

**“Experience Itself Must Be Taught to Read and Write”:  
Scientific Practice and Berkeley’s Language of Nature**

**I. Introduction: Three Puzzles in Berkeley's Writings**

The purpose of this paper is to solve three puzzles in George Berkeley's writings, each pertaining to his divine language model of the natural world:

1. Why does Berkeley describe scientists as *grammarians* of nature in the 1710 edition of the *Principles* (§§108-110), but later remove this language from the 1734 edition?
2. Why does Berkeley oscillate, seemingly indiscriminately, between analogies suggesting the divine language of nature is a written language and analogies suggesting it is a spoken language?
3. Why, given the far-reaching knowledge of God that he takes to be available from our experience of the natural world, does he think—contrary to many other philosophers of his era—that natural science makes no distinctive contribution to natural theology?

It is my view that these three mysteries admit of a common solution: between the publication of *Alciphron* in 1732 and the revision of the *Principles* in 1734, Berkeley at least tentatively adopted the view (likely borrowed from Francis Bacon) that scientists are distinguished by their *literacy* in the language of nature from laymen who are merely *fluent* in the language of nature. It can hardly be clear, at this juncture, how this thesis can accomplish all

that I claim; for the moment, I can only counsel patience. Beyond the textual support I will provide in what follows, I take the ability of my interpretation to solve three seemingly disparate mysteries at one stroke to be the best argument in its favor. Indeed, these may all appear to be rather "minor" mysteries, but I believe that their resolution can shed important light on several more prominent issues within Berkeley scholarship—chief among them, the relationship between common-sense and scientific discourse, the divine language argument, and the historical development of Berkeley's philosophical thought in general.

## **II. The Mystery of the Grammarian Analogy**

Of the above mysteries, (1) has received the most attention. Some, like Lisa Downing and Richard Brook,<sup>1</sup> see scientists as grammarians primarily in the sense that it is their task to discover empirical regularities with greater generality (and therefore usefulness in terms of predictive value and breadth of applicability) than ordinary empirical regularities. Interpretations of this sort have the virtue that they take most seriously Berkeley's various statements to the effect that the knowledge possessed by scientists is different mainly in *degree* and not *kind* from that which laymen possess (see, e.g., PHK §104, §105, §114 and S §243, §254), and that they make it relatively clear why this additional knowledge is useful. Interpretations of this sort have the vice that they do not take the term "grammar" itself seriously. Grammar rules are not merely empirical regularities, however general or even universal,<sup>2</sup> in how a language is spoken or written—for one thing, they have a prescriptive as well as descriptive dimension,<sup>3</sup> and for

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<sup>1</sup> See, e.g., Downing 2005 (pp. 249-252) and Brook 1973 (p. 20).

<sup>2</sup> That laws of nature are rendered universal by experimental proofs, Downing argues (see 2005, pp. 250-251), is Berkeley's *De Motu* view of laws of nature, as contrasted with an earlier and purely inductivist view of laws.

<sup>3</sup> Various commentators have discussed the prescriptive aspects of laws of nature in Berkeley's system (see, e.g., Turbayne 31 and Printz 124).

another, they govern how the meanings of complex expressions relate to the meanings of the simple expressions of which they are composed.

Others, like Pearce, Turbayne, Creery, McGowan, and Mirarchi,<sup>4</sup> see scientists as grammarians in the sense that the laws of nature scientists discover are the *syntax* of the divine language—the rules for how lexical items (i.e. sensible bodies)<sup>5</sup> can be combined and ordered in experience. Interpretations of this sort have the virtue that they take the term "grammar" seriously, but the vice that they make it more difficult to explain why the additional knowledge that science provides is useful. This is Jonathan Dancy's criticism: "the syntactical analogy gives the wrong account of the relation between nonscientific and scientific knowledge. What can the grammarian add to our understanding and competence, supposing that we already understand and speak a language perfectly well? Not a lot, it seems" (Dancy 2014, p. 6). Pearce writes, perhaps in reply, that grammarians "have a special expertise that goes beyond mere linguistic competence [insofar as] writing down the rules is a more difficult task than following them" (2017, p. 68)—but it is still unclear from Pearce's discussion what it is, exactly, which is so useful about this additional linguistic competence.<sup>6</sup>

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<sup>4</sup> See, e.g., McGowan 238, Turbayne 7, Creery 218, Mirarchi 253-254, and Pearce 2017, pp. 192, 204. Pearce's approach is the most sophisticated, subsuming *both* syntax and compositional grammar (as well as, I believe, the morphological rules for forming words out of letters) under the heading of "grammar." Laws of nature govern both how sensible bodies can be combined/ordered, and what effects can be predicted from any particular ordering.

