

# From modality to millianism

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## Abstract

A new argument is offered which proceeds through epistemic possibility (*for all S knows, p*), cutting a trail from modality to Millianism, the controversial thesis that the semantic content of a proper name is simply its bearer. New definitions are provided for various epistemic modal notions. A surprising theorem about epistemic necessity is proved. A proposition *p* can be epistemically necessary for a knowing subject *S* even though *p* is a posteriori and *S* does not know *p*. The identity relation is well-behaved in metaphysically possible worlds but can go rogue in epistemically possible worlds. Whereas it can be epistemically possible that Lewis Carroll is not Charles Lutwidge Dodgson, this is not epistemically possible in the manner that anti-Millianism requires.

I have elsewhere defended a Millian account of proper names, demonstratives, variables, and similar designators.<sup>1</sup> According to Millianism—so-named for its brilliant godfather, John Stuart Mill—proper names, and similar devices like demonstratives, are Millian designators, in the sense that their semantic content is nothing more than their bearer or designatum.<sup>2</sup> (Millianism is also known as ‘neo-Russellianism’, so-named for Mill’s brilliant godson, Bertrand Russell.) It is uncontroversial (by the standards of philosophy) that Millianism inexorably leads to rigidity (to

<sup>1</sup> In *Frege’s Puzzle* (Atascadero, Ca: Ridgeview, 1986, 1991) and subsequent work.

<sup>2</sup> John Stuart Mill, *A System of Logic* (London: John W. Parker, 1843), Book I “Of Names and Propositions”, Chapter II “Of Names”, §5. To obtain a more complete picture of Mill’s account of semantic content, one must also read Chapter V “Of the Import of Propositions”, especially §§ 2, 4. (Mill uses the word ‘proposition’ for declarative sentences.)

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be defined below). It is also relatively uncontroversial that the converse does not hold. In fact, whereas Kripke brought our attention to the rigidity of proper names in his masterpiece *Naming and Necessity* (hereafter, *N&N*),<sup>3</sup> and while to my knowledge he never rejected Millianism, he certainly never endorsed it. Although he later defended Millianism against one stock objection—the objection from purported failure of substitution—in the very same landmark essay, Kripke also argued against some of Millianism’s other consequences.<sup>4</sup> Here I undertake a careful study of one particular type of modality, which has not been properly set out in the existing literature. I shall make a case that considerations from this quarter provide very strong support for Millianism. I regard the assumptions I shall make to be not merely exceedingly plausible but definitely correct and obvious, or at least intuitive. Still, anti-Millians, if they are sufficiently stubborn, will also reject one or more of those assumptions. Tellingly, it is highly unlikely that they will entirely agree concerning exactly which assumptions to reject. In any case, one may regard the immediate conclusion of my argument to be conditional: Insofar as the various plausible assumptions are correct, proper names are not only rigid designators but Millian designators.<sup>5</sup>

In broad outline, my argument proceeds as follows: Metaphysical modality is only one among a variety of kinds of modality (logical modality, mathematical modality, etc.). Any type of modality may be understood in terms of worlds that are possible in the relevant manner (e.g., logically possible worlds). One non-metaphysical type of possibility is epistemic possibility relative to a knowing subject *S*. This is the notion: *for all S knows, p*. Epistemic modality is properly defined in terms of propositional knowledge, and may be clarified in terms of epistemically possible worlds. The actual world is epistemically possible, but many epistemically possible worlds are metaphysically impossible. Some are even logically impossible. Proper names (and some similar devices) are modally rigid designators as a consequence of their being nondescriptorial. Just as the metaphysically-modal rigidity of proper names is a consequence of their being nondescriptorial, so also is rigidity of any type of modality. Proper names are therefore epistemically rigid in addition to being metaphysically-modal rigid. A surprising but fundamental theorem is proved about epistemic modality: *p* is epistemically necessary for *S* iff either *S* knows *p* or *S* knows  $\sim\sim p$  (or both). It thereby follows that it is indeed epistemically possible for some knowers that Hesperus is not Phosphorus. However, it also thereby follows from semantics and the epistemic rigidity of proper names that, contrary to anti-Millianism, anyone who believes anything at all about Venus believes that Hesperus is Phosphorus. Indeed it follows, in accordance with Millianism, that for anyone who believes anything about Venus, it is a priori that Hesperus is Phosphorus.

## 1 |

It is widely recognized that modal concepts like that of metaphysical necessity—“necessity *tout court*” (Kripke)—are intimately connected with Leibniz’s idea of a *possible world*. A proposition *p* has a given kind of necessity  $\Box$  (e.g., mathematical necessity,  $\Box_{Math}$ ) iff *p* is true in every world that is possible *in that way* (e.g., mathematically). A proposition is possible in a particular way iff it is true in at least one world that is possible in that way. A proposition is contingent in a

<sup>3</sup> Kripke, *Naming and Necessity* (Oxford: Blackwell, 1972, 1980).

<sup>4</sup> Kripke, “A Puzzle about Belief,” in A. Margalit, ed., *Meaning and Use* (Dordrecht: D. Reidel, 1979), pp. 239–283. Kripke repeatedly insists that Pierre’s beliefs are consistent. But it is precisely this that a well-considered Millianism rejects. See Appendix III below concerning Kripke’s heretofore unpublished final views.

<sup>5</sup> See Appendix I below concerning David Chalmers’s basis for rejecting the case mounted here.

particular way iff it is possible in that way but not necessary, i.e., true in some but not all worlds that are possible in that way. In particular, and as a special case, a proposition is metaphysically possible iff it is true in some metaphysically possible world. This generalization is analytic, but it does not provide a definition of ‘metaphysically possible’ as applied to propositions in terms of metaphysically possible worlds. The order of analysis is exactly the reverse. The generalization is true as a consequence of a definition of ‘metaphysically possible’ as applied to worlds, in terms of the same phrase as applied to propositions: A world  $w$  is *metaphysically possible* =<sub>def</sub> the propositions true in  $w$  are jointly metaphysically possible. Similarly for every other type of modality (e.g., mathematical).

A type of necessity  $\Box$  (e.g.,  $\Box_{Math}$ ) is *alethic* iff a proposition’s having  $\Box$  logically entails that proposition itself, i.e., iff for all propositions  $p$ ,  $\Box p \models p$ .<sup>6</sup> Among truths, some are alethically necessary of one variety or other, while the rest are contingent of that same variety. The class of worlds that respect a particular set of laws, e.g., the laws of biology (perhaps together with initial or boundary conditions) characterize a particular kind of modality. Some varieties of alethic possibility are broader or wider than others —less constrained, less narrow, or less restricted. A proposition is *logically possible*,  $\Diamond_{Logic}$ , iff it does not logically entail a contradiction. Logical necessity is the kind of necessity such that: any argument is valid iff it is necessary in that way that if the premises are true then so is the conclusion. A proposition is *mathematically possible*,  $\Diamond_{Math}$ , iff it does not lead to mathematical falsehood. Mathematical possibility is broader than natural (sometimes called ‘nomological’) possibility,  $\Diamond_{Nature}$ , in that the class of naturally possible worlds is a proper subclass of the class of mathematically possible worlds. Correspondingly, the class of naturally possible propositions is a proper subclass of the class of mathematically possible propositions. (Each naturally possible proposition determines its natural intension, the class of naturally possible worlds in which the proposition is true.) Contrapositively, the class of mathematically necessary truths is a proper subclass of the class of naturally necessary truths. That is, some naturally necessary truths (e.g., that nothing travels at a velocity greater than  $c$ ) are mathematically contingent, whereas every mathematically necessary truth is *ipso facto* naturally necessary. Throughout the remainder of this essay, I shall use the unadorned word ‘possible’ (i.e., possible *tout court*) as shorthand for ‘metaphysically possible’, and the unadorned ‘necessary’ as shorthand for ‘metaphysically necessary’.

