the point that the direct reliance of nature on the will of God means that there can be no genuinely contingent events.

> All of this suggests that common claims about voluntarism and early-modern natural philosophy are seriously mistaken on at least three counts. First, Calvin and Luther played no positive role in the transmission to modernity of the medieval view about the divine powers. Second, where the power distinction was employed in the seventeenth century, it was employed in the classical sense. Third, the power distinction was not considered equivalent to the distinction between ordinary and extraordinary providence.

It is not unreasonable to inquire why, if the distinction between God's ordinary and extraordinary providence did not arise out of the earlier medieval distinction, it was used at all. The simple explanation is that an account of divine operations was required in which provision could be made for the miraculous. It was this that had been absent from the medieval power distinction, and which arguably led to the distortions of later scholasticism. William Courtenay thus writes of the medieval power distinction that "What was needed and what was attempted but never fully

developed in the thirteenth and fourteenth centuries was a subdistinction within *potentia ordinata* between the total ordained will of God ... and *potentia ordinata* as it is expressed in specific laws (*lex ut nunc*) which have been altered or suspended from time to time, thus creating a home within *potentia ordinata* for the forordained but miraculous activity of God".[82] The seventeenth-century categories of ordinary and extraordinary providence provided just such a distinction — and this is seen most clearly in Norton's analysis — but it was one that applied within the context of God's ordained power, or to use the forensic terminology of the Calvinists, within the boundaries of God's 'eternal decree'. It is important to understand that merely by allowing for the possibility of miraculous interventions, seventeenth-century thinkers were not thereby suggesting the exercise of God's absolute power, despite many commentators reading them thus. After all, if the created order were under God's immediate control, there could be no objective difference between the course of nature and a miraculous 'intervention'. For a number of seventeenth-century natural philosophers 'laws of nature' were thus human constructions, approximations of the general divine plan that God had ordained.[83]

4. VOLUNTARISM, NATURAL THEOLOGY, AND THE SEVENTEENTH-CENTURY NATURAL PHILOSOPHERS

If it is granted that there were no thinkers in the seventeenth century who were voluntarists in the sense that they allowed for the present exercise of God's absolute power, and if it is further granted that virtually all seventeenth-century thinkers held that the creation was, in important ways, dependent on the will of God, the question can still be asked, notwithstanding Descartes, whether most of those committed to experimental philosophy were voluntarists in the sense that they considered God's creative will not to have been determined by his goodness and wisdom. In this section I will briefly offer considerations from which it can be inferred that Gassendi, Barrow, Boyle, and Newton were not voluntarists in at least one important sense. This discussion is not intended to set out the definitive positions of these individuals with regard to voluntarism, for this task is beyond the immediate scope of this paper. However, what follows should at least establish the necessity for a reexamination of the standard reading of these individuals on this question.

Much of the evidence for the putative voluntarism of Gassendi, Barrow, Boyle, and Newton is that they spoke frequently about the dependence of the creation on the will of God. As we have seen, there is nothing distinctively voluntarist about such a position. Once we discount use of the vocabulary of ordinary and extraordinary providence, there seems to be little in the expressed theological convictions of these individuals that stands out as evidence of a voluntarist commitment. On the contrary, we occasionally find statements clearly indicative of intellectualism, at least with regard to God's willing of moral laws. In the writings of Isaac Newton, perhaps the most prominent of the early moderns claimed as an exemplar of the voluntarism and science thesis, we encounter what appear to be indications of an intellectualist position.[84] In the unpublished manuscript "On the Church",

Newton refers to the laws of love of God and love of neighbour, as "the laws of nature, the essential part of religion which ever was and ever will be binding to all nations, being of an immutable eternal nature *because grounded upon immutable reason*".[85] This is an unmistakably intellectualist position, similar to that espoused by Cudworth. It is significant that the Newtonian theologian Samuel Clarke similarly urged such a view against the Cartesian position, insisting that "God's laws" are "founded upon the same immutable *reasons*".[86] It would follow that moral rules would be discernible through reason, and indeed this is Newton's position: "our duty towards Him, as well as that towards one another, will appear to us by the light of nature."[87] Other 'voluntarists' expressed similar views. Robert Boyle, whose position is admittedly more ambiguous than Newton's, insisted on at least one occasion that God had "regulated" his omnipotence by his "boundless wisdom" and that he had done "nothing without weighing reasons".[88] Walter Charleton, usually associated with the voluntarist clique, seemed to subscribe to a similar view: God is "a Rector General, or Supervisor, whose Will receives laws from his Wisdome, and gives them to all besides himself".[89] Inasmuch as all these statements suggest that God's willing of moral laws is governed by "reason" or "wisdom", they are indicative of intellectualism.

To direct evidence such as this, we can add two further considerations that make it unlikely that these natural philosophers would be inclined to the views of the medieval voluntarists. First, it is worth considering how, if the operations of nature are governed by God's arbitrary decree — arbitrary in the sense of capricious or random — a science of nature would be possible at all. This was precisely the (misplaced) objection Cudworth raised against the voluntarism of Descartes: "if the natures and essences of all things, as to their being such and such, do depend on a will of God that is essentially arbitrary, there can be no such thing as science or demonstration."[90] As far as requiring a commitment to empiricism goes, it can be said that experimentation might well determine how God chooses to operate on some occasions, but on the assumption of the ever present possibility of the exercise of absolute divine power would provide no guarantee that he would tend so to act on most occasions. The problem of induction poses a serious enough objection to empirical science as it is, without introducing into the equation a Deity who might act in nature in the most unpredictable way at any moment.[91]

Isaac Barrow responded to this question with the statement that the philosopher ought to accept any proposition "confirmed with frequent Experiments as universally true, and not suspect that Nature is inconstant, and the great Author of the universe unlike himself".[92] Barrow's position is that while God's will directs natural bodies, we can be assured on account of God's immutability that nature's operations will always be regular. The problem of induction is thus solved for Barrow, and I suspect his contemporaries, on theological grounds relating to the immutability of God. Again, this also was the view of Descartes, who had anticipated the objections of Cudworth, noted above.[93] The fact that God is in direct control of the operations of nature thus provides a greater guarantee of the regularity of nature than when

nature had been governed by immanent powers and countless intermediaries.[94] This response illustrates why Barrow and Newton could retain confidence in a programme for the mathematization of nature, for the apparently necessary character of mathematical laws would simply be a function of immutability of the Deity.[95]