<sup>5</sup> Not all interpreters agree that sensible bodies are the words in Berkeley's language of nature (e.g. Copenhaver, who thinks that visible figures constitute the vocabulary), but this is the prevailing view and I accept it because of Berkeley's remarks in PHK §65 about ideas being combined into bodies/machines for the same reason that letters are combined into words. I also, like Pearce, "follow Turbayne in taking visual ideas to signify tangible stimuli in the way written words signify spoken words, rather than in the way words signify their referents" (Pearce 2017, p. 181). The Turbayne-Pearce interpretation is based on NTV §143, where Berkeley states "that visible figures represent tangible figures much after the same manner that written words do sounds," because the relationship between written words and their corresponding sounds is not one of reference or signification. Rather, the written word 'table' and the spoken word 'table' both signify table. Sensible bodies are words in the language of nature, for the same word can be represented using letters or sounds just as the same table can be seen or touched.

<sup>6</sup> Cf. Pearce 2017, p. 196 for further discussion of how the technical grammar of physics is supposed to differ from the common-sense grammar of ordinary body-talk. Pearce argues that on the syntactic approach "Berkeley preserves the ability of natural science to teach us things we didn't know before," which is no doubt true but does not suffice as an explanation of science's usefulness; not all knowledge is particularly useful knowledge.

Dancy's own view is that non-scientists are like those at an early stage of language-acquisition (where, allegedly, we begin learning the language sentence-by-sentence without any knowledge of how these sentences are divided into words), while scientists are like fluent speakers who can make use of the compositional grammar. Thus, "the scientist is distinguished by his ability to decompose whole utterances into their component words" (Dancy 1987, p. 114), which is a crucial step towards fluency: it is only by acquiring this ability, for example, that we begin to be able to form novel utterances of our own. This interpretation takes the term "grammar" seriously, and points to the usefulness of grammatical understanding, but it has major problems. Berkeley makes clear that we have all been learning the divine language almost constantly from our first entrance into the world (see NTV §144 and Alc. 4.12).<sup>7</sup> If, moreover, fluency is largely a matter of automatically attending to the senses of words rather than to the words themselves (as Pearce [2017 p. 72] and Copenhaver [p. 13] explain), and if distance (for example) is suggested to us by immediately visible qualities so naturally that we can mistakenly think we perceive distance immediately (see, e.g., NTV §51), then it seems that most human beings must already be fluent in the divine language whether or not they are scientists. Since ordinary speakers obviously have a grasp, if only implicitly, of compositional grammar, then such a grasp cannot be what distinguishes the scientist *qua* grammarian; and after all, it is not as though laymen have any difficulty decomposing visual scenes into their component sensible bodies, which Dancy's approach would suggest.

I accept the syntactic approach because I believe that there is a more promising solution to Dancy's criticism available (which I will discuss shortly). However, I do not think that the syntactical approach—in and of itself—adequately explains Berkeley's subsequent removal of

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<sup>7</sup> Likewise, "If the Author of nature constantly speaks to the eyes of all mankind, even in their earliest infancy, it doth not seem to me at all strange that men should not be aware they had ever learned a language" (Alc. 4.11).

the grammarian analogy from the 1734 edition of PHK. Why, as Berkeley embraces the language model of nature more and more (and ever more and more literally),<sup>8</sup> would he suddenly return to PHK and deliberately excise one of the most intriguing and potentially important aspects of the language model? As Dancy remarks, “It must be admitted that, for reasons which I am unable to reconstruct, even for the 2nd edition of PHK Berkeley watered down the remarks which introduce the semantic turn” (Dancy 2014, p. 17). All of us ought to share Dancy’s bafflement. To date, there has been only one attempt at a substantive explanation: the Pearce-Fasko view. Pearce argues (2008, p. 258) and Fasko endorses (2019, personal communication) that the grammarian analogy, while apt with respect to syntax, suggests the wrong *goals* for natural science. “Grammar manuals are useful,” Pearce tells us, “but the purpose of literature is nonetheless not to be analysed grammatically, but to be read for its content” (see *ibid.*). Studying the grammar of nature is indeed *part* of the job of the scientist (and to that extent Berkeley’s view does not change), but it would be myopic to analyze the grammar of a text rather than attend to its meaning (which is why Berkeley still opted to revise PHK in the way he did).

The main textual support for the Pearce-Fasko view is in PHK §109,<sup>9</sup> and I have no opposition to their interpretation of this passage on its own merits. Berkeley does indeed want science to have practical benefits to humanity as a main goal (as we can see in passages like PHK §62), and so Berkeley’s 1734 redactions may turn out to be overdetermined if my own view is correct. Even so, the Pearce-Fasko view, however plausible as an explanation of these redactions, does not help to explain why the study of grammar is useful and should even be a

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<sup>8</sup> The claim at least holds true between the publication of NTV and Alc./TVV that the language model becomes more and more literal (as well as more and more central to his philosophy). Many have noted this tendency, but Amanda Printz (2007) has done an especially admirable job tracing this development in detail.

<sup>9</sup> “As in reading other books, a wise man will fix his thoughts on the sense and apply it to use, rather than lay them out in grammatical remarks on the language; so in perusing the volume of Nature, it seems beneath the dignity of the mind to affect an exactness in reducing each particular phenomenon to general rules” (PHK §109).