Many philosophers of modality were initially seriously confused about the nature of a possible world, succumbing to the temptation to treat the misleading idiom ‘possible world’ as meaning something like “universe that might have existed”. A number of philosophers took possible worlds to be not only full-blown universes that *might have* existed, but universes that *exist* parallel to our own universe. Insofar as one’s philosophical semantics posits a multiverse cosmology, one is not doing semantics correctly. The most prominent adherent of the parallel-universe misconception was David Lewis. The blunder was eventually noted and corrected, though Lewis himself adamantly refused to admit the mistake.<sup>7</sup> Surprisingly, many philosophers today persist in conceiving of possible worlds under the parallel-universe misconception. Although the phrase ‘possible world’ is an idiom, it is also compositional in meaning. It means: *world* that is *possible*. Each of the words ‘possible’ and ‘world’ occurs in a special, decidedly philosophical sense. A pos-

<sup>6</sup> I take it throughout that alethic necessity and alethic possibility are primarily properties of propositions. Derivatively a sentence is said to have a modality of a particular kind (e.g., to be *mathematically necessary*) iff the proposition it expresses has that kind of modality.

<sup>7</sup> See David Lewis, *On the Plurality of Worlds* (Oxford: Blackwell, 1986); Kripke, *N&N*, pp. 15-20, 43-53; and Robert Stalnaker, “Possible Worlds” *Noûs*, 10 (1976), pp. 65-75.

sible world is a highly specific scenario, but crucially, a scenario that might have obtained. What distinguishes a possible world from other types of scenarios that might have obtained is that it is a *world*, in the metaphysician's sense. A world in this special sense is not a universe but a complete scenario, a scenario involving *everything*—everything at every time and everything timelessly. A world decides every question of fact; it determines the truth-values of each proposition—or in some cases, it decides that a given proposition lacks truth-value. For present purposes, the latter prospect will be accommodated by adopting so-called *external* (as opposed to *internal*) or *exclusion* (as opposed to *choice*) *negation*, indicated throughout by ‘ $\sim$ ’. An external-negation proposition  $\sim p$  is true if  $p$  is not true, irrespective of whether  $p$  is false.

A possible world is a world (complete scenario) that might have obtained. As others have noted, the phrase ‘possible world’ may be understood as shorthand for *total state that the entire universe might have been in*. Alternatively, the phrase may be understood as meaning a *way all things might have gone*—all things past, all things present, all things future, and all things timeless.<sup>8</sup>

The actual world  $w^*$  is a uniquely special possible world, and hence not a universe but a world in the metaphysician's sense. It is the way all things *are*, the total state that the entire universe is in. All other worlds are non-actual. It is important to recognize that not all worlds are genuinely possible worlds. Some worlds are impossible. Many philosophers eschew the very notion of an impossible world, but this is generally coupled with the parallel-universe misconception of worlds (or sometimes with the failure to distinguish between metaphysical and logical modality). An impossible world is not an especially repugnant universe. It is an object of the same ontological category as a possible world; it is a way for all things to be. Possible worlds and impossible worlds differ metaphysically. A possible world is a way all things might have been; an impossible world is a way all things could not have been. That is, an impossible world is a way for all things to be such that things could not have been that way. For example, a world in which water is not composed of hydrogen and oxygen is an impossible world, and a world in which I am a credit-card account is likewise an impossible world.<sup>9</sup> Although it has not been generally recognized, impossible worlds already arise in classical Kripke-style possible-world semantics for propositional modal logic, in its  $T$  and  $B$  models. If  $w_2$  is not accessible to  $w_1$ , and  $w_1$  is the actual world, then  $w_2$  is an impossible world.

A world, in this metaphysical sense, both determines, and is determined by, the propositions that are true in it. For most purposes, one may regard a world, in this metaphysical sense, as a *yes/no-complete class* of propositions, i.e., a class  $w$  of propositions such that for every proposition  $p$ , either  $p \in w$  or else  $\sim p \in w$ .<sup>10</sup> It is not required that the class be closed under logical consequence. Consequently, some worlds are inconsistent. Note that the definition of ‘yes/no-complete’ invokes

<sup>8</sup> In *Counterfactuals* (Harvard University Press, 1973), Lewis, defines possible worlds as “ways things could have been” (p. 84). This passage, however, is spectacularly inconsistent with the burden of the book cited in note 7 above. Cf. Stalnaker, “Possible Worlds”.

Kripke pointed out in a 2022 seminar that one could manage instead with less-than-maximal possible scenarios. A proposition is possible iff it is true in at least one possible scenario. However, for a proposition to be necessary it is not required that the proposition be true in every possible scenario, including less-than-maximal scenarios. Few (if any) necessary truths meet this condition. What is required is that its denial not be true in any possible scenario.

<sup>9</sup> Cf. “The Logic of What Might Have Been”, *The Philosophical Review*, 98, 1 (January 1989), pp. 3-34; reprinted in my *Metaphysics, Mathematics, and Meaning* (Oxford University Press, 2005), pp. 129-149.

<sup>10</sup> A world should not be identified with a set in the mathematical sense, for cardinality reasons. More pertinently, for familiar reasons involving distinct but co-intensional propositions, a proposition is not identifiable with the class of worlds in which it is true. Cf. my “Synonymy”, in Alessandro Capone, Roberto Graci, and Pietro Perconti, eds, *New Frontiers in Pragmalinguistic Studies: Philosophy, Cognition and Pragmatics: Perspectives in Pragmatics, Philosophy & Psychology* 34

inclusive disjunction, so that in some worlds some proposition and its denial both obtain, i.e.,  $\exists w \exists p[(\text{in } w, p) \ \& \ (\text{in } w, \sim p)]$ . An inconsistent world, in the metaphysician's sense of 'world', is a complete way for all things to be such that logically, things could not be that way. It is important to recognize also that some but not all inconsistent worlds include a conjunctive proposition whose conjuncts are each of a pair of contradictory propositions. A world  $w$  is a *contradiction-conjunction world* iff  $\exists p(\text{in } w, p \ \& \ \sim p)$ .

Though there are contradiction-conjunction worlds in this sense, no inconsistent world is a genuinely possible world. A world is possible iff its elements are compossible, i.e., metaphysically they could all have been true together. More generally, a world has a particular type of possibility iff it is possible in that way for all of its element propositions to have been true together. All possible worlds are logically possible, but not vice versa. A logically possible world in which I am a credit-card account is not a possible world. Although it gives rise to no logical inconsistency, it is not metaphysically possible.

