Philosophia (2009) 37:361–372
DOI 10.1007/s11406-008-9146-4

Berkeley's Contingent Necessities

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Received: 13 June 2008 / Accepted: 1 July 2008 /
Published online: 15 August 2008
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Abstract The paper provides an account of necessary truths in Berkeley based upon his divine language model. If the thesis of the paper is correct, not all Berkeleian necessary truths can be known a priori.

Keywords George Berkley · Necessity · Truth · Language · Divine language · Science · Laws of nature

Any account of necessary truth must address two questions: (1) What are the grounds for the necessity? (2) How are necessary truths known? In examining Berkeley's position on necessary truths, I argue that all Berkeleian necessary truths are founded on acts of will and that only some necessary truths are known a priori.[1] My argument is based on Berkeley's linguistic model for understanding the world, his divine language model. First, I examine elements of Berkeley's theory of the meaning of sortal terms.[2] Secondly, I argue that natural laws are necessary truths founded by acts of God, although such necessary truths *cannot* be known a priori. Thirdly, I explore the relation between necessary truths and necessary connections in Berkeley's philosophy. Fourthly, I tie considerations of necessary truth to Berkeley's method and argue that explains why his criticisms of scientific and philosophical theories generally focus on inconsistency. Finally, I briefly examine Berkeley's account of arithmetic truths, arguing that arithmetic is an artificial language of human construction, and for that reason one can have a priori knowledge of arithmetic truths, although arithmetic, as such, tells us nothing about the natural world.

[1] As Saul Kripke has shown us, not all necessary truths are known a priori. See Saul A. Kripke (1980), pp. 135ff.

[2] This will *not* include a discussion of the use of terms to stir emotions, although I believe that role of language also could be subsumed under the account I provide.

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Language

In the Introduction to the *Principles*, Berkeley provides a critique of abstract ideas. This critique undercuts one putative source of the claims of necessary truth. While Berkeley's focus is on Locke's account of abstraction—he deemed Locke the clearest of the abstractionists[3]—Locke's account was part of a long tradition that can be traced back at least as far as Aristotle. Aristotle held that mathematical truths, as well as the notion of being, are abstracted from experience.[4] The Scholastics held that one abstracts intelligible forms from hylomorphic compounds that constitute material objects.[5] Insofar as they are forms that make an object an object of a particular kind, abstraction is said to yield essential truths. Descartes held that divinely created eternal truths and true and immutable natures[6] are known by abstraction, or, at least, that general terms obtain their meaning by abstraction.[7] Even the logicians of Port-Royal discuss abstraction in their *Logic or the Art of Thinking*.[8]

Part of Berkeley's critique of abstraction has ad hominem force. He recognized that the abstractionists deemed it impossible for a mode, property, or form to exist apart from some object having it, while claming that it is possible to form an idea of those modes, properties, or forms apart from determine objects, that is, form an abstract idea (Intro. Section 7). Since most of the abstractionists also held that whatever is conceivable is possible (cf. *CSM* 2:54), their principles form an inconsistent triad. As Berkeley put it in the Introduction to the *Principles*, "But I deny that I can abstract one from another, or conceive separately, those qualities which it is impossible should exist so separated; or that I can frame a general notion by abstracting from particulars in the manner aforesaid. Which two last are the proper acceptations of abstraction" (Intro. Section 10).[9] Hence, there are no grounds for claiming that there are essential properties of things. Further, even those such as Locke, who maintained that kinds are a convenient fiction—"All Things, that exist,

[3] As he writes in his Notebooks, "Wonderful in Locke that he could wn advanc'd in years see at all thro a mist y^{t} had been so long a gathering & was consequently thick. This more to be admir'd than y^{t} he didn't see farther," George Berkeley (1948–1957), 1:71. Further references to the Notebooks (PC) will be made parenthetically by entry number. References to the *Principles of Human Knowledge* (PHK), the Introduction to the *Principles* (Intro.), the *New Theory of Vision* (NTV), the *Theory of Vision… Vindicated* (TVV), *DeMotu* (DeM), and *Passive Obedience* (PO) will be made parenthetically by section. References to the *Three Dialogues* will be made parenthetically by dialogue and page in the *Works*, volume 2. References to the *Alciphron* (A) will be by dialogue and section.