*part* of the scientist's job-description. My view can. Is the explicit formulation of syntactic rules we already follow implicitly useful for understanding and/or generating any new *utterances*? Usually not—but it is almost always useful for learning to read and to write. Strictly speaking, of course, it is possible in principle both to read and to write simply by learning phonetics without grammar; one can, for example, learn to sound-out a text, listen to one's own voice, and interpret the sounds accordingly (as was sometimes the normal method in the ancient world for texts written in *scriptio continua*). However—even if due only to contingent features of and limitations on human cognitive abilities—this is incredibly inefficient and error-prone. Moreover, fluency in a language can be acquired without explicit training, while literacy generally cannot. It is no coincidence that children begin to be taught the rudiments of grammar in the course of being taught to read and write, and no coincidence that even fully fluent adults can routinely make mistakes in writing that they would never make in speech.<sup>10</sup> The massive utility of literacy in human languages requires no explanation, and a moment's reflection reveals the practical indispensability of studying grammar for acquiring (and then improving) one's literacy. On my view, the grammarian is literally a grammarian (insofar as she renders explicit the syntactic rules and perhaps other grammar rules we already follow implicitly), but *pace* Dancy this is useful beyond measure. As with the Pearce-Fasko view, Berkeley does not abandon the view that laws of nature are rules of syntax in the divine language (and that it is *part* of the job of scientists to discover them), but he redacts the grammarian analogy because his mature view is that scientists are distinguished by their literacy in the divine language (for which an explicit understanding of its grammar is merely a prerequisite).

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<sup>10</sup> This is why students are often advised to read their own papers aloud, so as to detect in speech grammatical errors that they have great difficulty detecting in text.

Dancy writes that the key desideratum for understanding the grammarian analogy is that “Scientific knowledge has to be conceived of as extremely helpful but not exactly essential, since God’s language is one which all can understand but which the scientist can somehow understand better” (Dancy 1987, p. 113). My approach satisfies this desideratum, in addition to the other considerations earlier discussed, better than the alternative approaches. Scientists and laymen can both understand the divine language, and science isn’t strictly necessary for understanding any particular matter of fact, but scientists have privileged access to those instances of the language which are encoded in written form (and perhaps also the unique ability to write).<sup>11</sup> The challenge now is to explain what those instances are—i.e. what the written-spoken distinction amounts to in the natural world—and to explain why we should think that Berkeley even had this distinction in mind given that he never explicitly makes it. For guidance, we must turn to *Alciphron* and the divine language argument.

### **III. The Oscillation Between Written and Spoken Language**

There is aggressive inconsistency in the secondary literature—hitherto unresolved—as to whether to regard Berkeley’s divine language of nature as a written or spoken language. What follows here is but a few choice examples: Creery and Hooker conclude that the language of nature is spoken only, mainly based on Berkeley saying in various places that the Author of Nature speaks to us through the visual sense (see Creery 219, Hooker 269). Turbayne and

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<sup>11</sup> The topic of what it means for humans to *write* in the language of nature is immensely interesting, but inessential to this paper. My view, which I cannot here defend, is that writing in the language of nature corresponds to the invention of technology (since technology exploits laws of nature discovered by science in order to establish new empirical regularities, as in the case of a mechanical clock), whereas speaking in the language of nature corresponds to our (coherent) actions more generally—ones which do not introduce any new empirical regularities (or if they do, these empirical regularities are very local and impermanent by comparison). For related discussion, see Mirarchi 249-254, Turbayne 29-30, Dancy 2014 p. 14, and Pearce 2008 p. 256.

McGowan, on the other hand, conclude that the language of nature is written only, mainly based on the prevailing analogies in PHK.<sup>12</sup> Dancy and Printz cannot seem to make up their minds. Dancy makes explicit the conception of the world as *text* (see, e.g., Dancy 1987, p. 122 and 2014, p. 13) but in several other places deviates without explanation to the claim that individual natural events are divine *utterances* (see, e.g., Dancy 1987, p. 109). Printz states that nature is a book because for Berkeley perception is *identical to reading* (see Printz 78 and 91), yet counts *phonemes* as well as letters among the fundamental elements of the divine language (see Printz 43 and 65). Meanwhile, Pearce and Fasko have signaled openness to the possibility of the world having both written and spoken aspects, but Pearce's focus is overwhelmingly on written language while Fasko has not yet, as far as I am aware, made any systematic use of this possibility. Such interpretive chaos demands resolution.