## 2 |

The notion of a possible world is an essential tool in the metaphysician's toolbox, even though many metaphysicians spurn possible worlds. While the notion has been in use since Leibniz, its distinctly contemporary use arose in the 20<sup>th</sup> Century with possible-world semantics as a branch of philosophical logic. Our discourse can be re-focused on scenarios that deviate in one way or another from reality. The central idea of possible-world semantics is that extensional semantic relations, like designation and truth, are to be relativized to a world. The fundamental semantic conception of the truth of a sentence (closed formula)  $\phi$  with respect to a world  $w$  is given by the following second-order formulation:

$$\phi \text{ is true with respect to } w =_{\text{def}} \exists p [ (\phi \text{ semantically expresses } p) \ \& \ (\text{in } w, p) ],$$

where 'p' ranges over propositions.<sup>11</sup> This definition is to be supplemented with Kripke-style world-relative intensional semantics, which is modelled after Tarski-style extensional semantics but relativized to worlds.<sup>12</sup> The two together tightly constrain which propositions the sentences semantically express. A designator designates something with respect to a possible world (under an assignment of values to variables), potentially different things with respect to different worlds. A sentence  $\phi$  is true, or not, with respect to a possible world. Potentially, a single sentence is true with respect to some worlds and not with respect to others. Importantly, a formula of the form  $\ulcorner \diamond \phi \urcorner$  is true with respect to a world  $w$  iff  $\phi$  is true with respect to some world  $w'$  that is possible in  $w$ ; a formula of the form  $\ulcorner \Box \phi \urcorner$  is true with respect to a world  $w$  iff  $\phi$  is true with respect to

(Switzerland: Springer Nature, 2024), pp. 45-52; and "Singular Concepts", *Synthese*, 204, 20 (2024), <https://doi.org/10.1007/s11229-024-04624-w>.

<sup>11</sup> Reference to the particular object language is suppressed throughout. The definition provided here, instantiated to the actual world, supplants the Tarski-style "definition" of 'true' in terms of truth under every assignment of values to variables ("satisfaction by every sequence"). Strictly, the latter should be understood not as a definition, but as an axiom of a Tarski-like theory of the semantic conception of truth. (Correcting one anonymous reviewer's misunderstanding, an assignment of values to variables is not the product of an action of assigning values to each of the variables, but simply a function from countably many variables to values.)

<sup>12</sup> Saul Kripke, "Semantical Considerations on Modal Logic", *Acta Philosophica Fennica*, 16 (1963), pp. 83-94.

every world  $w'$  that is possible in  $w$ . In this way, world-relative semantics catalogs the conditions for the sentences of the object language to express possible, impossible, true, and/or necessary propositions.

Kripke introduced the notion of a *rigid designator* in *N&N*. His intended notion is given by the following definitions:

$\alpha$  (*metaphysically*) *rigidly designates*  $x =_{\text{def}}$   $\alpha$  designates  $x$  with respect to every (ancestrally) metaphysically possible world in which  $x$  exists, and does not designate anything other than  $x$  with respect to any (ancestrally) metaphysically possible world.

$\alpha$  *strongly rigidly designates*  $x =_{\text{def}}$   $\alpha$  rigidly designates  $x$  and  $x$  (ancestrally) metaphysically necessarily exists.<sup>13</sup>

In his later preface (1980), Kripke refined the notion by distinguishing between two special types of rigidity:

$\alpha$  *de jure rigidly designates*  $x =_{\text{def}}$   $\alpha$  is “stipulated” to designate  $x$  rigidly (i.e.,  $\alpha$  rigidly designates  $x$  solely by virtue of pure semantics).

$\alpha$  *de facto rigidly designates*  $x =_{\text{def}}$   $\alpha$  rigidly designates  $x$  but not *de jure*, i.e.,  $\alpha$  “happens” to designate  $x$  rigidly (i.e.,  $\alpha$  rigidly designates  $x$  partly by virtue of facts beyond pure semantics).<sup>14</sup>

The latter two types are exhaustive and mutually exclusive. In my *Essentialism in Current Theories of Reference* (University of California, Los Angeles, doctoral dissertation, 1979), I drew a distinction closely related to Kripke’s distinction between *de jure* and *de facto* rigidity:

$\alpha$  *persistently (metaphysically) rigidly designates*  $x =_{\text{def}}$   $\alpha$  designates  $x$  with respect to every (ancestrally) metaphysically possible world in which  $x$  exists, and does not designate anything with respect to any (ancestrally) metaphysically possible world in which  $x$  does not exist.

$\alpha$  *obstinately (metaphysically) rigidly designates*  $x =_{\text{def}}$   $\alpha$  designates  $x$  with respect to every (ancestrally) metaphysically possible world  $w$ , whether  $x$  exists in  $w$  or not.<sup>15</sup>

There are important interconnections among these various notions. Most important are these: A designator is strongly rigid iff it is both persistently and obstinately rigid. Proper names, variables (under an assigned value), demonstratives, and the like are *de jure* rigid; rigid definite descriptions

<sup>13</sup> *N&N*, pp. 48–49. A proposition is *ancestrally possible* iff it is possible, or possibly possible, or possibly possibly possible, or etc.

<sup>14</sup> *N&N*, pp. 21n21. Kripke confirmed at the 2022 Hudson workshop cited in the acknowledgments that these formulations capture his intent.

<sup>15</sup> Salmón, *Reference and Essence, Second Edition* (Amherst, NY: Prometheus, 1981, 2005), at pp. 32–41.

are *de facto* rigid. Every *de jure* rigid designator is obstinately rigid. Every *de facto* rigid designator is persistently rigid.

A central thesis of *N&N* is now widely accepted: that proper names are *nondescriptional*, in the sense that their designation is not secured through describing. (This, not Millianism, was Mill's actual thesis.) Descriptive designators designate with respect to a world by sifting through the world, seeking something or someone that uniquely meets the fixed conditions that the designator semantically expresses. Nondescriptional designators work altogether differently: They bring their independently secured designatum with them to a world. From this, it virtually follows that proper names are rigid designators. Indeed it virtually follows that proper names are rigid *de jure*, and therefore obstinately rigid.<sup>16</sup>

There is an alternative, forceful argument that proper names are obstinately rigid. This comes by way of the case of the individual variable under an assigned value. A variable under an assigned value is utterly nondescriptive. With respect to a world (or a time), it must designate its assigned value; there is simply nothing else for it to designate. The variable under an assigned value does not rummage through the individuals in a world searching for a suitable designatum. It brings its assigned value with it to the world. An *individual constant* is any simple (non-compound) singular term that under any interpretation (or "model") has a fixed designatum, the same for every assignment of values to variables. Individual constants are effectively individual variables but married to a particular value. The only difference between an individual constant and an individual variable is that the variable roves promiscuously whereas the constant remains monogamous. It follows that individual constants are obstinately rigid. It is but a small step to recognize that proper names are individual constants (though some philosophers have denied this). Any consideration meant to cast doubt on this is refuted, in the style of Kripke's 'schmidentity' argument, by considering the brute stipulation of individual constants added to a natural language. If it is doubted that 'Socrates' is an individual constant, then consider instead the artificial singular term 'Schmocrates', stipulated to be an individual constant of an expanded version of English. As Kripke noted, "If anyone thinks about this seriously, I think [they] will see that probably [their alternative account] was not necessary, and probably not possible, for the problems it was originally meant to solve" (*N&N*, p. 108). In what follows, I shall take proper names to be natural-language individual constants. However, this assumption is not essential to the main argument.

It is important to recognize that the world to which designation or truth is relativized need not actually be possible. The possible-world semantics of an iterated necessitation " $\Box\Box\phi$ " leads one to consider worlds  $w''$  that are possible in worlds  $w'$  that are possible in an initial world  $w$ , *quite independently of whether  $w''$  is possible or impossible in  $w$* . One is entitled to insist that the same worlds would have been possible no matter which world were realized. That is a separate matter. The general semantic framework does not require any such supplementary constraints. Alethic-modal-logic imposes the constraint that, as a matter of pure logic, every logically possible world is possible in itself. This is guaranteed by the standard requirement that the modal relation of accessibility be reflexive. The general world-relative semantic framework need not impose any further constraints. I maintain furthermore that in the absence of weighty considerations favoring such supplementary constraints, the semantic framework should remain neutral by not imposing them. Though I take this to be obvious, others disagree with it, some vehemently. The point is unimportant to the present case for Millianism. The important point is that world-relative semantics applies to possible worlds and to impossible worlds alike in exactly the same way.