[4] Aristotle, *Metaphysics* Book 11, Chapter 3, 1060^{a}29–1060^{b}5.

[5] See, for example, Thomas Aquinas, *Summa Theologica*, I, question 85, reply to objection 1.

[6] See the letter to Mesland, 2 May 1644, in René Descartes (1991). See also Jonathan Bennett (1994).

[7] René Descartes (1985, 1984). Further references to *The Philosophical Writings of Descartes* (CSM) will be made parenthetically.

[8] Antoine Arnauld and Pierre Nicole (1996). For a history of theories of abstraction see Julius R. Weinberg (1965).

[9] As he puts this in the First Draft of the Introduction to the *Principles*, "It is, I think, a receiv'd axiom that an impossibility cannot be conceiv'd. For what created intelligence will pretend to conceive, that which God cannot cause to be? Now it is on all hands agreed, that nothing abstract or general can be made really to exist, whence it should seem to follow, that it cannot have so much as an ideal existence in the understanding," *Works*, 2:125.

[are] Particulars"[10]—were faced with inconsistencies, as Berkeley takes the celebrated triangle passage to show (Intro. Section 13; *NTV* Section 125; *PC* #687). If it *were* possible to form a clear and distinct abstract idea in the manner prescribed by Locke, the Cartesians could claim that there are grounds for claiming the existence of a true and immutable nature (*CSM* 2:44–45), which would undercut Locke's claim that all existents are particulars.

Berkeley proposes an alternative account of the meaning of sortal terms. As he notes in Section 11 of the Introduction to the *Principles*, "But it seems that a word becomes general by being made the sign, not of an abstract general idea but, of several particular ideas, any one of which it indifferently suggests to the mind." What does that mean? Berkeley's examples are the propositions, "*the change of motion is proportional to the impressed force*" and "*whatever has extension is divisible*" (Intro. Section 11). His contention is that these propositions are *true of* any motion or extension (cf. Intro. Section 12).

Berkeley's point might be clearer if one focuses on a sortal term such as 'dog'. The meaning of a word is fundamentally arbitrary (*NTV* Section 145). Establishing the meaning of the word 'dog' consists of establishing a rule of use. To establish the meaning of the word 'dog', one would initially "baptize" several animals with the word—Fido (a Rottweiler), Lassie (a collie), Snoopy (a beagle), and Manuel (a Chihuahua)—stipulating a rule, "By 'dog' I mean Fido, Lassie, Snoopy, Manuel, and anything that resembles any one of these to at least the degree that they resemble one another."[11]

What is the status of this rule? If a necessary truth is a statement that cannot be false, it would seem to be a necessary truth. It specifies only what *I* mean by 'dog' at a certain time. The rule functions as a stipulative definition, what in the early modern period was known as a nominal definition.

In the *Logic or Art of Thinking*, Arnauld and Nicole give three characteristics of a nominal definition.[12] (1) It is arbitrary. (2) Because it is arbitrary, it cannot be contested. (3) Because it cannot be contested, it can function as a principle, even though no existence claims follow from it. The logicians of Port-Royal's principal concern with nominal definitions is with clarifying the meaning of a term in a particular context.[13]

In wedding the Berkeleian meaning-specifying rule to a nominal definition, one must draw several distinctions. (1) Arnauld and Nicole's nominal definitions are connotative definitions. In this respect they are comparable to Lockean nominal essences. Does this mean that a nominal definition commits one to the existence of an abstract idea? No. Even if one states the meaning of a word on the basis of several determinate objects taken as paradigms, these paradigms provide the basis for multiple classifications of the objects. One can attend to the resembling aspects of one's paradigmatic dogs and develop a connotative definition: dogs fall into classes

[10] John Locke (1975), Book 3, Chapter 3, Section 1, p. 409; cf. *Essay* 3.3.6, p. 410; cf. DHP_1 192.