Little if anything, I believe, can be concluded from Berkeley's frequent use of the terms "author" and "discourse," both of which (contra Turbayne pp. 14-15) appear to be neutral with respect to the written-spoken distinction. In the Draft Introduction to the *Principles*, Berkeley twice contrasts the hearing of discourses to the reading of texts, but this usage does not survive in any of his published works; IPHK §20 and TVV §48 both clearly indicate that a discourse can be either read or heard. Likewise, Berkeley normally uses "author" in a non-literary sense having more to do with origination or cause: God is variously described, for example, as the author of motion and possibly sin (3D 3:236-237), a possible author of false opinions (3D 3:243), the author of grace (Alc. 7.7), the author of our religion (Alc. 5.20), the author of my being (PHK §81), the author of all good (S §320), the *Mover and Author* of Nature (Alc. 4.12), the author of

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<sup>12</sup> Turbayne goes so far as to include the claim that the language of nature is a written language in his list of *axioms* about the divine language hypothesis.

life and motion (S §341), and the *author and founder* of a rational society (Alc. 3.10). Elsewhere, “Author of Nature” is used as a generic title for God, with no apparent link to the language model (e.g. PHK §65, §152, 3D 2:215, TVV §43). Nor, I believe, can anything be concluded from Berkeley’s use of written and spoken language analogies to illustrate mediate perception or the bundling of ideas into objects (see, e.g., 3D 1:174, TVV §40, §48, Alc. 4.11), since his point is simply about the way in which words come to suggest sensible things through arbitrary connexion/association.

These red herrings set aside, we still find little apparent rhyme or reason in NTV and PHK; at most, we can say that PHK tends overall to employ written-language analogies while NTV freely runs analogies of both kinds together. Upward of 20 times in PHK, Berkeley states that our ideas are “imprinted” or “impressed” on the senses by another spirit, which is suggestive of written language—and as Turbayne points out, “Further confirmation is provided by Berkeley’s use of such metaphors as: ‘well-read in the language of nature’ (PHK §108), ‘perusing the volume of nature’ (PHK §109), and ‘reading other books’ (PHK §109)” (Turbayne 15).<sup>13</sup> Berkeley even states that “nothing can be more plainly *legible* than the intimate presence of an all-wise Spirit” (PHK §151, emphasis mine). Yet at the same time, Berkeley routinely uses *marks* and *signs* interchangeably in his discussion of causation in natural philosophy (see, e.g., PHK §§65-66). ‘Marks,’ whatever its technical usage,<sup>14</sup> bears a connotation of inscribed permanence<sup>15</sup> while ‘sign’ bears no such connotation. If we turn to NTV, Berkeley states that

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<sup>13</sup> Printz (p. 77) also points to the “natural letters” in *Siris* §252 to support the written language interpretation, but since this passage is describing Plotinus’ view it is unclear whether to ascribe this view to the Berkeley of 1744.

<sup>14</sup> See Winkler 2005, p. 129, for one interpretation of its technical usage (i.e., that marks are a species of sign which, like names, stand only for particular things).

<sup>15</sup> Consult Alc. 7.12, and compare NTV §140 and §143, if there is any doubt on this point.

“the voice of [the Author of] nature ... speaks to our eyes” (NTV §152),<sup>16</sup> our perceptual ideas are compared to *pronounced* words (NTV §73), and we find the same interchangeable use of ‘mark’ and ‘sign’ (e.g. NTV §147). At the same time, however, Berkeley leans heavily on the comparison with specifically written words in order to explain how a visible square is more apt than a visible circle to represent a tangible square due to an isomorphism of component parts (see NTV §§142-143). At this point in his career (1709-1710), little seems to hang on the distinction and Berkeley is happy to elide it.

To the extent that a traditional project in natural theology was Berkeley’s concern, eliding the written-spoken language distinction is reasonable. As he states, instances of written and spoken language seem to be equally strong indications of intelligent agency: “no matter whether these signs are pronounced or written, whether they enter by the eye or the ear: they have the same use, and are equally proofs of an intelligent, thinking, designing cause” (Alc. 4.7). However, the Berkeley of 1732 is not content to prove God’s mere existence, or even that God designed the natural world. On the contrary, he wants the divine language argument of Alc. 4 to prove “not a Creator merely, but a provident Governor, actually and intimately present” (Alc. 4.14). It appears that in Alc. 4, Berkeley suddenly realized that he could not infer a provident Governor so long as the language of nature were conceived on the model of written language, or at least only on the model of written language. This is because written books, while perfectly good evidence of one or more intelligent authors, can hardly be used to prove that these authors are intimately present with us (or even still alive). This is why, in Alc. 4, everything changes:

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<sup>16</sup> The brackets here represent a later insertion in the third edition of NTV. Given that “author” has no particular significance for the written vs. spoken distinction, it is most likely that Berkeley made this insertion because the expression “voice of nature” was typically used in the 18<sup>th</sup> century to refer to the innate moral conscience belonging to human beings independent of Christian revelation, and he wished to avoid potential ambiguity. Berkeley himself uses it in this same moral sense in various places, including PO §25, §39, and Alc. 1.16.