It is also significant that voluntarism, at least in its late medieval manifestations, counted against the possibility of a natural theology, given that resort must be had to special revelation and divine grace rather than reason. This view was also promoted by the reformers. Thus Luther: "A wisdom which sees the invisible things of God in works as perceived by man is completely puffed up, blinded, and hardened."[96] Yet natural theology is a primary motivation for the scientific pursuits of such purported voluntarists as Boyle, Barrow, and Newton.[97] Indeed the whole enterprise of physico-theology is premised upon that very possibility of discerning rational design in the cosmos which was called into question by earlier voluntarists. For theologically-motivated natural philosophers, the created order provided evidence not merely of the divine power, but also the divine wisdom and goodness.

Boyle, for example, never tires of informing his readers that nature displays "the Divine Architects Power, Wisdom, and Beneficence".[98] Barrow similarly argues that the visible frame of nature declares God's "chief and peculiar attributes of wisdom, goodness, and power, superlative".[99] None of this would have been possible, had not God's goodness and wisdom informed his creative will, for otherwise these divine qualities would not be evident in natural objects and in the laws of the universe. If nature were the product of a capricious and arbitrary (in our sense of the word) will, the physico-theological project would have been doomed from the outset. More radical medieval voluntarists were thus suspicious of the claims of natural theology, and asserted that the only legitimate source of knowledge of the divine nature was special revelation. Such a standpoint would hardly have been hospitable to the motivations and theological commitments of early modern natural philosophers.

In short, some purported voluntarists explicitly state that the divine will is informed by reason and goodness. Others imply it, for the primary justification for the pursuit of natural philosophy in the seventeenth-century — that such an enterprise conferred knowledge of the divine nature — is not consistent with the view that nothing of the divine wisdom and goodness is communicated through the creative acts of God. This logic could hardly have escaped such proponents of a natural theology as Barrow, Boyle, and Newton.

CONCLUSION

It should by now be apparent that the postulated link between voluntarism and empirical natural philosophy simply cannot be sustained. We can clearly identify voluntarists who were not empiricists, and empiricists (a number of whom are often mistakenly labelled voluntarists) who were intellectualists. The idea that a contingent natural order will call for empirical investigation is problematic, if by

'contingent' is meant 'dependent', for the direct dependence of the world on the will of an immutable Deity is likely to lead to a view that there are no genuine contingencies in nature. That early-modern voluntarists took their cue from those medieval thinkers who advocated an operationalized absolute power of God or from Luther and Calvin is simply wrong, and the physico-theological commitment of natural philosophers is difficult to square with their putative voluntarism. In all of this, the term 'voluntarist' is used to characterize such a range of positions that it, too, has probably outlived its usefulness, at least as it functions as a descriptor in this particular discussion. The voluntarism and science thesis should be abandoned.

Having said this, there are some important insights in the thesis that are worth preserving. Oakley's original intuition about the development of the concept of natural laws is basically correct. The emergence of the idea of a divine legislator who directly rules the creation seems to have played an important role in the formation of the notion of 'laws of nature'. However, this idea was not a specifically voluntarist notion, and ironically it was the rationalist Descartes who made a major contribution here.[100] The point at which a number of interpreters of early modern natural philosophy have gone astray in discussions of laws of nature is on the issue of the miraculous. Many commentators have assumed that in order to preserve the integrity and lawfulness of the realm of nature on the one hand, while allowing for the possibility of miracles on the other, seventeenth-century thinkers resorted to the distinction between two types of divine activity, 'ordinary' and 'extraordinary', which corresponded respectively to God's ordained and absolute power, the realm of natural philosophy being the former. Most of the so-called voluntarists did indeed recognize a distinction between ordinary and extraordinary providence but considered this difference to be a function of incomplete human knowledge. For a number of them, even miracles took place according to a preordained and lawful pattern, albeit a pattern that was difficult to discern. To put it another way, that miracles could not be fitted into a pattern of natural laws was a consequence of the limits of human understanding, not of any difference in the mode of divine operation. All of this was a direct implication of the view that God is the immediate cause of events.[101]

It is also possible to sketch an alternative account of theological influence on the development of experimental natural philosophy — one that takes as its point of departure the relative impotence of human cognitive powers. The Protestant reformers laid considerable emphasis on the limits of human knowledge, which for them were a consequence of the Fall. Thus it was not Calvin's contention that God's decrees were irrational, but rather that they were *unsearchable*. This does not imply a capricious absolute divine will, but one the determinations of which cannot be fully grasped by fallen human minds. The theological principle that is relevant here is to do with the hiddenness of God, not with what determines his will. As Calvin expressed it: "there is no erratic power, or action, or motion in creatures, but ... they are governed by God's secret plan in such a way that nothing happens except

what is knowingly and willingly decreed by him."[102] To assert the inscrutability of the divine will is to make a claim not about the nature of God, but the human intellect. The divine will is not in principle beyond reason: rather, fallen and finite human minds are incompetent to grasp its operations.