[11] Cf. Kripke, *Naming and Necessity*, p. 136.

[12] See Arnauld and Nicole, *Logic or the Art of Thinking*, pp. 61–62.

[13] Some nominal definitions are precising definitions.

of things having a certain type of rear-leg structure, having several long pointed teeth, making certain kinds of sounds, and behaving in certain ways.

(2) Arnauld and Nicole distinguish nominal definitions from real definitions, typically, definitions by genus and difference. Definitions by genus and difference concern the essential properties of things.[14] Real definitions are open to debate: if there were essential properties, a putative real definition could be false. As a nominalist, Berkeley eschews real definitions. There are no essential properties as such; there are only those properties one takes to be definitive of a thing of a kind. The closest one comes to a real definition on a Berkeleian model of natural language is learning the conventions that determine the meaning of a word. These conventions are often imprecise, and there can be controversies regarding whether objects are denoted by a general term.[15] Relative to these conventions, one's nominal definition of a term might be false. On the other hand, one's nominal definition might be richer than a conventional definition. Locke contends that one's nominal essence becomes richer as one discovers an increasing number of properties that found together in things names 'gold', for example. On the Berkeleian scheme, the same holds. On the Lockean scheme, a set of properties (an abstract idea) is taken to constitute the essence to which one applies a general term. On the Berkeleian scheme, it is all definition: "By 'gold' I mean a yellow metal that if fusible, malleable, and dissolves in *aqua regia*," where 'yellow', 'metal', 'fusible', 'malleable', and 'dissolvable in *aqua regia*' pick out classes of things.

Insofar as one is concerned with a connotative definition assumed by an individual at a time, a Berkeleian definition is necessarily true, although it is only true for that individual at that time. Insofar as he employs a linguistic model, such subjective definitions would appear to be analytic.[16]

Natural Laws

So far I have argued that Berkeley's account of language provides the basis for the creation of necessary truths. Words are arbitrary sounds or marks. The meaning of a word is established by a volitional act which establishes a rule of meaning. This rule takes the form "By (general term) I mean…," and can either focus on paradigms of a kind or resemblance classes that apply to those paradigms. In either case, the rule functions as a necessary truth, though it is strictly subjective and temporally grounded. It is a necessary truth which, if it were to be known by anyone distinct from the rule-maker could be known only a posteriori.

But Berkeley's language model is not limited to natural languages such as English or Spanish; it is also the model for understanding natural laws. In the *New Theory of*

[14] Arnauld and Nicole, *Logic or the Art of Thinking*, p. 126. Arnauld and Nicole distinguish between definitions by genus and difference and what they call "descriptions," which provide "some knowledge of a thing in terms of the accidents that are proper to it and determine it enough to give us an idea distinguishing it from other things."

[15] Cf. Locke on monsters and baptism, *Essay* 3.6.26, pp. 453–454.

[16] Cf. Arnauld and Nicole, *Logic of the Art of Thinking*, p. 248.

Vision, the *Theory of Vision…Vindicated*, and *Alciphron*, Berkeley describes natural laws—particularly the laws linking visual ideas with tactual ideas—as a divine language. That ideas of sight and touch are distinct in kind (the heterogeneity thesis) is one of the principal conclusions for which Berkeley argues in the *New Theory of Vision*. While they are distinct in kind—there are no necessary connections between ideas of sight and tough (*PC* ##181, 246, 256; *NTV* Sections 45, 58, 62, 64, 103, 104, 105, 107; *TVV* Sections 39, 42, 43, 58, 61, 62, 63; *PHK* Section 43)—ideas of sight signify ideas of touch. One takes one kind of visible idea to be a sign of a corresponding kind of tangible idea because they are regularly found together in experience. As Berkeley writes in the *Theory of Vision…Vindicated*:

> Ideas which are observed to be connected with other ideas come to be considered as signs, by means whereof things not actually perceived by sense are signified or suggested to the imagination, whose objects they are, and which alone perceives them. And as sounds suggest other things, so characters suggest those sounds; and, in general, all signs suggest the things signified, there being no idea which may not offer to the mind another idea which hath been frequently joined with it. In certain cases a sign may suggest its correlate as an image, in others as an effect, in others as a cause. But where there is no such relation of similitude or causality, nor any necessary connexion whatsoever, two things, by their mere coexistence, or two ideas, merely by being perceived together, may suggest or signify one the other, their connexion being all the while arbitrary; for it is the connexion only, as such, that causeth this effect. (*TVV* Section 39)

At the human level, the coexistence of two distinct kinds of ideas may make one a sign of the other. Indeed, as the discussions of signification in Berkeley's works make clear, the association might become so close that one might not recognize that the sign and the signified are distinct. As they become signs for us, they provide the basis for well-founded predictions (*PHK* Sections 59, 62, 67).

At the divine level, the regularity in the concurrence of distinct kinds of ideas constitute laws of nature:

> Now the set rules or established methods, wherein the mind we depend on excites in us the ideas of sense, are called the Laws of Nature: and these we learn by experience, which teaches us that such and such ideas are attended with such and such other ideas, in the ordinary course of things. (*PHK* Section 30)

It is the will of God that "constitutes the laws of nature" (*PHK* Section 32; cf Section 106).

If the laws of nature are constituted—created—by the will of God, and if this is understood on the model of words and meanings, Berkeley would seem to have taken laws of nature to be necessary truths.[17] Just as humans individually intend a class of objects or a collection of properties by a word and thereby establish the meaning of a word (at a time), so God intends the correlations among objects (including ideas and minds). Laws of nature are strictly analogous to meaning relations, and, therefore, it is reasonable to treat them as necessary truths.

[17] Cf. Richard J. Brook (1973), where Brook takes the connection to be necessary in virtue of "the connection between the divine volition and the divine effects."

How shall we understand this analogy? In the case of humans, the individual meaning relation is temporally grounded: at time *t*, I mean *x* by *y*. In the divine case one can also look at meaning in terms of individual acts (cf. *PHK* Section 97), although there is a presumed uniformity that is not common to individual acts of meaning over an extended period of time (cf. *PHK* Sections 57 and 62).[18] Even though natural laws as divine acts of meaning are necessary truths, they are learned by experience (*PHK* Sections 30 and 62). This is once again analogous to learning a natural language. In learning a natural language we learn by experience to match our semantic intentions to the linguistic conventions we find operative in the language. Similarly, we learn God's semantic intentions (natural laws) by experience. The two cases are similar insofar as one takes uniformity of the correlations between sign and signified as the *mark* of the necessary truths one is attempting to discover.

Necessary Connections and Necessary Truths

If the position I have proposed is correct, then it would seem that all the connections between objects result strictly from intentional acts. In this sense they are contingent: the intentions could have been different. But there is an element of Berkeley's philosophy that seems inconsistent with the language model and, perhaps, his nominalism. This is his contention that there are necessary connections between some kinds of things. At *Theory of Vision…Vindicated* Section 42 he writes, "We infer causes from effects, effects from causes, and properties one from another, *where the connection is necessary*" (emphasis added). Earlier, in Section 39, he suggests that the relations of causality and resemblance (similitude) involve necessary connections. If resemblance is properly a necessary connection, then it would seem that objects in the world are *inherently* divided into kinds (resemblance classes), a claim that seems to be inconsistent with his nominalism insofar as it seems inconsistent with the contention that ideas are inherently individuals.[19] *If* there are necessary connections, does this pose a problem?

We must consider two issues. First, Berkeley almost certainly held that if there are necessary connections, causal and perceptual relations are such. How does this fit with the account of necessary truths as meaning relations that was developed in the previous section? Second, can Berkeley consistently claim that there are necessary connections among ideas? Regarding the former, I argue that one must distinguish between the ontological ground for a necessary truth and the postulation of a necessary truth. Regarding the latter, I argue that *if* resemblance relations are necessary connections, they are more like causal relations than perceptual relations.