Berkeley carefully avoids any use of the term ‘mark’ (reserving it for Alc. 7, where he discusses the ‘marks of a permanent nature’ devised by scientists and mathematicians), and the spoken language analogy entirely dominates. Alciphron insists to Euphranor that he must show that “God speaks to man in the same clear and sensible manner as one man doth to another” (Alc. 4.6), because “nothing so much convinces me of the existence of another person as his speaking to me. It is my hearing you talk that, in strict and philosophical truth, is to me the best argument for your being” (ibid.). We learn in what follows that “the Author of Nature constantly speaks to the eyes of all mankind” (Alc. 4.11), that “you have as much reason to think [God] speaks to your eyes, as you can have for thinking any particular person speaks to your ears” (Alc. 4.12), and finally that “we [see] God with our fleshly eyes as plain as we see any human person whatsoever, and he daily speaks to our senses in a manifest and clear dialect” (Alc. 4.14).

Of course, when we discuss spoken and written language in this context the distinction should not be drawn in terms of the sense-modality in which the language is encoded.<sup>17</sup> An audio-recording of someone’s voice, after all, is no better evidence of providence or intimate presence than a book is, while a real-time exchange of epistles very much is.<sup>18</sup> The distinction is metaphorical, and should instead be drawn in terms of contextually-appropriate responsiveness

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<sup>17</sup> Some have tried to equate written *letters* and spoken *phonemes* with *visibilia* and *tangibilia*, respectively, based on passages like PHK §44 (see, e.g., Mirarchi 250-252 and Turbayne 12). Whether this can be done has no particular significance for whether we think of perceptions of sensible bodies (the *words* in the divine language) as instances of spoken or written language in the technical sense that I discuss in this paragraph (which is why Turbayne can consistently maintain that the divine language is exclusively a written language on the semantic level while allowing a written-spoken distinction, in a different sense, on the morphological level). *Visibilia* may indeed *stand for* *tangibilia* in the same way letters stand for phonemes, while *meaning* a much more general and robust range of things once appropriately compounded into sensible objects and scenes. I believe that Barnouw has something like this in mind when he writes that “the semiotic linking of visual and tactile sensations is transferred or transposed to a different level, moving from the construction of objects in space to anticipation of the results of events in the world” (Barnouw 169).

<sup>18</sup> Likewise, although Danaher thinks that the divine language is a written language because when we read we “take meaning from the arrangement of visual marks on the page of a book” (Danaher 363), the fact that most written language is visual is purely accidental. We need only consider Braille to realize that a written language need not be visual at all, and sign-language to realize that a visual language need not be written.

to our own actions and utterances. Written language, in my technical sense, is *monologic* and corresponds to what we might call 'mere transmission.' Spoken language, in contrast, is *dialogic* and corresponds to reciprocal communication. It is only if we understand the spoken-written distinction in this way that Berkeley's divine language argument is intelligible as an argument for divine providence, and so understood his exclusive use of spoken language analogies in Alc. 4 makes perfect sense. Written words obviously exhibit contextual variation in the limited sense that their meanings partially depend upon the context of surrounding words and sometimes where they are inscribed (e.g. the word 'STOP' inscribed on a street sign vs. at the end of a sentence in a telegram), but not with respect to our own subsequent actions and utterances. A copy of the Iliad says the same things no matter where I take it or what I yell at it; a living person does not. This is why Berkeley writes that it is "the instantaneous production and reproduction of so many signs combined, dissolved, transposed, diversified, and adapted to such an endless variety of purposes, *ever shifting with the occasions and suited to them*, [that] doth set forth and testify the immediate operation of a provident Spirit" (Alc. 4.14, emphasis mine).

What, then, has become of written language? Has God speaking completely replaced the 'volume of nature' described in PHK? In my view, it has not. If we look to Alc. 7, Berkeley asserts that arithmetic, being one of the sciences,<sup>19</sup> requires not only that we establish a set of conventional names but that we "devise proper *marks of a permanent nature*" (Alc. 7.12, emphasis mine). The connection between the permanence of a mark/sign and its status as a written mark/sign is straightforward: such a mark is static, and thus monologic. It is because the book and the audio-recording are both static transmissions that both exhibit no variation in

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<sup>19</sup> The assertion that arithmetic is among the sciences is not exclusive to Alc. 7. For example, he elsewhere writes that "The two great provinces of speculative science, conversant about the ideas received from sense and their relations, are natural philosophy and mathematics" (PHK §101).

response to our own actions and utterances. Consider, moreover, that in Alc. 4.7 Alciphron had explicitly rejected a conventional teleological design argument based on the universality of scientific laws (see Alc. 4.5-6), in favor of one based on spoken language. While we have very limited power to choose what we perceive by sense given, for example, that our eyes are open,<sup>20</sup> we do have the power to choose whether and where to “look,” and what is expressed in the divine language *qua* manifest image thus responds to our own actions in a systematic way indicative of divine providence. In contrast, at least some of what is expressed in the divine language *qua* scientific image—such as Newton’s laws of motion and gravitation—is the same always and everywhere.<sup>21</sup> Whether the laws of gravitation or chemistry continue to obtain has exactly nothing to do with our own actions and utterances; the deliverances of the robustly mathematizable sciences are thus based on monologic transmissions, and the written aspects of the language of nature correspond to these monologic transmissions. Finally, unlike conventional design arguments which rely on specifically scientific information (e.g. the values of natural constants) and which can at most demonstrate Deism, the divine language argument is deliberately crafted to depend on no specifically scientific understanding whatsoever; laymen need only open their eyes to see God. The implication is tantalizing: in an important sense, Berkeley meant for the divine language *qua* written text to correspond to the natural world viewed through the eyes of scientific practice, and for the divine language *qua* spoken discourse to correspond to the natural world viewed through the eyes of common sense. That Berkeley should