Suggestions of the weakness of human reason are common in the writings of seventeenth-century empiricists. Barrow, for example, followed Calvin in speaking of the hiddenness of the Deity, concluding that "many proceedings of God depend upon grounds inaccessible to our apprehension".[103] Boyle wrote that the system of the universe was "*as to us* arbitrarily establisht by God". But this is only an apparent arbitrariness, and has no implications for the divine nature. As Boyle quickly points out: "not that he created things without accompanying, & as it were regulating, his omnipotence, by his boundless wisdom; & consequently did nothing without weighing reasons: but because those reasons are a priori [unsearchable – deleted] discoverable by us." Boyle's point is not related to what determines the will of the Deity — clearly it is reason. But the reasons of certain acts of God are unknown on account of the limitations of "purblind mortals" who are at best "incompetent" judges of the ways of the Deity.[104] It is this that rules out the *a priori* approach to nature. Gassendi, too, believed that it is God's "general providence that establishes the course of nature and permits it to be served continuously". It follows, he insisted, that when any "wonderful effects are observed", these are merely divine causes that are "hidden from our skill and understanding".[105] This is where the real difference between Gassendi and Descartes lies. For Descartes, these laws are imprinted so indelibly on our understanding that even after the Fall they have not faded.[106] For Gassendi, the real mode of operation of at least some of those laws is simply beyond our skill and understanding. Considerations such as these, if pursued in more detail, might provide the basis for an alternative account of the influence of theological ideas on the development of modern empiricism.[107] What now seems certain is that theological voluntarism is not a viable candidate for that role.

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2. Francis Oakley, "Christian theology and the Newtonian science: The rise of the concept of laws of nature", *Church history*, xxx (1961), 433–57, p. 438.
3. J. E. McGuire, "Boyle's conception of nature", *Journal of the history of ideas*, xxxiii (1972), 523–42; Eugene Klaaren, *Religious origins of modern science* (Grand Rapids, 1977); Peter Heimann, "Voluntarism and immanence: Conceptions of nature in eighteenth-century thought", *Journal of the history of ideas*, xxxix (1978), 271–83; Betty Jo Teeter Dobbs, *The Janus faces of genius: The role of alchemy in Newton's thought* (Cambridge, 1991); Margaret Osler, *Divine will and the mechanical philosophy: Gassendi and Descartes on contingency and necessity in the created world* (Cambridge, 1994). See also J. Henry, "Henry More versus Robert Boyle", in *Henry More (1614–87): Tercentenary essays*, ed. by Sarah Hutton (Dordrecht, 1990), 55–76; James E. Force and Richard H. Popkin, *Essays on the context, nature, and influence of Isaac Newton's theology* (Dordrecht, 1990); Antoni Malet, "Isaac Barrow on the mathematization

of nature: Theological voluntarism and the rise of geometrical optics", *Journal of the history of ideas*, lviii (1997), 265–87; Margaret Osler, "Fortune, fate, and divination: Gassendi's voluntarist theology and the baptism of Epicureanism", in *Atoms, pneuma, and tranquility: Epicurean and Stoic themes in European thought*, ed. by Margaret Osler (Cambridge, 1991); *Idem*, "The intellectual sources of Robert Boyle's philosophy of nature", in *Philosophy, science, and religion, 1640–1700*, ed. by Richard Ashcroft, Richard Kroll and Perez Zagorin (Cambridge, 1991); "Divine will and mathematical truths: Gassendi and Descartes on the status of eternal truths", in *Descartes and his contemporaries*, ed. by Roger Ariew and Marjorie Grene (Chicago, 1996), 145–58.

4. John Bossy, "Thinking with Clark", *Past and present*, clxvi (2000), 242–50, p. 244.
5. Thus Oakley: "from Ockham's fundamental insistence upon the omnipotence and freedom of God follows, not only his ethical and legal voluntarism, but also his empiricism" ("Christian theology and the Newtonian science" (ref. 2), 442). Foster also makes this logic explicit in "Creation and the rise of science" (ref. 1), 311.
6. Francis Suárez, *De legibus, ac Deo legislatore* (1612), I.v.8, in *Three works of Francis Suárez*, ed. by James Scott (2 vols, Washington, 1944), i, 26f.
7. These medieval thinkers did not designate themselves 'voluntarists', neither did their early-modern successors. Until quite recently, 'voluntarism' has meant 'doxastic voluntarism' — the view according to which choice plays a significant role in belief. This position is contrasted with 'evidentialism', according to which belief is determined by evidence. *Theological* voluntarism in this sense is another term for fideism. See, e.g., *Belief, cognition and the will*, ed. by Anthonie Meijers (Tilburg, 1999). The article "Voluntarism" by Richard Taylor in *The encyclopaedia of philosophy* associates this view with Ockham and Kierkegaard and notes that voluntarism is associated with "various forms of fideism". *Encyclopaedia of philosophy*, ed. by Paul Edwards (8 vols, New York, 1967), viii, 271. Also stressing the link with fideism, the more recent *Cambridge dictionary of philosophy* (1995) offers this definition of "theological voluntarism": "A special case of doxastic voluntarism ... which implies that religious belief requires a substantial element of choice; the evidence alone cannot decide the issue. This is a view that is closely associated with Pascal, Kierkegaard, and James." *Cambridge dictionary of philosophy*, ed. by Robert Audi (Cambridge, 1995), *s.v.* "Voluntarism", 845a.
8. Osler, *Divine will* (ref. 3), 17. Elsewhere, however, Osler defines intellectualism as "the view that there are some elements of necessity in the creation" (p. 11). This is a presumed implication of intellectualism, rather than a definition of it.
9. Plato, *Euthyphro* 10a.
10. Foster, "Creation and the rise of science" (ref. 1), 311.
11. In an article also critical of the voluntarism and science thesis, Edward B. Davis makes a good case that Galileo, too, is an important exception to the voluntarism and science thesis. "Christianity and early modern science: The Foster thesis reconsidered", in *Evangelicals in historical perspective*, ed. by David N. Livingstone, D. G. Hart and Mark A. Noll (Oxford, 1999), 75–95. Davis points out that Galileo was clearly not averse to experimentation, yet expressed little interest in speculations about the divine will. He posited the existence of at least some necessary relations in nature, stressing that natural truths must follow "necessarily, in such a way that it would be impossible for them to take place in any other manner". *Dialogue concerning the two chief world systems*, transl. by Stillman Drake (Berkeley, 1953), 406. Elsewhere he insisted that mathematical demonstrations could be produced only for properties that are "eternal and necessary". *Discourses on the two new sciences*, transl. by Stillman Drake (Madison, 1974), 13.
12. Descartes to Mersenne, 15 April 1630, in *The philosophical writings of Descartes*, transl. by J. Cottingham *et al*. (3 vols, Cambridge, 1984–??), iii, 23.