[18] This also fits well with the presumption that God occasionally performs miracles, which would fit into the linguistic model as a metaphorical meaning.

[19] As Norman Kemp Smith noted regarding David Hume's celebrated problem with his account of personal identity, viz., the alleged inconsistency between the principles "*that all out distinct perceptions are distinct existences*, and *that the mind never perceives any real connexion among distinct existences*" (Hume 1978, p. 636; 2000, p. 400), the second principle is a corollary of the first (Smith 1941, p. 558). If a necessary connection between two things obviates their distinctness (particularity), then to deem resemblance a necessary connection between properties implies that those properties are not properly distinct.

Berkeley proposed a volitional theory of causation: all causes, properly so called, are acts of will.[20] At the time it was widely held that causal relations involve a necessary connection between cause and effect, and such a view is unavoidable on a volitional theory of causation. As Tom Stoneham notes, "The usual argument to show that it [a cause as an act of volition] is not contingent is that in cases where there are no defeating circumstances and yet someone fails to do what they apparently intended to do, we deny that they had the intention in the first place" (Stoneham 2002). What does it imply to call this connection "necessary"?

Berkeley also held that the perceptual relation between a mind and an idea is a necessary connection.[21] What does that imply?

At bottom, claiming that causal and perceptual relations are necessary connections implies at least (1) that there is an existent if and only if there is an act of will that takes the existence of that thing to be its end, and (2) that there is an idea if and only if there is some mind in which it exists. Both causal and perceptual relations are relations between a mind and a state of affairs (in the case of perception, an idea). Both relations have existential implications, that is, as necessary connections both have ontological status. Both relations are asymmetrical: an act of will can cause a state of affairs, but not conversely; a mind can perceive an idea, but not conversely. In both cases, the mind (or an act of mind) is the ontologically primary (dominant) object in the relation: the mind can exist even if a particular idea or state of affairs does not exist. Does this mean that given a certain act of will one can know that a corresponding state of affairs obtains, or that given an idea it must be perceived by some mind? No. It is one thing for a necessary connection to obtain; it is something else to know that a necessary connection obtains.

Consider acts of will. Let us assume that for anything x, if God wills that x, then x obtains. The same cannot be said regarding human beings. We learn through experience that some—and only some—of our acts of will result in the desired state of affairs. God might be able to cause a three-thousand-pound car to levitate above the ground by a mere act of will, but mere mortals cannot do so, although only experience teaches us that we cannot do so. If there are necessary (ontological) connections between acts of human will and their effects, they are discovered through experience. On the linguistic model one could state this in terms of a meaning relations: "Act of will x means that a certain state of affairs y will obtain." Insofar as this can be deemed a necessary truth, it is one *we* create.

"But surely," someone will contend, "the case of the perceiving relation must be different. 'All ideas are perceived by some mind' has to be a necessary truth immediately known upon he least consideration."[22] Berkeley's master argument

[20] If you prefer, all principal causes are acts of will. At *De Motu*, Section 71, Berkeley refers to laws of nature as second causes.

[21] At least it is taken to be such. I have found no place in which claims that the relation of perception is a necessary connection, although the fact that he regularly claims that it would be contradictory for an idea to exist apart from a mind *might* be evidence that he held the relation is a necessary connection. The same evidence would show that he took the fact that all ideas exist in minds to be a necessary truth.

[22] Of course, not everyone would agree that this truth is immediately known. See Hume, *Treatise*, 1.4.5, Paragraph 5, S-B p. 233, Norton. 153.

suggests otherwise. Whatever else one takes the argument to do, it at least shows that there can be no evidence that the existence of an idea apart from a mind is so much as possible. As George Pappas says, the challenge to conceive of an idea that is unrelated to a mind calls for an "impossible performance."[23] So, even in the case of the perceiving relation, the presumed fact that there is a necessary connection between an idea and a mind does not, as such, show that the proposition, "To be an idea means to be perceived by some mind" is immediately known as a necessary truth.