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<sup>20</sup> "When in broad daylight I open my eyes, it is not in my power to choose whether I shall see or no, or to determine what particular objects shall present themselves to my view" (PHK §29).

<sup>21</sup> Kenneth Winkler sees in Berkeley’s system a dichotomy of empirical regularities that closely mirrors Wilfrid Sellars’ manifest and scientific images: “the simultaneous existence of two sets of useful regularities—one available to the common man and viable within the realm of ordinary life, the other apparent only to the curious eye of the philosopher and in the end more useful than the other, even from the point of view of common sense” (Winkler 1986, p. 35).

have subsequently come to think that scientists should be distinguished from laymen by their literacy is, in light of all this, perfectly unsurprising.

It may be objected that Berkeley writes in TVV (published in 1733, a year after the completion of *Alciphron*) that “The characters of divinity are large and legible throughout the whole creation to men of plain sense and common understanding” (TVV §7). This passage seems clearly to suggest that laymen are (or can be) literate in the language of nature, and I freely own that it is by far the passage most recalcitrant to my interpretation. My reply is twofold. First, TVV is, on the whole, a combination of neutral and vague on the spoken-written distinction (see §8, §38, and §40 for a few examples). Although Berkeley knows he needs the language of nature *qua* manifest image to be spoken in order for the inference to divine providence to work for laymen, he is still grappling (prior to the revisions to PHK in 1734) with whether and how to reincorporate the ‘book of nature’ trope into his system. Berkeley would have found himself under significant pressure to do so, given the theological background which compares Nature and Scripture as God’s two books (see Matthiessen 8 and Gorham 34) and the alchemical background which extensively uses written-language metaphors for the natural world. TVV is representative of a Berkeley in puzzlement and transition, but by 1734 his puzzlement is resolved and there is a smoking gun to prove it: the revisions to PHK §108 and §110.

In the 1710 edition of PHK, §108 states that scientists “seem to be grammarians, and their art the grammar of nature ... two ways there are of learning a language, either by rule or by practice: a man may be well-read in the language of nature, without understanding the grammar of it” and §110 states that “the best grammar of the kind we are speaking of [is Newton’s *Principia*].” In the 1734 edition of PHK, both of these lines are replaced. §108 now states that scientists “consider signs rather than causes” and that “a man may well *understand* natural signs

without knowing their analogy, or being able to say by what rule a thing is so or so,” while §110 states that “the best *key* for natural science [is Newton’s *Principia*]” (both emphases mine). This is truly stunning. At one stroke, Berkeley has done two things: he has replaced the one and only indication outside of TVV §7 that laymen are literate (“well-read”) in the language of nature with an indication merely that they are fluent (“understanding”) in the language of nature,<sup>22</sup> and while downplaying the grammarian analogy (for reasons I have already discussed) introduces a cryptographical analogy into his philosophical writings for the first time.

Why is the passing mention of cryptography significant, given that Berkeley never goes on to make systematic use of such analogies to develop a conception of scientists as codebreakers rather than grammarians? It is because such analogies pervade the writings of the alchemists in general, and Francis Bacon in particular. As Matthiessen observes, “Alchemical discourse bore a resemblance to the depiction of natural philosopher as code-breaker” (Matthiessen 14), and this was no accident; alchemists, like their mechanist bedfellows, needed the cryptographical analogy to justify their use of the hypothetico-deductive method (as opposed to an inductivist approach more germane to the traditional empiricist/Aristotelian epistemologies).<sup>23</sup> That Berkeley chooses to re-describe Newton’s *Principia* as a *key* is a dead giveaway that he has been reading the alchemists in the lead-up to 1734—presumably because, in the wake of his rudimentary insights in *Alciphron* about the written-spoken distinction in the

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<sup>22</sup> See also the changes to PHK §66. Berkeley replaces the statement that “to understand this language of the Author of Nature ought to be the employment of the natural philosopher” with the statement that “to understand those signs instituted by the Author of Nature ought to be the employment of the natural philosopher.” Contra Dancy, Berkeley is not downplaying the semantic turn at all; instead, he is systematically removing everything in PHK that might suggest that laymen do not understand the divine language.