13. *Ibid*., iii, 23.
14. Descartes, *Objections and replies*, *ibid*., ii, 29.
15. Osler, *Divine will* (ref. 3), 11, 146–52.
16. Thomas Aquinas, *Summa theologiae* 1a. 44, 4; 1a 65, 2; 1a. 103, 1.
17. The *Dictionnaire de théologie Catholique* identifies Descartes as a voluntarist and a case is made for the direct influence of scholastic voluntarism on Descartes. Texts of Duns Scotus, Gabriel Biel, and Jean Gerson are placed side by side with Descartes's declarations of voluntarism, such that the case for a direct influence is difficult to deny. *Dictionnaire de theologie Catholique* (Paris, 1941), xv, cols. 3313f. (*s.v*. "Volontarisme, en Dieu").
18. Doxastic voluntarists hold that belief is an act of the will. This appears to be the sense in which the expression is used in the *New Catholic encyclopaedia*, which sets out the lineage of voluntarist philosophers beginning with Augustine and progressing through Scotus and Pascal to Kant. The state of play in the early modern period is represented thus: "The voluntaristic Christianity of Blaise Pascal was set in opposition to the rationalistic humanism of René Descartes." *New Catholic encyclopaedia* (New York, 1967), xiv, *s.v*. "Voluntarism".
19. The Cambridge Platonist Ralph Cudworth, for example, contested Descartes's claim that "moral good and evil" and "the essences of things depend upon an arbitrary will in God", asserting the intellectualist position that the divine will was "guided and determined by wisdom and truth". *Treatise concerning eternal and immutable morality* with *A treatise of freewill*, ed. by Sarah Hutton (Cambridge, 1996), 22, 24, 26. Interestingly, Oakley also notes that Cudworth regarded Descartes as "one of the principal advocates" of voluntarism. "Christian theology and the Newtonian science" (ref. 2), 441. See also Leibniz: "However, we should not imagine, as some do, that since the eternal truths depend on God, they are arbitrary and depend on his will, as Descartes appears to have held, and after him Mr. Poiret." G. W. Leibniz, *The principles of philosophy, or, the monadology*, 46, in *Philosophical essays*, ed. and transl. by Roger Ariew and Daniel Garber, (Cambridge, 1989), I.29, 218. Boyle also regarded Descartes as a voluntarist and Peter Anstey goes so far as to suggest that Boyle's own voluntarism (if he is so to be characterized) was possibly a consequence of Cartesian influence. Peter Anstey, 'The Christian Virtuoso and the Reformers: Are there Reformation roots to Boyle's natural philosophy?', forthcoming; Boyle, *Some considerations about the reconcileableness of reason and religion* (London, 1675), 25f. *Cf*. Robert Desgabets, *Supplément à la philosophie de M. Descartes*, Opuscule 6, in *Oeuvres philosophiques* (Amsterdam, 1983), 249; Susan James, "Reason, the passions, and the good life", in *The Cambridge history of seventeenth-century philosophy*, ed. by Daniel Garber and Michael Ayers (2 vols, Cambridge, 1998), ii, 1358–96, p. 1371.
20. See, e.g., John Schuster, "Descartes *opticien*", in *Descartes' natural philosophy*, ed. by S. Gaukroger, J. Schuster and J. Sutton (London, 2000), 258–312, and "Descartes and the scientific revolution, 1618–1634", Ph.D. Diss., Princeton University, 1977, esp. pp. 622–47; Martha Bolton, "Universals, essences, and abstract entities", in *Cambridge history of seventeenth-century philosophy* (ref. 19), i, 178–211, p. 197; John Etchemendy, "The Cartesian circle: Circulus ex tempore", in *Studia cartesiana* (Amsterdam, 1981), ii, 5–42, esp. pp. 32–39; Geneviève Rodis-Lewis, "Polémiques sur la création des possibles et sur l'impossible dans l'école cartésienne", in *Studia cartesiana* (Amsterdam, 1981), ii, 105–23; T. M. Lennon, "Pandora: or essence and reference", in *Descartes and his contemporaries*, ed. by Ariew and Grene (ref. 3), 159–81, p. 180; Jean-Luc Marion, *Sur l'ontology grise de Descartes* (Paris, 1981), 220; "Volontarisme, en Dieu" (ref. 17). This brief list shows that the identification of Descartes as a voluntarist is not a peculiarity of Anglo-American interpreters who are of analytical persuasion, as Osler suggests, *Divine will* (ref. 3), 146.
21. Descartes to Mersenne, in *Philosophical writings* (ref. 12), iii, 23.
22. Descartes, *The world*, in *Philosophical writings* (ref. 12), i, 97.