So, in the case of both the causal relation and the perceiving relation, the presumption that the relation is a necessary connection does not, as such, entail that one knows that the corresponding proposition is a necessary truth, rather, such necessary connections provide the ontological ground for the truth of the proposition.[24]

Can the same be said regarding necessary connections among properties, e.g., the relation of resemblance? Resemblance is a peculiar case. In the works on vision Berkeley repeatedly stresses that there are no necessary connections between ideas of sight and ideas of touch, and the coach passage (*NTV* 46; cf. DHP_1 204) suggests that there are no necessary connections among any ideas of different senses. Is the resemblance relation fundamentally different from other cases of relations among ideas? It seems so.

Berkeley's fundamental point in the discussions of vision is that there are no resemblances among ideas of different sensible modalities; such relations can obtain *only* among ideas of a single modality. If there are necessary connections among resembling ideas, then the sense of 'necessary connection' must differ from that in the cases of causality and perception. Unlike a causal relation, it does not bring an idea into existence;[25] unlike the perceptual relation no idea ceases to exist if the relation does not obtain. Unlike both, it is not a relation between a mind and an idea, nor is it asymmetrical. So, if there are necessary connections among resembling ideas, it seems that Berkeley uses the expression 'necessary connexion' in more than one way.

And there is some evidence that he does so. For example, in *Passive Obedience* he writes, "whatsoever practical proposition doth to right reason evidently appear to have a necessary connexion with the Universal well-being [of humankind] included in it, is to be looked upon as enjoined by the will of God" (*PO* Section 11; cf. *PO* Sections 15 and 16). Here 'necessary connexion' appears to be something like logical entailment.[26] In the case of resemblance, the human mind classifies objects into kinds, thereby creating subjective necessary truths. Is resemblance as a necessary connection between ideas the ontological ground found "in" ideas that results in the classification?

[23] George S. Pappas (2000); George Pappas (1995, especially 142–145). See also Daniel E. Flage (2004).

[24] In "Berkeley's Archetypes," *Hermathena* 171 (2001): 17–20, I argue that ontological archetypes play a comparable role insofar as they provide the ontological ground for claims of identity regarding ordinary objects perceived by multiple people.

[25] Or, insofar as it brings anything into existence, it brings "kinds" into existence, which, given Berkeley's nominalism, are convenient fictions.

[26] Cf. Brook, *Berkeley's Philosophy of Science*, pp. 17–18n16.

No. If resemblance is a *relation*, then it would seem to be an act of mind. At *Principles* Section 142 Berkeley writes that all relations include an act of mind, and both Locke and Hume claimed that relations are fundamentally comparings of ideas.[27] If human minds are fairly uniform in faculties—if there is a fairly uniform relating of things in terms of resemblances[28]—the connection would be grounded in terms of an act of the mind. While an act of will brings something into existence, and a perceptual relation is a necessary condition for the existence of an object, the relation of resemblance constitutes a resemblance between two ideas. The ideas so related remain distinct. The act of the mind in deeming two ideas resembling brings that state of affairs into existence, making resemblance similar to a causal relation.

Necessity and Method

If my account of the linguistic model for understanding nature is correct, then there are several systems of necessary truths. On the divine side, God creates natural laws by creating temporally coordinated ideas. Insofar as their coordinations are taken as meaning relations, natural laws are necessary truths. On the human side, we learn a language by positing meaning relations. These meaning-postulations, while necessary truths of the form "At this time I mean *x* by *y*," are subject to change with increased experience. Whether one is learning a natural language or the divine language, one learns a language by matching one's meaning intentions with those of the (imprecisely defined and constantly evolving) conventions of a natural language or the "meaning conventions" of the divine language: the correlations between ideas or ideas and substances. How does this happen?