<sup>16</sup> Kripke confirmed at the 2022 Hudson workshop that he endorsed these theses.

The general world-relative framework can be extended to types of modality other than metaphysical. The broad framework is applicable to the temporal realm in addition to the modal. The sentence ‘The U.S. President is a Democrat’ is true with respect to the year 2022, false with respect to 2019. With respect to 2019, the description ‘the U.S. President’ designates Donald Trump. With respect to 2022, the phrase designates Joe Biden. Time-relative semantics yields a temporal analog of Kripke’s notion of rigidity:

*$\alpha$  temporally rigidly designates  $x =_{def}$   $\alpha$  designates  $x$  with respect to every time at which  $x$  exists, and does not designate anything other than  $x$  with respect to any time.*

Different types of modality give rise to different types of worlds. For example, physically possible worlds are worlds that are consistent with the laws of physics (and perhaps with initial or boundary conditions). More generally, naturally possible worlds are worlds that are consistent with the laws of nature. A naturally possible world is a world, in the same metaphysical sense, and may be regarded as a yes/no-complete class of propositions. What differentiates a naturally possible world from a metaphysically possible world is that the propositions true in a naturally possible world are consistent with the laws of nature. By contrast, the propositions true in a metaphysically possible world are consistent with the laws of metaphysics, and with some initial conditions, such as that water consists of hydrogen and oxygen. If some laws of nature are metaphysically contingent, then some possible worlds are naturally impossible. If some necessary truths are naturally contingent, then some impossible worlds are naturally possible.

One type of modality of special interest to philosophers is often confused with metaphysical modality. This is logical modality. A logically possible world is a world in the same philosophical sense, but one that is logically consistent, period—consistent with the laws of logic. Since there are metaphysically necessary truths that are not logical truths—e.g., that water consists of hydrogen and oxygen—some logically possible worlds are impossible worlds, e.g., a logically possible world in which water does not consist of hydrogen and oxygen. The “possibility” of a logically possible world is of a distinctly logical sort.

As with the temporal realm, logical modality gives rise to a special notion of rigidity:

*$\alpha$  logically rigidly designates  $x =_{def}$   $\alpha$  designates  $x$  with respect to every logically possible world in which  $x$  exists, and does not designate anything other than  $x$  with respect to any logically possible world.*

It is beyond reasonable doubt that insofar as proper names are nondescriptual, they are *de jure* and obstinately rigid among metaphysically possible worlds. The *de jure*, obstinate metaphysically-modal rigidity of a nondescriptual designator is not dependent on metaphysical modality and has everything to do with nondescriptuality. Insofar as they are nondescriptual, proper names are physically rigid, naturally rigid, and even logically rigid. In discourse about the metaphysically impossible but logically possible prospect of me being a credit-card account, the name ‘Nathan Salmón’ designates me. It is me that is a credit-card account in such a world, not some very bizarre, surreal counterpart of me. I could not have been a credit-card account. That is what makes the logically possible world an impossible world. Do not ask ‘But what makes the object in question Nathan Salmón?’. Kripke taught us that we can simply stipulate that we are talking about possible worlds in which Aristotle, so identified, is a fisherman. This is no less true of impossible worlds. To echo Kripke, we stipulate that we are talking about worlds in which I am



a credit-card account. It is not otiose to talk of such worlds, but even if it is, there is no problem about doing so.

These considerations suggest a broad notion of rigidity, of which all others are special cases:

*$\alpha$  absolutely rigidly designates  $x =_{def}$   $\alpha$  designates  $x$  with respect to every world (logically possible or not) in which  $x$  exists, and does not designate anything other than  $x$  with respect to any world.*

A central thesis of this paper is one I take to be obvious and beyond reasonable, well-considered doubt: Not only are proper names rigid designators, temporally rigid designators, physically rigid designators, naturally rigid designators, and logically rigid designators. *Insofar as they are non-descriptive, proper names are in fact absolutely rigid designators.* In discourse about any type of scenario—complete or no, possible or no—a proper name continues to designate exactly what it designates in discourse about the actual world, i.e., in discourse about reality. Being nondescriptive, names lack a basis on which to designate different things with respect to different scenarios. Rather, in some sense, names bring their designatum with them to the scenario with respect to which they designate, quite irrespective of whether the scenario is possible or impossible.

### 3 |

With the thesis that names are absolutely rigid designators, we approach our intended destination: the thesis that names are Millian designators. To continue on our path we consider yet another type of modality, one that is critical to philosophy: epistemic modality. Epistemic possibility is the notion expressed by the phrase ‘might be’ in contrast to ‘might have’, in the sense of the locution ‘For all we know’, as in ‘For all we presently know, there is no life beyond planet Earth’. There is a world of difference between the sentences ‘There might have been no life beyond Earth’ and ‘There might be no life beyond Earth’. The former expresses that the prospect that there is no life beyond Earth is metaphysically possible. The latter expresses that the prospect is epistemically possible, that for all we know the prospect actually obtains. Many (including myself) expect that someday the prospect will be shown not to obtain, and will thereby lose its status as an epistemic possibility. There is also a notion of epistemic necessity. Epistemic necessity is a species of knowledge. The exact relationship between the two will be explored below.

There are at least six features of epistemic modality that some philosophers fail to appreciate, or at least fail to appreciate sufficiently.

First, epistemic modality is not metaphysical. It is epistemic. Whereas epistemic necessity is a type of necessity and epistemic possibility is a type of possibility, neither is a restriction on metaphysical modality. Metaphysical possibility is no guarantee of epistemic possibility. As epistemic necessity is a species of knowledge, so epistemic contingency is a species of ignorance. It is possible that I am wearing a yellow shirt, but that is not epistemically possible for me since I know that I am not. Likewise, epistemic possibility is no guarantee of metaphysical possibility. Consider Goldbach’s conjecture, the hypothesis that every even integer greater than two is the sum of two prime integers. This conjecture might be true; for all we presently know, it is true. However, for all we presently know, it is false. Although it is epistemically impossible that it is both true and false, Goldbach’s conjecture itself is presently epistemically possible, and so likewise is its denial. Presently, each is, by itself, an epistemic possibility. We may never know which one is false. Yet one of the two is false. The false one is mathematically impossible, and therefore metaphysically

impossible, despite being currently epistemically possible. Some epistemically possible scenarios are inconsistent—as was the mathematics that would later be utilized in Andrew Wiles’s proof of Fermat’s theorem together with the denial of the theorem.

Second, since epistemic modality is epistemic, it is relative to a knowing subject. One and the same proposition can be epistemically possible for me but epistemically impossible for you. That is, it can happen that for all subject  $S$  knows,  $p$  is true, whereas it is not the case that for all  $S'$  knows,  $p$  is true. For  $S'$  might know  $\sim p$ .