23. It is possible to think of Descartes expressing, somewhat vaguely, a doctrine of iterated modalities, which distinguishes necessary truths about necessary beings from necessary truths about contingent beings. For this, and alternative readings see E. M. Curley, "Descartes on the creation of eternal truths", *The philosophical review*, xciii (1984), 569–97; Harry Frankfurt, "Descartes on the creation of eternal truths", *The philosophical review*, lxxxvi (1977), 36–57; Thomas M. Lennon, "The Cartesian dialectic of creation", in *Cambridge history of seventeenth-century philosophy* (ref. 19), i, 331–62.
24. Robert Fludd, *Apologia compendiaria*, in *Robert Fludd: Essential readings*, ed. by William Huffman (London, 1992), 46.
25. Robert Boyle, *Some considerations touching the usefulness of natural philosophy*, in *The works of the honourable Robert Boyle*, ed. by Thomas Birch (6 vols, London, 1722), ii, 1–246, p. 61.
26. Bacon, *A new organon*, 1.65, in *The works of Francis Bacon*, ed. by James Spedding, Robert Ellis and Douglas Heath (14 vols, London, 1857–74), iv, 66. *Cf. Advancement of learning*, ed. by Arthur Johnston (Oxford, 1974), II.xxv.16 (pp. 207f.).
27. Pierre Poiret, *L'oeconomie divine* (Amsterdam, 1687); English translation, *The divine economy; or, an universal system of the works and purposes of God* (6 vols, London, 1713). See T. M. Lennon's discussion of Poiret's position in "The Cartesian dialectic of creation", in *Cambridge history of seventeenth-century philosophy* (ref. 19), i, 349–50.
28. Boyle, for example, allowed some role for divine inspiration, albeit combined with the necessary experimental labours. He thought that from time to time God had inspired "Heroicke Spirits" who wrought some required revolution in theology or natural philosophy. *Usefulness of natural philosophy*, in *Works* (ref. 25), ii, 61. Boyle also thought that corpuscularian philosophy was "knowable by the light of nature, improved by the information of the scriptures". *The excellency of theology,* in *Works* (ref. 25), iv, 18. Henry More had for a time thought Descartes to have been divinely inspired, and considered the Cartesian philosophy to have been a restatement of the "physiology" which Moses had recorded in the book of Genesis. *A defence of the three-fold cabbala*, in *A collection of several philosophical writings* (London, 1662), 79–104. Part of the background to these ideas was the view, widespread during the Middle Ages and Renaissance, that Adam had enjoyed an encyclopaedic knowledge of nature. The task of the sciences was to re-establish this knowledge. Adamic science was presumably of contingent truths yet was unlikely to have been accumulated through the methods of empirical research, making divine inspiration the most likely source of his knowledge. Thus Aquinas: "The first man had knowledge of all things by divinely infused species." *Summa theologiae* 1a. 94, 3.
29. Hence Aquinas used 'necessary' in a number of different senses. See J. J. MacIntosh, "Aquinas on Necessity", *American Catholic philosophical quarterly*, lxxii (1998), 371–404.
30. Since Aristotle the relationship of contingency to other modal properties has been somewhat confused. See *Cambridge dictionary of philosophy*, *s.v.* "contingency". It is also helpful to distinguish between various forms of 'logical' necessity and 'nomic' necessity, the former being knowable *a priori*, the latter which are to do with laws of nature, are knowable through induction. On nomic necessity see D. M. Armstrong, *What is a law of nature?* (Cambridge, 1983). Finally there is 'metaphysical' necessity which is stronger than nomic necessity but distinguishable from logical necessity in that metaphysically necessary propositions (e.g., "Water is H_2O"), despite being true in all possible worlds, can only be known *a posteriori*. See Saul Kripke, *Naming and necessity* (Cambridge, Mass., 1980). While seventeenth-century thinkers did not trouble themselves with metaphysical necessity, there was some understanding of the difference between logical and nomic necessity. Malebranche's occasionalism arose out of his view that nomically necessary relations were actually logically necessary, because only in the case of God is it impossible to conceive of his willing something and that something not

eventuating. See Steven Nadler, "Malebranche on causation", in *The Cambridge companion to Malebranche*, ed. by Steven Nadler (Cambridge, 2000), 112–38. Hume was subsequently to deny that laws of nature were in any genuine sense necessary.

31. Dobbs, *Janus faces of genius* (ref. 3), 110.
32. Osler, *Divine will* (ref. 3), 11.
33. Pierre Gassendi, *Syntagma philosophicum*, in *Opera omnia* (6 vols, Lyons, 1658), i, 323; Osler, *Divine will* (ref. 3), 57.
34. Isaac Barrow, *The usefulness of mathematical learning explained and demonstrated*, transl. by John Kirby (London, 1734), Lecture VII, 109.
35. Isaac Barrow, "Maker of heaven and earth" (Sermon XII), in *Theological works* (3 vols, London, 1885), ii, 303.
36. Newton, MS Yahuda 21, fol. 1r. *Cf.*: "it must be agreed that God, by the sole action of thinking and willing, can prevent a body from penetrating any space defined by Certain limits." *Unpublished scientific papers of Isaac Newton*, ed. and transl. by A. Rupert Hall and Marie Boas Hall (Cambridge, 1962), 139. For the association of this view with Newton's voluntarism, see James Force, "Newton's God of dominion", in James Force and Richard Popkin, *Essays on the context, nature, and influence of Newton's theology* (Dordrecht, 1990), 85f., and E. B. Davis, "Newton's rejection of the Newtonian world view", *Science and Christian belief*, iii (1991), 103–17.
37. Samuel Clarke, "The evidences of natural and revealed religion", *The works of Samuel Clarke, D.D.* (2 vols, London, 1738), ii, 698.
38. William Whiston, *A new theory of the earth* (London, 1696), 6. Elsewhere Whiston states that the "Effects of Nature" are nothing but divine power "acting according to fixt and certain Laws" (p. 211).
39. Thus Aquinas: "God does not maintain things in existence by any new action, but by the continuation of the act whereby he bestows being." *Summa theologiae* 1a. 104, 1.
40. Descartes, *Objections and replies*, in *Philosophical writings* (ref. 12), ii, 293. This idea is repeated in a number of places: "In the beginning {in his omnipotence} he [God] created matter, along with its motion and rest; and now, merely by his regular concurrence [*concursum ordinarium*], he preserves the same amount of motion and rest in the material universe as he put there in the beginning" (*Principles of philosophy*, in *Philosophical writings* (ref. 12), i, 240); "For to occur 'naturally' is nothing other than to occur through the ordinary power of God, which in no way differs from his extraordinary power — the effect on the real world is exactly the same" (*Objections and replies*, in *Philosophical writings* (ref. 12), ii, 293); "This rule is based on the same foundation as the other two: it depends solely on God's preserving each thing by a continuous action, and consequently on his preserving it not as it may have been some time earlier but precisely as it is at the very instant that he preserves it" (*The world*, in *Philosophical writings* (ref. 12), i, 96); "But if there were any bodies in the world, or any intelligences or other natures that were not wholly perfect, their being must depend on God's power in such a manner that they could not subsist for a single moment without him" (*Discourse*, in *Philosophical writings* (ref. 12), i, 127).
41. Nicolas Malebranche, *Dialogues on metaphysics*, VII.8, transl. by Nicholas Jolley and David Scott (Cambridge, 1997), 113. *Cf. The search after truth*, transl. and ed. by Thomas Lennon and Paul Olscamp (Cambridge, 1997), 450.
42. Nicolas Malebranche, *Treatise on nature and grace*, transl. by Patrick Riley (Oxford, 1992), 162.
43. Heimann, "Voluntarism and immanence" (ref. 3), 273.
44. On the Cartesians and occasionalism, see Desmond Clarke, "Casual powers and occasionalism from Descartes to Malebranche", in *Descartes' natural philosophy* (ref. 20), 131–48; Daniel