<sup>23</sup> Boyle uses cryptography to connect the ‘book of nature’ with the hypothetico-deductive method by analogizing nature to “an excellent Letter about several Subjects, and to different Purposes, whereof some Parts were written in plain Characters, others in Cyphers, besides a third sort wherein both Kinds of Writing were variously mix’d” (Works 10, p. 569).

language of nature, he wishes to better understand how scientists like Boyle and Bacon have made use (as they frequently did) of the ‘book of nature’ trope.

There is no definitive proof that Berkeley was reading Bacon in particular (the only explicit mentions of Bacon are passing references in PC 564 and Alc. 6.22), but the circumstantial evidence is considerable, and it would hardly be surprising given how well-versed in general Berkeley was in the science of his day. Most importantly, Bacon draws detailed parallels between scientific practice and linguistic competence, specifically competence with written language. He makes the highly provocative claim that “the results of investigation need to be written down, that ‘experience itself has to be taught how to read and write,’ that is, to become literate” (Gorham 54). Bacon is the lone alchemist (so far as I am aware) to explicitly analogize scientific ability to literacy. It is unclear exactly how literally Bacon would have meant for his readers to take such claims. One author states that it is “extremely tempting to give such claims a quasiliteral interpretation, transforming Bacon’s project of an experimental investigation of nature into a form of literary pursuit” (ibid. 54), but remains justifiably wary because Bacon has nothing to say about rules of grammar and syntax (see ibid. 63). Berkeley, however, does—and given the structure of the divine language argument, it is clear he would have had no compunction appropriating Bacon’s idea and giving it a perfectly literal interpretation. My position is that Berkeley did just that, and this is what explains the 1734 revisions to PHK as well as the oscillation between written and spoken language analogies largely coming, at long last, to an end. It remains perfectly *possible*, however, that Berkeley arrived at the same conclusion independently from Bacon.

Before turning to Berkeley’s view of the relationship between natural science and natural theology, it is worth mentioning that my theory may help to explain the genesis of *Siris*,

Berkeley's highly peculiar and seemingly incongruous 1744 work on the salutary virtues of tar-water. Alchemical literature is a bottomless pit—by contemporary standards, a truly sprawling landscape of loose thematic associations interspersed here and there with genuine philosophical insight and scientific experimentation. This is exactly how *Siris* reads. That *Siris* is influenced heavily by alchemical writings is uncontroversial; what my theory adds is an explanation of why Berkeley began his descent into said bottomless pit in the first place. Having realized that nature has to be a spoken language for the divine language argument to work as intended, Berkeley is left confused about how to handle the more common idea of nature as a written text—so he returns to the alchemists who used the 'book of nature' motif the most, in the process gaining not only an eclectic battery of alchemical information to draw upon while writing *Siris* but discovering a) that scientists are better understood as literate than as grammarians (from Bacon) and b) the virtues of the hypothetico-deductive method (from Boyle and/or others). That *Siris* bears witness to an evolution in Berkeley's philosophy of science from inductivist anti-corpuscularianism to hypothetico-deductive corpuscularianism has been widely documented, most notably by Lisa Downing (e.g. 1995, p. 293) and Gabriel Moked (e.g. 1988, pp. 88-89); my theory simply adds a further partial explanation of what led to this evolution.

#### **IV. Natural Science Makes No Contribution to Natural Theology**

In *De Motu*, Berkeley pens the following:

But to treat of the good and great God, creator and preserver of all things, and to show how all things depend on supreme and true being, although it is the most excellent part of human knowledge, is, however, rather the province of first philosophy or metaphysics and theology than of natural philosophy which to-day is almost entirely confined to experiments and mechanics. And so natural philosophy either presupposes the knowledge of God or borrows it from some superior science. Although it is most true that the

investigation of nature everywhere supplies the higher sciences with notable arguments to illustrate and prove the wisdom, the goodness, and the power of God (DM §34)

This passage appears internally inconsistent—on the one hand explaining that natural theology is not the province of natural science/philosophy, and on the other hand stating that natural science/philosophy provides arguments to demonstrate the divine attributes. Notably, however, Berkeley never says what these arguments provided by natural science actually are, and he never utilizes such arguments within his own philosophy.<sup>24</sup> The best explanation of this passage, therefore, is that Berkeley is simply throwing a bone to his Cartesian audience—the Cartesians who would be judging *De Motu* for an essay competition—and that his considered position is the same as we find throughout the rest of his writings: natural science makes no (distinct) contribution to natural theology whatsoever. This is in stark contrast to many philosophers of Berkeley’s day, Cartesian and otherwise, who saw science as providing knowledge of God that is in some way superior to that which is available through common sense.