The divine language is the language of nature. Berkeley's paradigm case is the denotation of tactile ideas by visual ideas, although construing the language model more broadly, it can be understood as the general procedure of the sciences. The divine "meaning relations," as understood by humans, are natural laws expressing the correlations among ideas and, as I suggest below, ideas and minds. I look briefly at the procedure in the *New Theory of Vision* and argue that the method found there applies in Berkeley's philosophical works generally.[29]

In the *New Theory of Vision*, Berkeley proposes an account of vision that is contrary to and more empirical than the then-standard accounts found in Descartes's *Optics* and Barrow's *Lectures on Optics*, accounts of vision that rest on a geometrical account of optics. While Berkeley's account is "new" insofar as it is nongeometrical, it is not *entirely* independent of the earlier accounts. Indeed, some

[27] Locke, *Essay*, 2.25.1, p. 319; Hume, *Treatise* 1.1.5, Paragraph 1, S-B p. 13, Norton p. 14.

[28] Berkeley's remark in the Notebooks, #649, that "There are innate Ideas i.e. Ideas created with us" might be taken as some evidence that he held that there are such uniformities. If Berkeley understands 'innate ideas' in the manner of Descartes (see *Comments on a Certain Broadsheet*, comments on articles 12–14, *CSM* 1:303–305), that is, as dispositions to form ideas with a certain content, this suggests that all human minds tend to put ideas together in similar ways.

[29] I examined the method of analysis in the *New Theory of Vision* in "Analysis in Berkeley's *New Theory of Vision*," a paper I presented at the Berkeley conference in Helsinki, Finland in August 2007. I there argue that analysis is a form of inference to the best explanation.

of the main points of Berkeley's account were found in Descartes's discourse on vision, although not the contention that one perceives ideas of touch mediately by way of ideas of sight. Notice some of Descartes's nongeometrical remarks on perceiving distance:

> We have yet another way of perceiving distance, namely by the distinctness or indistinctness of the shape seen, together with the strength or weakness of the light….Finally, we may already have from another source an image of an object's size, or its position, or the distinctness of its shape and its colours, or merely the strength of the light coming from it; and this may enable us to imagine its distance, if not actually to see it. For example, when we observe from afar some body we are used to seeing close at hand, we judge its distance much better than we would if its size were less well known to us.[30]

Methodologically, Berkeley begins with an established theory and builds upon it. This "building" consists, in part, of kneading out inconsistencies in the earlier theories and finding simpler explanations. But the fact that it begins with earlier theories—typically the best available theories—is methodologically important: it implies that many of the assumptions of earlier theories are taken to be true.[31] Indeed, this provides the basis for claiming that certain properties are "essential," a contention one would not expect to find in a nominalist. For example, insofar as Berkeley deemed Locke's philosophy the best available, and Locke held that the mind is passive in perception,[32] Berkeley was free to assume that the claim that the mind is passive in perception is a necessary truth.[33]

Why is this important? If, as Berkeley contends, God is the cause[34] of the world, and if natural laws and any "connections" between objects are construed on the model of a definition, statements describing divinely instituted relations are construed as necessary truths. Learning about the world is an attempt to match our "definitions" with God's. Our definitions are false if they fail to match God's. But insofar as definitions, if true, are necessarily true, and insofar as connotative definitions are analytic, definitions, if false, are necessarily false and contradictory. Notice, this applies to metaphysics as well as the sciences. Any successful theory

[30] *CSM* 1:172 and 173; cf. *NTV* Sections 27ff. There are numerous other points of agreement: Light and color are the only qualities proper to sight (*CSM* 1:167; *NTV* Section 43). There are variations on a no-resemblance thesis, *CSM* 1:167, *NTV* Section 117. It is properly the soul or mind that sees, not the eye (CSM 1:172; *NTV* Section 36).

[31] These "assumptions" might include not only some of the content of the theory, but even logical truths. If Berkeley was a thoroughgoing nominalist, there cannot be such things as eternal *logical* forms. So, one of the "assumptions" is the principle of noncontradiction. Charles Bolyard tells me, however, that even the medieval nominalists held that logical truths are not mere conventions. So, *if* Berkeley held that logical truths are *not* mere conventions, he is part of a well-established tradition.