Third, epistemic modality is a modality. Importantly for my present argument, epistemic modality is an alethic modality, by definition, since epistemic necessity analytically entails truth. As with any alethic modality, epistemic modality can be understood in terms of worlds—*not* metaphysically possible worlds, but epistemically possible worlds. A proposition  $p$  is epistemically possible for a subject  $S$  iff  $p$  is true in at least one world that is epistemically possible for  $S$ . Proposition  $p$  is epistemically necessary for subject  $S$  iff  $p$  is true in every world that is epistemically possible for  $S$ . Although an epistemically possible world need not be metaphysically possible, it is a world every bit as much as a metaphysically possible world is. It is a complete scenario that decides every issue. It may be regarded as a yes/no-complete class of propositions, and so on. What is distinctive about it is that for all  $S$  knows, it is the actual world.<sup>17</sup>

Fourth, since epistemic necessity is a species of mere knowledge, it is no guarantee of a-priority. (Equivalently, a-posteriority is no guarantee of epistemic contingency.) For example, it is a posteriori, but it is epistemically necessary for us, that Donald Trump was the only U.S. president to be impeached twice and convicted of multiple felonies. On the other side of the coin, a-priority is likewise no guarantee of epistemic necessity. (Equivalently, epistemic contingency is no guarantee of a-posteriority.) In 1994, Andrew Wiles proved Fermat’s famous conjecture (“theorem”). The theorem is a priori, and has always been so. But before Wiles proved it, for all we knew, it was false; it was epistemically possible that there were counterexamples. Indeed, despite his intellectual valor in devoting himself to finding a proof, for all Wiles knew before his astounding success, the conjecture was false. By the time Wiles published his proof, the denial of the a priori theorem was no longer epistemically possible among the cognoscenti, but prior to that it had been (unless Fermat actually had a proof, as he claimed).<sup>18</sup>

Fifth, an epistemically possible world need not be closed under logical consequence. Unless  $S$  is logically omniscient, inevitably some worlds that are epistemically possible for  $S$  are logically inconsistent. No one, not even Kurt Gödel, deduces all of the logical consequences of their beliefs. If anyone did, there would be no research left for mathematicians to do. It follows that some epistemically possible worlds for  $S$  will include the denials of the logical consequences of some propositions also included. (A variant of this disturbing result remains even in the limiting case

<sup>17</sup> A case parallel to the case made here may be mounted invoking mere correct belief in place of knowledge. A similar case might be attempted in connection with belief instead of knowledge. However, doxastic modality is not an alethic modality. See Appendix II below.

<sup>18</sup> David Chalmers and Scott Soames use what they call ‘epistemically possible worlds’ in representing a-priority as a type of necessity (truth in all worlds of a particular epistemic type of possibility). See Chalmers, *Constructing the World* (Oxford University Press, 2012), chapter 5; and Soames, “Actually”, *Proceedings of the Aristotelian Society*, Supplementary Volume, LXXXI (2007), pp. 251–277. The reader is cautioned, however, the resemblance of their apparatus and their usage to those employed here is at least somewhat superficial. Their notion of what they call an ‘epistemically possible world’ or ‘scenario’ is that of a world for which it is not a priori that it is not realized. To repeat: Epistemic necessity, in the sense used here, does not entail a-priority, nor vice versa. It would be a mistake to read either Chalmers or Soames as referring to epistemically possible worlds in the present sense without further ado. As will emerge, epistemically possible worlds, which are concerned with epistemic possibility (‘for all  $S$  knows’) rather than a-posteriority, are often a priori not realized.

of an extreme Cartesian doubter who believes nothing at all.) As a result, the classical Tarskian scheme for determining the truth-values with respect to a possible world of compound sentences on the basis of the truth-values of their components must be radically altered to accommodate epistemic modality. Probably the classical evaluation clause for negation—that  $\ulcorner \sim\phi \urcorner$  is true with respect to  $w$  iff  $\phi$  is not true with respect to  $w$ —can be retained intact. Perhaps one direction of the clause for conjunction can also be retained intact, but even so, the other direction cannot. There will inevitably be sentences  $\phi$  and  $\psi$  such that each is true with respect to an epistemically possible world but so also is the negation of their conjunction,  $\ulcorner \sim(\phi \ \& \ \psi) \urcorner$ . Similarly, there will inevitably be epistemically possible worlds with respect to which both premises of a *modus ponens* inference are true but so also is the denial of the conclusion. Epistemically-possible-world semantics is a delicate affair.

A question that must be faced is whether a contradiction-conjunction world can be an epistemically possible world. It appears so. For each human subject  $S$ , there are some contradiction-conjunctions,  $q \ \& \ \sim q$ , such that  $S$  is in no position to know its denial,  $\sim(q \ \& \ \sim q)$ . I say that a subject  $S$  is *de re connected* to an object  $x$  iff  $S$  is in a position with the cognitive resources at hand to form *de re* beliefs about  $x$ . If Jones has no *de re* connection to Saul Kripke, then Jones does not know anything directly about Kripke. In particular, Jones does not know of Kripke that it is not the case that he was both a philosopher and not a philosopher. In that sense, it is epistemically possible for Jones that Kripke was both a philosopher and not a philosopher. Of course, Jones's ignorance of Kripke is merely a matter of practical human limitation. The same is true of any contradiction-conjunction ( $q \ \& \ \sim q$ ) that exceeds the limits of  $S$ 's comprehension.

The sixth underappreciated feature of epistemic modality concerns the identity relation: whereas it is well-behaved in ancestrally metaphysically possible worlds, it goes rogue in epistemically possible worlds. This important feature is explored below (Section 6).

#### 4 |

To say that for all Smith knows, the number of shoppers presently at the local Trader Joe's is even, is just to say that Smith does not know that the number is odd. Epistemic possibility is *not knowing otherwise*. Equivalently, knowledge otherwise is epistemic impossibility. Regarding any proposition  $p$ , there are two relevant ways of knowing otherwise. The most straightforward way is to know the denial  $\sim p$ . This is *negative knowledge-otherwise*. There is also *positive knowledge-otherwise*. If  $p$  is itself the denial  $\sim q$  of a proposition  $q$ , then negative knowledge-otherwise with respect to  $p$  is simply knowledge of  $q$ . Suppose  $S$  definitely knows  $q$  but  $S$  does not infer  $\sim\sim q$ . Then  $S$  positively knows otherwise with respect to  $\sim q$ , but not negatively.  $S$ 's knowledge does not contradict  $\sim q$ , but  $\sim q$  contradicts  $S$ 's knowledge. (Perhaps  $S$  is unable to grasp  $\sim q$  because  $q$  is at the very limits of  $S$ 's powers of comprehension. For every one of us, there is some proposition that we know but do not infer its double denial. However perversely fond one may be of double negating, one eventually stops.)

I submit that a proposition  $p$  is epistemically possible for a knowing subject  $S$  iff  $S$  does not know otherwise, either positively or negatively, with respect to  $p$ . The following definition of an epistemically possible world is the central, key definition of epistemic modality:

$w$  is epistemically possible for  $S =_{\text{def}} \sim\exists p( [(S \text{ knows } p) \ \& \ (\text{in } w, \sim p)] \ \vee$

$[(S \text{ knows } \sim p) \& (\text{in } w, p)]$ .<sup>19</sup>

That is, a world (in the metaphysician's sense) is *epistemically possible for S* iff it does not contradict, and is not contradicted by, anything *S* knows. A pair of propositions are said to be *in contradiction with* one another iff one is the denial of the other; and a pair of classes of propositions are said to be *in contradiction with* one another iff some element of one and some element of the other are in contradiction with one another. Then any yes/no-complete class of propositions that is not in contradiction with *S*'s knowledge may be regarded as an epistemically possible world for *S*. As long as *S* does not know otherwise with respect to a proposition *p*—even if *S* also does not so much as apprehend *p*—*p* is epistemically possible for *S*.<sup>20</sup>

This proposed definition clearly captures some epistemic property that worlds have in relation to a knowing agent *S*. Even if this property somehow fails to coincide exactly with the intuitive concept of a world that *for all S knows*, is the actual world, it is a definite property of worlds, one worth investigating in some detail. So much the better if it is, as I believe it to be, the property of being an epistemically possible world for *S*.