Garber, "Descartes and occasionalism", in *Causation in early modern philosophy*, ed. by Steven Nadler (University Park, 1993), 9–26; Steven Nadler, "Occasionalism and the question of Arnauld's Cartesianism", in *Descartes and his contemporaries*, ed. by Ariew and Grene (ref. 3), 129–44; "Doctrines of explanation in late scholasticism and in the mechanical philosophy", 541, in *Cambridge history of seventeenth-century philosophy* (ref. 19), i, 513–52; Daniel Garber, "How God causes motion: Descartes, divine substance, and occasionalism", *Journal of philosophy*, lxxxiv (1987), 567–80.

45. Malebranche, *Dialogues* (ref. 41), 168.
46. On Descartes's contribution to this notion of laws of nature, see Theo Verbeek, "The invention of nature", in *Descartes' natural philosophy* (ref. 20), 149–67. See also Daniel Garber, "How God causes motion: Descartes, divine substance, and occasionalism", *The journal of philosophy*, lxxxiv (1987), 567–80; Hans van Ruler, "Minds, forms, and spirits: The nature of Cartesian disenchantment", *Journal of the history of ideas*, lxi (2000), 381–95.
47. Keith Hutchison has spoken in this context about a possible influence of the "radical supernaturalism" of the Protestant reformers. "Supernaturalism and the mechanical philosophy", *History of science*, xxi (1983), 297–333.
48. Martin Luther, *D. Martin Luthers werke: Kritische Gesammtausgabe* (Weimar, 1883–), xviii, 617, 615.
49. On the distinction and its history see Lawrence Moonan, *Divine power: The medieval power distinction and its adoption by Albert, Bonaventure, and Aquinas* (Oxford, 1994); Francis Oakley, "The absolute and ordained power of God in sixteenth- and seventeenth-century theology", *Journal of the history of ideas*, lix (1998), 437–61; *idem*, "The absolute and ordained power of God and king in the sixteenth and seventeenth centuries: Philosophy, science, politics, and law", *Journal of the history of ideas*, lix (1998), 669–89; William Courtenay, *Capacity and volition: A history of the distinction of absolute and ordained power* (Bergamo, 1990).
50. Aquinas is careful to stress, however, that the essential attributes of the Deity are not really distinct from one another or, to put it another way, that God and his essence are not distinct. *Summa theologiae* 1a. 3, 3; *cf.* 1a. 13, 4. Descartes says something similar, when he argues that the act by which God understands, wills, and brings about all things is one "perfectly simply act". *Principles* I, 23, in *Philosophical writings* (ref. 12), i, 200.
51. Aquinas, *Summa theologiae* 1a. 25, 5.
52. Klaaren, *Religious origins* (ref. 3), 35.
53. *Ibid.*, 48.
54. McGuire, "Boyle's conception of nature" (ref. 3), 526. *Cf.* Force, "Newton's God" (ref. 36), 85; Malet, "Isaac Barrow" (ref. 3), 270.
55. Dobbs, *Janus faces of genius* (ref. 3), 111.
56. Oakley, "Christian theology" (ref. 2), 448; and again in "The absolute and ordained power of God" (ref. 49), 452.
57. Oakley, "The absolute power of God and king" (ref. 49), 677f. Oakley gives his source as Dobbs, *Janus faces of genius* (ref. 3), 110. *Cf.* Force, "Newton's God" (ref. 36).
58. Klaaren, *Religious origins* (ref. 3), 39–52.
59. Dobbs, *Janus faces of genius* (ref. 3), 111.
60. Oakley, "Christian theology" (ref. 2), 448; "The absolute and ordained power of God" (ref. 49), 452.
61. Oakley, "Christian theology" (ref. 2), 439.
62. Gordon Leff, *Medieval thought from St Augustine to Ockham* (Ringwood, 1958), 289; Erwin Iserloh, *Gnade und Eucharistie in der philosophischen Theologie des Wilhelm von Ockham*

(Wiesbaden, 1956), 67–79. See Oakley, "The absolute and ordained power of God" (ref. 49), 442f., for the history of such interpretations.