[32] Locke, *Essay*, 2.9.1, p. 183, 2.22.2, p. 381.

[33] Of course, Locke was not the only philosopher who held that the mind is passive in perception; cf. Descartes, *CSM* 2:54. An alternative to contending that Berkeley held that *one* theory was the best and that he worked only with that theory is to suggest that he entertained several theories and was willing to *assume* that the common elements of those theories were necessary truths unless and until he showed that those assumptions resulted in inconsistencies. This seems to have been his practice in the works on vision.

[34] And, perhaps, conservator. See Berkeley's first letter to Johnson, Section 3, *Works*, 2:281.

must be internally consistent and, insofar as it is a representation of a natural world (a scientific theory), consistent with appearances. So, methodologically, consistency plays the principal role in the development of a theory. This explains why, in both his scientific and his more strictly philosophical works, Berkeley's criticisms generally take the form of appeals to inconsistency.

Some Brief Remarks on Arithmetic

No account of necessary truth in the early modern period would be complete without some discussion of mathematics, since mathematical truths were assumed to be paradigms of necessity. So, I conclude with a few words on arithmetic.[35]

In both *Principles* Section 121 and *Alciphron* 7:12 Berkeley offers a natural history of arithmetic. While granting that "the principles laid down by mathematicians are true, and their way of deduction from those principles clear and incontestable" (*PHK* Section 118), he argues that the notion of a unit *as such* is not based upon ideas (*PHK* Section 120; cf. Sections 12–13). Units are always relegated to kinds: one cow, one tangible inch, one chair. The "science of numbers is subordinate to practice" (*PHK* Section 120), and in his historical reconstruction he claims that the task of counting was originally aided by counters or slashes, then symbols standing for groups of numbers, and finally Arabic numerals and the rules that define arithmetic functions (*PHK* Section 121). "In *arithmetic* therefore we regard not the *things* but the *signs*, which nevertheless are not regarded for their own sake, but because they direct us how to act with relation to things, and dispose rightly of them" (*PHK* Section 122; cf. *PC* #767). Arithmetic is an artificial language. It is purely nominal (*PC* #770), that is, it is composed solely of nominal definitions. Because it is artificial, because it is composed solely of notions and rules that we as mathematicians will not allow to change, once one knows the rules, one can deduce conclusions with certainty: one can have *a priori* knowledge of the necessary truths of arithmetic. Arithmetic is of purely utilitarian value (cf. *PC* #853). It rests strictly on *human* conventions. Arithmetic is not, *as such*, true of physical quantities (*DeM* Section 17): "mathematical entities have no stable essence in the nature of things; and they depend on the notion of the definer" (*DeM* Section 67). The nominal nature of arithmetic truths explains Berkeley's ambivalence toward "mathematical hypotheses" (cf. *NTV* Section 14; *DeM* Sections 17, 28, 41, and 66; *Siris* Section 234 and 250). While they are useful in describing the natural world, they tell us nothing about *what* exists.

Conclusions

In this paper I have explored Berkeley's linguistic model for understanding the sciences. After a brief examination of Berkeley's theory of the meaning of sortal

[35] I consider only arithmetic, since the issues involving geometry are more complex. See Jesseph (1993), 44–87, especially 69–70.

terms, I argued that, seen as divine meaning intentions, natural laws are necessary truths, but, insofar as they are the effects of divine will, they are fundamentally contingent. Humans learn these laws-cum-necessary truths through experience and by attempting to match their meaning relations to God's. I argued that the linguistic model explains why Berkeley's criticisms of both scientific and philosophical theories typically take the form of appeals to inconsistency. I concluded by looking briefly at Berkeley's account of arithmetic. Arithmetic is an artificial language, a language constructed principally for pragmatic purposes. Since it is artificial and since the conventions defining it are strictly enforced, once one learns the conventions one can have a priori knowledge of mathematical truths, although through arithmetic conventions one learns nothing about the natural world *as such*.

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