The notion of an epistemically possible world extends across all worlds. Succinctly put, *a world w is epistemically possible for S in a world w' iff w is not in contradiction with S's knowledge in w'*. Whatever is true is actually epistemically possible for everyone. For knowledge entails truth. Therefore, the actual world—which consists of all and only truths—is not in contradiction with anyone's knowledge.

It may be taken as a necessary condition on the adequacy of any proposed definition of 'w is an epistemically possible world for S' that it yield the following property as a consequence:

NC:  $\forall p[(S \text{ knows } p) \rightarrow (\text{in } w, p)]$ .

That is, the definition should have the consequence that it is analytic that a world is epistemically possible for a knowing subject *S* only if the world includes everything that *S* knows. It follows immediately from the conception of a world as a yes/no-complete scenario that epistemic possibility meets this adequacy condition. (If *w* is epistemically possible for *S*, and *S* knows *p*, then *w* lacks  $\sim p$ . That is, it is not the case that in *w*,  $\sim p$ . Since *w* is yes/no-complete, in *w*, *p*.) On the

<sup>19</sup> I had initially proposed only the first disjunct of this negative-disjunctive definition, and with it a corresponding fundamental "theorem" about epistemic modality. Teresa Robertson Ishii pointed out to me the need for the second disjunct. With it comes a more surprising theorem, proved below.

I here use the locution ' $\alpha$  knows that  $\phi$ ' in such a way that whereas it entails the truth of  $\phi$ , its negation does not, so that if  $\phi$  is false, then so is ' $\alpha$  knows that  $\phi$ '. Those who insist that this does not correspond to English should replace the locution throughout with the conjunction ' $\alpha$  knows that  $\phi$ '.

See note 18 above. In "Constructing Epistemic Space", *Constructing the World* (Oxford University Press, 2012), chapter 5, pp. 233-243, Chalmers considers that epistemically possible worlds are not worlds in the sense used in the present essay, but so-called centered worlds (roughly, utterance contexts). The definition proposed here applies to all and only worlds in the present sense, i.e., to ways for all things to be, possible or not.

<sup>20</sup> The terminology in Graham Priest, "Thinking the Impossible," *Philosophical Studies*, 173, 10 (2016), pp. 2649-2662, is superficially similar to that employed in the present essay. However, Priest uses 'logically possible' where I and others would instead use 'metaphysically possible', a term Priest does not use. Priest also understands 'epistemically possible' very differently from the present usage. He says that "it is ... epistemically possible for something to be made of antimatter. In the thirteenth Century, it was still a physical possibility, but it was not an epistemically possibility: people then had no conception of antimatter, or, therefore, of its possibilities" (p. 2652). As the term is used here, it was epistemically possible even then that it is physically possible for there to be things made of antimatter. It was even epistemically possible then that there actually were macroscopic objects made of antimatter. No one knew otherwise.

other hand, condition *NC* is not a sufficient condition for a world *w* to be epistemically possible for *S*. Some inconsistent worlds include everything *S* knows while also including something *S*'s knowledge contradicts. Such a world is not epistemically possible for *S*.

The notion of a rigid designator extends straightforwardly to epistemically-possible-world semantics:

*α* epistemically rigidly designates *x* for *S* =<sub>def</sub> *α* designates *x* with respect to every epistemically possible world for *S* in which *x* exists, and does not designate anything other than *x* with respect to any epistemically possible world for *S*.

The definitions of an 'epistemically possible world' and of 'epistemically rigid designator' are sufficiently precise to ensure that the resulting notion is legitimate. At the very least, the notion of epistemic rigidity is no less legitimate than the various notions expressed in the definienda: *S* knows *p*; in *w*, *p*; quantification over propositions, and quantification over worlds.

Since epistemically possible worlds are worlds, insofar as proper names are nondescriptive, they are epistemically rigid designators. A designating proper name designates the same thing with respect to every epistemically possible world in which that thing exists, and does not designate anything else with respect to any epistemically possible world. This follows directly from the fact that, insofar as proper names are nondescriptive, they are absolutely rigid designators. Since the actual world is epistemically possible for everyone, insofar as proper names are nondescriptive, they designate the same thing with respect to any epistemically possible world *w* that they designate with respect to the actual world, if that thing exists in *w*.

Here again, the case for the epistemic rigidity of proper names is bolstered by considering the individual variable under an assigned value. Consider the *de re* epistemic modal construction '∃*x*(*x* = Ortcutt & for all Ralph knows, *x* is a spy)'. This expresses that for Ralph it is epistemically possible of Ortcutt, *de re*, that he is a spy, in the sense defined above. In order to evaluate the sentence, we are led by the same definitions to consider first whether there is an epistemically possible world *w* for Ralph such that the open sentence '*x* is a spy' is true with respect to *w* under the assignment of Ortcutt as value for '*x*'. What does '*x*', under the assignment of Ortcutt as value, designate with respect to a world *w* that is epistemically possible for Ralph? *Hint*: It designates Ortcutt. What matters is just this: whether Ralph knows of Ortcutt, *de re*, that he is not a spy. The sentence is true iff Ralph does not.

## 5 |

The notions of an epistemically possible world give rise to the following epistemically-modal statuses for propositions:

*p* is epistemically possible for *S* =<sub>def</sub> ∃*w*(*w* is epistemically possible for *S* & in *w*, *p*).

*p* is epistemically impossible for *S* =<sub>def</sub> *p* is not epistemically possible for *S*.

*p* is epistemically necessary for *S* =<sub>def</sub> ∀*w*(*w* is epistemically possible for *S* → in *w*, *p*).

$p$  is *epistemically contingent* for  $S =_{\text{def}}$   $p$  is epistemically possible for  $S$  but not epistemically necessary for  $S$ .

The following *fundamental theorem of epistemic modality* is somewhat unexpected, but is provable from the definitions, and is thus analytic:

**FT:**  $\forall S \forall p [p \text{ is epistemically necessary for } S \leftrightarrow (S \text{ knows } p) \vee (S \text{ knows } \sim\sim p)]$ .

The disjunctive content of the right-hand side is due to the two modes of knowledge—otherwise. The following proof of *FT* invokes the analytic truth that  $\forall S \forall p [(S \text{ knows } p) \rightarrow p]$ :

*Left-to-right:* Suppose  $p$  is epistemically necessary for  $S$  but  $S$  does not know  $p$ , and  $S$  also does not know  $\sim\sim p$ . As noted above, the actual world  $w^*$  is epistemically possible for everyone. Since  $p$  obtains in every epistemically possible world for  $S$ , in particular in  $w^*$ ,  $p$  (i.e.,  $p$  is true). Consider the non-actual world  $w$  obtained from  $w^*$  in (at most) two steps: Replace  $p$  with its denial  $\sim p$ . Furthermore, if  $p$  is  $\sim q$  for some proposition  $q$ , include  $q$  in  $w$ . (World  $w$  need not be metaphysically possible, or even consistent. But to be a world it must include either  $p$  or  $\sim p$ , and if  $p = \sim q$ , it must include either  $q$  or  $\sim q$ .) Since (i)  $w^*$  is not in contradiction with anything  $S$  knows, (ii)  $S$  does not know  $p$ , and (iii)  $S$  also does not know  $\sim\sim p$ , it follows that  $w$  likewise is not in contradiction with anything  $S$  knows. Therefore,  $w$  is epistemically possible for  $S$ . Yet  $w$  lacks  $p$  (i.e., it is not the case that in  $w$ ,  $p$ ). This conflicts with the assumption that  $p$  is epistemically necessary for  $S$ . Hence, if  $p$  is epistemically necessary for  $S$ , then either  $S$  knows  $p$  or else  $S$  knows  $\sim\sim p$ .