63. William J. Courtenay, "Nominalism and later medieval religion", in *The pursuit of holiness in late medieval and renaissance religion*, ed. by Charles Trinkaus with Heiko Oberman (Leiden, 1974), 26–58, pp. 37, 42, 43. See also Courtenay, *Capacity and volition* (ref. 49), 16–20. *Cf.* Heiko Oberman who, while sympathetic to Oakley's reading, states that "the sharp contrasts between the conclusions of studies of nominalist thought are largely reducible to a difference in interpretation of these terms". *The harvest of medieval theology: Gabriel Biel and late medieval nominalism* (Cambridge, Mass., 1963), 30. See also Thomas Williams, "A most methodical lover: On Scotus's arbitrary creator", *Journal of the history of philosophy*, xxxviii (2000), 169–202, and "Reason, morality, and voluntarism in Duns Scotus", *The modern schoolman*, lxxiv (1977), 84–93. The literature also contains related discussions about whether certain individuals can be properly classified as voluntarists. See, e.g., John A. Laumakis, "The voluntarism of William of Auvergne and some evidence to the contrary", *The modern schoolman*, lxxvi (1999), 303–12.
64. "quod de absoluta potestata nugantur scholastici, non solum repudio, sed etiam detestor, quia justitiam eius ab imperio separant." *Calumniae nebulonis cuiusdam de occulta providentia Dei*, reply to art. I, *Corpus reformatorum* (Berlin, 1834–), ix, 288.
65. Calvin, *Institutes of the Christian religion*, III.xxiii.3, ed. by J. McNeill, transl. by Ford Lewis Battles (2 vols, Philadelphia, 1960), ii, 950. For a discussion of Calvin's position on *potentia absoluta* see François Wendel, *Calvin: Origins and development of his religious thought*, transl. by Philip Mairet (New York, 1963), 127f.; *cf.* Emile Doumergue, *Jean Calvin, les hommes et les choses de son temps* (7 vols, Lausanne, 1899–1927), iv, 120f.; Henri Bois, *La philosophie de Calvin* (Paris, 1919), 18ff.
66. Luther, *Randbemerkungen zu Sentenzen des Petrus Lombardus*, in *Werke* (ref. 49), ix, 31.
67. Richard Desharnais, "The history of the distinction between God's absolute and ordained power and its influence on Martin Luther", Ph.D. Dissertation, Catholic University of America, 1966, 248. Desharnais's final conclusion is that Luther "arrived at a position never held by any scholastic" (p. 257). Luther does seem to be a voluntarist in this respect, that goodness is so because of God's willing it. See *De servo arbitrio* in *Werke* (ref. 48), xviii, 712.
68. Oakley, "The absolute and ordained power of God" (ref. 49), 458f.
69. William Perkins, *A golden chaine, or, the description of theology* (London, 1621), 17f. (I have referred to one of the many later editions of this work.) *Cf. An exposition of the symbole or creede of the apostles* (London, 1611), 37. The same distinction is made here. Perkins also notes that "the father is and was able to haue created another world, yea a thousand worlds, but he would not, nor will not".
70. William Ames, *The marrow of sacred divinity* (London, 1642), 24 (my emphasis).
71. "Westminster Confession", ch. 3, "Of God's Eternal Decree", art. 1, *Creeds of Christendom*, ed. by Philip Schaff (3 vols, New York, 1878), iii, 608. *Cf.* ch. 5, "Of Providence", art. 3 "God, in His ordinary providence, makes use of means, yet is free to work without, above, and against them, at His pleasure" (*ibid.*, iii, 612f.).
72. The restatement of the classical view of the divine powers was not limited to puritan writers. In his controversy with Hobbes, the Anglican divine Bishop Bramhall also articulates the distinction and its classical interpretation: "By his absolute power, he can do all things which do no implie imperfection or contradiction: but by his ordinate power he cannot change his decrees, nor alter what he hath ordained." Bramhall uses the same example as Perkins to illustrate the difference — God could have raised up children of Abraham out of stones, but did not, and will not do so. John Bramhall, *Castigations of Mr. Hobbes his last animadversions* (London, 1657), 46, *cf.* 407f. Also see 247f. where Bramhall problematically seems to imply that God's absolute

power has the potential to be presently exercised. This apparent contradiction is to be accounted for by Bramhall's conception of time.

73. *Oxford English dictionary*, *s.v*. "arbitrary", 1 (obs.)
74. Hobbes, *De cive*, ch. 14, Sec. 8, in *The English works of Thomas Hobbes of Malmesbury*, ed. by Sir William Molesworth (7 vols, London, 1839–45), ii, 189.
75. Cudworth, *Treatise of freewill* (ref. 19), ch. 14, 189. Samuel Clarke, whom as we shall see is not a voluntarist, also speaks of God's "abitrary will". "The evidences of natural and revealed religion", *Works* (ref. 37), ii, 698.
76. Ames, *Marrow* (ref. 70), 46.
77. *Ibid*., 47.
78. John Norton, *The orthodox evangelist* (London, 1654), 19.
79. *Ibid*., 102, 103f. *Cf*. 7: "Whatsoever God willeth he willeth from Eternity, and always willeth."
80. Matthew Hale, *A discourse of the knowledge of God, and of our selves* (London, 1688), 33, 34, 35.
81. Thus Spinoza: "We divide the power of God, therefore, into absolute and ordained, and we call God's power absolute, when we consider his omnipotence without attending to his decree, but ordained, when we do consider his decrees. Then there is the ordinary power of God, and his extraordinary power. The ordinary is that by which he preserves the world in a certain order; the extraordinary is exercised when he does something beyond the order of nature, e.g., all miracles, such as the speaking of an ass, the appearance of angels, and the like." Spinoza, *Descartes' principles of philosophy* II.9, *The collected works of Spinoza*, transl. by Edwin Curley (Princeton, 1985), i, 333. Spinoza had reservations about the latter distinction, wishing to deny miracles: "Concerning this last there could, not without reason, be considerable doubt. For it seems a greater miracle if God always governs the world with one and the same fixed and immutable order, than if, on account of human folly, he abrogates the laws which (as only one thoroughly blinded could deny) he himself has most excellently decreed in nature, from sheer freedom. But we leave this for the Theologians to settle." *Ibid.*
82. William Courtenay, "The dialectic of divine omnipotence", 8, in *Covenant and causality within medieval thought* (London, 1984).
83. Thus Clarke, Whiston, and Newton regarded miracles as unusual, but within the ambit of a general divine plan. See Peter Harrison, "Newtonian science, miracles, and the laws of nature", *Journal of the history of ideas*, lvi (1995), 531–53.
84. On Newton's voluntarism see Dobbs, *Janus faces of genius* (ref. 3), 110; Matt Goldish, *Judaism in the theology of Isaac Newton* (Dordrecht, 1998), 159; Osler, *Divine will* (ref. 3), 151; James Force, "The God of Abraham and Isaac (Newton)", in James Force and Richard Popkin (eds), *The books of nature and scripture* (Dordrecht, 1994), 179–200, p. 183.
85. MS Bodmer, ch. 1, 4r–5r (my emphasis). *Cf*. Keynes MS. 3, *Irenicum or ecclesiastical polyty tending to peace*, fol. 5.
86. Clarke, "Of the immutability of God", *Works* (ref. 37), i, 41. Clarke's subtle analysis of the relation of divine goodness and the divine will is given on p. 40.
87. Newton, *Opticks*, 4th edn (New York, 1952), 182.
88. Boyle, Royal Society, Miscellaneous MS 185, fol. 29.
89. Walter Charleton, *The darkness of atheism dispelled* (London, 1652), 113. Charleton later added that "the *Divine Will* is absolutely *Free*, knowing no circumspection, but that of the *Divine Wisdome*" (p. 216).
90. Cudworth, *Treatise of freewill*, I.iii (ref. 19), 25.
91. It might be objected that for any natural philosopher who believed in the possibility of miracles there would always be a problem. However, Newton and a number of his contemporaries