That Berkeley thinks this is indicated in several ways. He writes that it is “a truth evident by the light of nature” that an omniscient spirit exists and that we ought to conform our actions to its will (PO §6). Similarly, in both PHK and *Alciphron*, he writes that “we need only open our eyes” (PHK §148) to see God; laymen have just as much access to these metaphysical truths as do the learned. In the *Three Dialogues*, Berkeley holds that his philosophical system enables us to “oppose and baffle the most strenuous advocate for atheism ... without any laborious search into the sciences” (3D 2:213). That Berkeley elsewhere makes the usual pious remarks about

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<sup>24</sup> The closest he comes is a possible *transcendental* argument for God’s existence/benevolence, from science’s reliance on God for the reliability of induction: “All deductions of [other phenomena from the general laws of nature] depend on a supposition that the Author of nature always operates uniformly, and in a constant observance of those rules we take for principles, which we cannot evidently know” (PHK §107).

God's wise contrivance in the hidden works of nature, there can be no doubt—but these seem to be pious remarks only and they play no role, systematic or substantial, in his work.

What *motivates* Berkeley to try to insulate natural theology from natural science is fairly clear and uncontroversial: his apologetic aims. As Pearce writes, “He wishes to defend his metaphysics and theology from any encroachment on the part of the physicists. Berkeley shares the positivist aim of separating science from metaphysics for the protection of science, but, unlike the positivists, he regards this separation as likewise protecting metaphysics and theology” (Pearce 2017, p. 51). What *justifies* this insulation is far less clear, especially given that few other philosophers of his day would have thought it was possible or desirable. Berkeley can argue, as he does, that his philosophical system affords people of common sense various theological insights, but there is no *principled reason* for this separation to be found.

I propose that Berkeley's conformity of the scientific image to written language, in contrast with the spoken language of the manifest image, gives him exactly the principled reason that he needs. To understand the relationship between science and common sense in this way makes science entirely derivative, and entirely contingent, just as written language is only a contingent part of a language like English. Even more importantly, there is no possible meaning expressible through the written version of a language which is not also expressible through the spoken version. It is, of course, possible that as a matter of contingent fact there is information about God that God has encoded only in written form—but it is never the case that there is information about God that God could *only* have encoded in written form. Since all the same meanings are expressible in both, the scientists' knowledge is not fundamentally different in kind from the laymen's (as Berkeley repeatedly states). Berkeley observes that “one who can neither write nor read, in common use understands the meaning of numeral words as well as the best

philosopher or mathematician" (Alc. 7.11)—and the same goes for theological words. At most, science can lend us additional precision and exactness, just as writing lends precision and exactness to speech: it “giv[es] us distinct views, gradually correcting our judgment and reducing it to a philosophical exactness” (TVV §35). There may indeed be knowledge of some of God’s token volitions available through science that is not available through common sense (see, e.g., PHK §32 for discussion of divine volitions constituting the laws of nature), but this information is comparatively trivial and does not pertain to God’s existence, intrinsic attributes, moral law, or providential governance (i.e., to natural theology).

It may be objected to my view that insofar as Berkeley is a scientific instrumentalist, *of course* science makes no distinctive contribution to metaphysics, and *a fortiori* no distinctive contribution to natural theology; he does not need the view of scientists as lectors to reach this conclusion. This is an interesting point, and it is certainly possible that Berkeley’s view of the relationship between science and theology is overdetermined, but I think that this objection has a significant flaw: there is substantial disagreement in the secondary literature about the *scope* of Berkeley’s instrumentalism. Downing, for example, has argued persuasively that while Berkeley is an instrumentalist about forces, this instrumentalism does not extend beyond Newtonian dynamics, e.g. to corpuscles (see 1992, ch. 5). Likewise, Jesseph distinguishes different grades of instrumentalism in Berkeley, arguing that Berkeley rejects mathematical instrumentalism while accepting it to different degrees in different scientific domains (see Hight 15 for concise discussion). These are but two examples, and I need take no stand here on the exact scope of Berkeley’s instrumentalism; the point is simply that there is no automatic inference available from instrumentalism in certain domains to the conclusion that natural science *as a whole* has nothing (or at least nothing unique) to tell us about metaphysical truths. If we accept the literacy-

based model of science that I am attributing to Berkeley, however, such an automatic inference *is* available, and the availability of this inference should count in its favor.

## **V. Conclusion**

I believe that I have been able to provide a compelling narrative explaining the evolution of Berkeley's philosophical thought about the relationship of scientific practice to the divine language model of nature. This narrative explains several apparent idiosyncrasies in his writings, explains the revisions he chose to make to those writings, and further enriches our understanding of the language model as a whole.

## **Primary Literature (Roughly Chronological)**

[PC] *Philosophical Commentaries* (unpublished).

[NTV] *An Essay Toward a New Theory of Vision* (1709).

[PHK] *A Treatise Concerning the Principles of Human Knowledge* (1710, 1734).

[PO] *A Discourse on Passive Obedience* (1712)

[3D] *Three Dialogues between Hylas and Philonous* (1713).

[DM] *De Motu* (1721).

[Alc.] *Alciphron, or The Minute Philosopher* (1732).

[TVV] *The Theory of Vision Vindicated and Explained* (1733).

[S] *Siris: A Chain of Philosophical Reflexions Concerning the Virtues of Tar Water* (1744).

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