*Right-to-left:* Assume  $S$  knows  $p$ . Suppose that nevertheless  $p$  is not epistemically necessary for  $S$ . Then there is an epistemically possible world  $w$  that lacks  $p$ . Since  $w$  is a world and therefore yes/no-complete, in  $w$ ,  $\sim p$ . In that case,  $w$  is in contradiction with  $S$ 's knowledge. This conflicts with the conclusion that  $w$  is epistemically possible for  $S$ . Hence, if  $S$  knows  $p$ , then  $p$  is epistemically necessary for  $S$ . The same argument applies *mutatis mutandis* assuming instead that  $S$  knows  $\sim\sim p$ .

As a corollary,  $p$  is epistemically necessary for  $S$  iff  $\sim p$  is not epistemically possible for  $S$ . By a similar argument,  $p$  is epistemic possible for  $S$  iff  $\sim(S \text{ knows } \sim p) \ \& \ \forall q [p = \sim q \rightarrow \sim(S \text{ knows } q)]$ . In particular, if  $p$  is epistemically possible for  $S$ , then either  $S$  knows  $p$  or else  $S$  is ignorant of whether  $p$  obtains.

Knowledge either of  $p$  or of  $\sim\sim p$  confers a special type of necessity onto  $p$ : epistemic necessity. Somewhat surprisingly, by *FT* even an a posteriori proposition is epistemically necessary for a subject  $S$  iff  $S$  either knows it or knows its (equally a posteriori) double denial. By the same token—and equally surprisingly—mere absence of knowledge of  $p$  and of  $\sim\sim p$ , even if  $p$  is a priori, confers epistemic possibility onto  $\sim p$ . Of course, in the ordinary case,  $S$  knows  $p$  iff  $S$  knows  $\sim\sim p$ . However, *FT* yields a further surprising result: A proposition  $p$  can be epistemically necessary for  $S$  even though  $p$  is a posteriori and  $S$  does not even know  $p$ . If  $S$  knows  $\sim\sim p$ , then  $p$  is epistemically necessary for  $S$  even if  $S$  neglects to infer  $p$ .

## 6 |

The preceding results will carry us finally to Millianism. According to Millianism, the proper names ‘Lewis Carroll’ and ‘Charles Lutwidge Dodgson’ are exactly synonymous. Thoroughgoing Millians, like myself, embrace and defend the consequence that Smith believes that Carroll wrote *Alice in Wonderland* iff Smith believes that Charles Lutwidge Dodgson did. Similarly for the consequences that Brown believes that Hesperus is a planet iff Brown believes that Phosphorus is a planet, that Lois Lane believes that Superman can fly iff Lois believes that Clark Kent can fly, that Pierre believes that London pretty iff he believes that *Londres* is pretty, and so on. Thoroughgoing Millians also embrace the further consequence that (Smith *knows* that Carroll wrote *Alice in Wonderland*) iff Smith *knows* that Charles Lutwidge Dodgson did. The fact that Millianism has these consequences is the primary reason that Millianism has remained controversial (at best).

These same consequences are strongly supported by the preceding considerations. Suppose Smith knows of an Oxford mathematician of the name ‘Charles Lutwidge Dodgson’. Suppose further that Smith has enjoyed reading the *Alice in Wonderland* stories, but he never learns that the mathematician is their author. Smith fully understands and sincerely assents to the sentence ‘Lewis Carroll wrote *Alice in Wonderland*’. He also fully understands but sincerely (and reflectively, non-reticently, etc.) dissents from the sentence ‘Charles Lutwidge Dodgson wrote *Alice in Wonderland*’. The name ‘Lewis Carroll’ is epistemically rigid for Smith; it designates Carroll with respect to every world that is epistemically possible for Smith and in which Carroll exists. Likewise, the name ‘Charles Lutwidge Dodgson’ is epistemically rigid for Smith. Both names designate Carroll with respect to every epistemically possible world for Smith in which Carroll exists.

It is crucial that one not confuse the extension of an expression with respect to a given world  $w$  with the extension in  $w$  of the expression *as it is used in  $w$* . The names ‘Lewis Carroll’ and ‘Charles Lutwidge Dodgson’ each designate Carroll with respect to every world, including worlds epistemically possible for Smith in which an author of *Alice in Wonderland* goes by the name ‘Lewis Carroll’ and an Oxford mathematician distinct from the fantasy author is named ‘Charles Lutwidge Dodgson’. The fact that the names are not co-designative as used in such a world is no reason whatsoever to suppose that they are not co-designative with respect to that world.<sup>21</sup>

Anti-Millians hold that, even if it is metaphysically necessary that Carroll is Dodgson (if he exists), there are worlds epistemically possible for Smith in which Carroll is not Dodgson. As was noted above, many epistemically possible worlds are not logically possible. This might be mistakenly taken as providing support for the anti-Millian position. There are indeed epistemically possible worlds, albeit logically impossible, in which Carroll is not Dodgson. But there are no

<sup>21</sup> Cf. Kripke, *N&N*, at p. 77. It will not do to claim that the name ‘Carroll’ designates with respect to an epistemically possible world for Smith some author of *Alice in Wonderland* who was not also an Oxford mathematician, rather than Carroll himself. There is no such person for ‘Carroll’ to designate.

Chalmers recognizes that according to Kripke, if the oceans and lakes had been filled by XYZ instead of H<sub>2</sub>O, water would still be H<sub>2</sub>O. But Chalmers effectively declares the corresponding indicative (non-subjunctive) conditional to be intuitively false: If the oceans and lakes are filled by XYZ, then water is H<sub>2</sub>O. (“Constructing Epistemic Space”, pp. 237–238). On the contrary, the indicative conditional is entailed by the subjunctive and is clearly true. (Compare the classically equivalent disjunction: Either the oceans and lakes are not filled by XYZ or water is H<sub>2</sub>O, or both.) Chalmers evidently misunderstands the indicative conditional as meaning something meta-theoretic and clearly false, e.g., that even if the oceans and lakes had been filled by XYZ instead of H<sub>2</sub>O, ‘*Water is H<sub>2</sub>O*’ would still be true. It is irrelevant that the generic sentence (the sequence of characters and spaces) ‘Water is H<sub>2</sub>O’ is false with the meaning it would have if the generic word ‘water’ had named XYZ. The generic word with its actual meaning designates the same substance with respect to every world, including worlds in which the word instead names XYZ.

such worlds of the sort that anti-Millianism requires. Specifically, no such world is epistemically possible for Smith.

The classical evaluation clause for identity statements in possible-world semantics is the following:

*CI*: For any (ancestrally) metaphysically possible world  $w$ , and for any singular terms  $\alpha$  and  $\beta$ ,  $\ulcorner \alpha = \beta \urcorner$  is true with respect to  $w$  iff the designatum with respect to  $w$  of  $\alpha$  is identical with the designatum with respect to  $w$  of  $\beta$ .

It immediately follows from *CI* that the sentence ‘Lewis Carroll is Charles Lutwidge Dodgson’ is true with respect to every metaphysically possible world (in which Carroll exists).

It does not follow that the sentence is also true with respect to every epistemically possible world. Suppose that Jones, unlike Smith, is remarkably ignorant concerning Lewis Carroll. Jones has never encountered the names ‘Lewis Carroll’ or ‘Charles Lutwidge Dodgson’, has never heard of *Alice in Wonderland*, etc. Jones knows nothing at all about Carroll, not even that he is self-identical. Then for all Jones knows, Carroll is not self-identical. Since Jones does not know that Carroll is Carroll, and also does not know that Carroll is not distinct from Carroll, in light of theorem *FT*, it is epistemically possible for Jones that Carroll is not Carroll.