believed that even God's miraculous "interventions" ultimately conformed to some coherent, ordained plan, albeit one which was only partially apparent. See Harrison, "Newtonian science" (ref. 83); Malet, "Isaac Barrow" (ref. 3), 271.

92. Barrow, *Usefulness* (ref. 34), 73–74.
93. "It will be said that if God had established these truths He could change them as a king changes his laws. To this the answer is: 'Yes he can, if his will can change.' — 'But I understand them to be eternal and unchangeable.' — 'I make the same judgment about God.' — 'But his will is free.' 'Yes, but his power is incomprehensible.'" Descartes to Mersenne, in *Philosophical writings* (ref. 12), iii, 23. *Cf.*: "Now there are some changes whose occurrence is guaranteed either by our own plain experience or by divine revelation, and either our perception or our faith shows us that these take place without any change in the creator; but apart from these we should not suppose that any other changes occur in God's works, in case this suggests some inconstancy in God." *Principles of philosophy*, in *ibid.*, i, 240.
94. Arguably induction is not a problem until after Hume had endorsed Malebranche's position stripped of its theism. G. A. J. Rogers has also written about a religious solution to the problem of induction, arguing that for Newton, the notion of the simplicity of nature vitiated the problem of induction. See "Newton and the Guaranteeing God", in James Force and Richard Popkin (eds), *Newton and religion: Context, nature, and influence* (Dordrecht, 1999), 221–36.
95. This question is also raised by Malet, "Isaac Barrow" (ref. 3), 265.
96. Luther, *Heidelberg disputation*, 22, *Luther's works*, ed. by Jaroslav Pelikan and Helmut Lehman (55 vols, St Louis, 1955–75), xxxi, 40f. *Cf.* the "Proofs of the disputation", *Luther's works*, xxxi, 52f.
97. I am grateful to Peter Anstey for this point.
98. Robert Boyle, *A disquisition about the final causes of natural things* (London, 1688), 87.
99. Isaac Barrow, Sermon VI: "The being of God proved from the frame of the world", *Works* (ref. 35), i, 232. See also Sermon LXVIII: "Of the goodness of God", *ibid.*, ii, 52.
100. See, e.g., Theo Verbeeck, "The invention of nature", in *Descartes' natural philosophy* (ref. 20), 149–67.
101. Thus Malebranche: "By 'miracle' I mean the effects which depend on general laws which are not known to us naturally." *Dialogues* (ref. 41), XII.xiii. *Cf. Oeuvres complètes*, ed. by André Robine (22 vols, Paris, 1958), viii, 231n. John Norton distinguishes between God's "decree" and the "Law of Nature", and notes that we may not understand the former on account of "the error of our understanding". *Orthodox evangelist* (ref. 78), 102–4, 7. It also significant that the possibility of legitimate prophecy required that events be necessitated but in ways unknown to most individuals. Nehemiah Grew wrote that: "The Being of Prophecies, supposeth, the Non-being of Contingents, Tho things seem contingent to us." *Cosmologia sacra: or, a Discourse of the universe as it is the creature and kingdom of God* (London, 1701), 209. See Peter Harrison, "Prophecy, early-modern apologetics, and Hume's argument against miracles", *Journal of the history of ideas*, lx (1999), 241–57.
102. Calvin, *Institutes* (ref. 65), I.xvi.3, i, 201. *Cf.*: "I acknowledge that the Lord, as the Sovereign Prince and ruler of all, brings good out of evil; in short, directs all things as by a kind of secret reins, and overrules them by a certain admirable method, which it becomes us to adore with all submissiveness of mind, since we cannot embrace it in thought." "Brief confession of faith", *Tracts and treatises on the reformation of the Church* (Grand Rapids, 1958), transl. by Henry Beveridge, ii, 131.
103. Isaac Barrow, *Sermons preached upon several occasions*, 2nd edn (London, 1679), Sermon 11, 414. *Cf.*: "God designeth not commonly to exert his hand in a notorious way, but often purposely doth conceal it" (p. 412).
104. Boyle, Royal Society MS 185, fol. 29: *Appendix to the first part of The Christian virtuoso*,

in *Works* (ref. 25), vi, 673–715, pp. 676f. (my emphasis). For a thoroughgoing account of Boyle on the limitations of human reason, see Jan Wojcik, *Robert Boyle and the limits of reason* (Cambridge, 1997).

105. Pierre Gassendi, *Syntagma philosophicum*, in *Opera omnia* (ref. 33), i, 326; Osler, *Divine will* (ref. 3), 54. *Cf.* William Whiston: "And this I take to be the Secret of Divine Providence in the Government of the World, whereby the Rewards and Punishments of God's mercy and Justice are distributed to his Rational Creatures without any disturbance of the setled Course of Nature, or a miraculous interposition on every occasion." *New theory* (ref. 38), 359.

106. *Cf.* Spinoza, who rehearses the Cartesian position on this matter. *Descartes' principles of philosophy*, II.9, *Collected works* (ref. 81), i, 333.

107. I have developed this theme in more detail in "Original sin and the problem of knowledge in early modern Europe", *Journal of the history of ideas*, lxiii (2002), forthcoming.