This feature of ignorance presents a thorny problem for epistemically-possible-world semantics. The names ‘Carroll’ and ‘Dodgson’ evidently co-designate with respect to every world that is epistemically possible for Jones. Is the sentence ‘Carroll = Dodgson’ therefore true with respect to every epistemically possible world for Jones? If so, then by *FT*, either Jones knows that Carroll is Dodgson or else Jones knows that Carroll is not distinct from Dodgson, or both. Yet Jones evidently knows nothing at all about Carroll, not even that he is Carroll.

The correct way to solve this problem is to recognize that there are indeed worlds epistemically possible for Jones in which Carroll is not Carroll, and to generalize appropriately on *CI* (among other things) with respect to logically inconsistent worlds. In particular, the mere fact that ‘Carroll’ is co-designative with itself with respect to such a world is not sufficient for the truth of ‘Carroll = Carroll’ with respect to that world. One needs somehow to accommodate the repugnant but very real prospect that Carroll is not himself and is instead the Empire State Building with respect to such a world.

There is a feature of epistemic modality that, although crucial, has been overlooked as far as I can determine by everyone who has worked on epistemic modality: Although proper names are epistemically rigid, the identity relation in an epistemically possible world will routinely deviate from identity in the metaphysically possible worlds. Barring omniscience, epistemically possible worlds are routinely metaphysically impossible, even inconsistent. In any genuinely possible world, any individual  $x$  is identical with  $x$  and nothing else, and  $x$  is the only thing identical with  $x$ . Although the identity relation is well-behaved in all metaphysically possible worlds, it can go rogue in epistemically possible worlds. In an epistemically possible world, something can fail to be identical with itself, and can even be identical with something that it in fact is not.

A subject  $S$  is *de re* connected with each thing that  $S$  perceives or knows of, including anything of  $S$ ’s acquaintance. However (and with all due respect to those who have accepted unrestricted exportation into their hearts), few among us are *de re* connected to the world’s shortest spy. An epistemically possible world for a subject  $S$  may alter the identity relation, thereby altering the semantic extension of ‘=’. The semantic extension of ‘=’ with respect to an epistemically possible world for  $S$  will include all reflexive ordered pairs  $\langle x, x \rangle$  where  $S$  knows that  $x$  is itself, or that  $x$  is not distinct from itself. Normally, these will be the ordered pairs  $\langle x, x \rangle$  where  $S$  is *de re* connected



to  $x$ . Beyond that, anything goes and identity runs amok. In particular, the semantic extension of ‘=’ with respect to an epistemically possible world for  $S$  may exclude reflexive ordered pairs  $\langle y, y \rangle$  where  $S$  does not know of  $y$ . It may also include ordered pairs  $\langle x, y \rangle$  where  $x$  is not  $y$ . For all Jones knows, Carroll is not Carroll and is instead the Empire State Building. There are epistemically possible worlds for Jones in which precisely that is the case. The sentence ‘Carroll is Carroll’ is false with respect to those worlds. But it is still about Carroll.

The semantic extension of ‘=’ with respect to any world  $w$ —possible or impossible—includes all and only those pairs  $\langle x, y \rangle$  such that in  $w$ ,  $x$  is identical with  $y$ . The generalization of  $CI$  for general world-relative semantics is thus the following:

*GI*: For any world  $w$ , ancestrally possible or not, and for any singular terms  $\alpha$  and  $\beta$ ,  $\ulcorner \alpha = \beta \urcorner$  is true with respect to  $w$  iff the designatum with respect to  $w$  of  $\alpha$  is identical in  $w$  with the designatum with respect to  $w$  of  $\beta$ .

Note the occurrence of ‘identical in  $w$ ’ in the right-hand side of *GI*. In effect, *GI* treats the identity predicate ‘=’ as subject to reinterpretation in the same way as a non-logical dyadic predicate. The classical clause *CI* falls out as the special case of *GI* for ancestrally metaphysically possible worlds. This precludes worlds  $w$  such that actually distinct things are identical in  $w$ . Clause *GI* accommodates the awkward fact that in an impossible world  $w$ , an individual can be distinct from itself and can be identical with something else.

The rationale for generalizing *CI* into *GI* is straightforward. Consider Jones, who does not know anything at all about Lewis Carroll. In particular, Jones does not know either that Carroll is Carroll or that Carroll is not distinct from Carroll. Given Jones’s ignorance, there is a world  $W$  that is epistemically possible for Jones in which Carroll is not Carroll. Is it the case nevertheless that Carroll also *is* Carroll in  $W$ ? There is no warrant to assert that it is. Since it is yes/no-complete,  $W$  decides every issue, including issues that Jones is in no position to raise, let alone judge. Confronted with the question of whether Carroll is, or is not, Carroll,  $W$  simply resolves the issue in the negative. There is no pressure on  $W$  other than from logic to decide the issue instead in the affirmative. Jones’s epistemically possible space is not beholden to logic with regard to issues that Jones is in no position to consider. It is beholden only to Jones’s knowledge. There are other worlds epistemically possible for Jones in which Carroll is Carroll, but in  $W$ , Carroll is not Carroll, and with respect to  $W$  the sentence ‘Lewis Carroll  $\neq$  Lewis Carroll’ is true, end of story.

Implementation of *GI* requires special care. What is true according to an epistemically possible world for  $S$  is governed solely by  $S$ ’s knowledge and ignorance. Although there are epistemically possible worlds like  $W$  in which Carroll is not Carroll, it does not follow that identity is not reflexive in those worlds. If Jones knows that  $\forall x(x = x)$ , then by *FT*, identity is reflexive in every epistemically possible world for Jones, including  $W$ .<sup>22</sup> The fact that Jones is epistemically unconnected to Carroll renders the inconsistent combination coherent. To know about Carroll that he is himself is to have *de re* knowledge concerning Carroll. Since Jones knows nothing at all about Carroll, Jones is unable to instantiate the knowledge that everything is itself to Carroll. Jones is in the position of one who knows that all humans are mortal, but never having heard of Socrates, and having no

<sup>22</sup> One must guard against a fallacious exportation inference. As is well known,  $\ulcorner \alpha \text{ knows that } \forall \beta(\phi_\beta \rightarrow \psi_\beta) \urcorner$  does not logically entail  $\ulcorner \forall \beta(\phi_\beta \rightarrow \alpha \text{ knows that } \psi_\beta) \urcorner$ . Before 3 BC, mathematicians knew that every whole number is self-identical, but they did not know that zero is.

name for him, is unable to infer that if Socrates is human then he is mortal. For all Jones knows, Carroll is not Carroll; Jones does not know otherwise.<sup>23</sup>

Consider a surreal world  $V$  in which Carroll is not Carroll and is the Empire State Building. This world  $V$  is not epistemically possible for Smith, who knows that Carroll is himself and not the Empire State Building, but it is epistemically possible for Jones. According to the generalized clause  $GI$ , the sentence ‘Lewis Carroll = the Empire State Building’ is true with respect to  $V$ . Since the name ‘Lewis Carroll’ is absolutely rigid, it designates Carroll even with respect to  $V$ . Does it somehow also designate the Empire State Building?

No, it designates Carroll and nothing else. Similarly, with respect to  $V$  the appellation ‘the Empire State Building’ designates the Empire State Building and nothing else. But *according to*  $V$ , those things are the same thing. On this score,  $V$  is simply incorrect, and spectacularly so; the two things are not one thing. To build upon Bishop Joseph Butler’s deep insight, everything and another thing are what they are and not the same. (Recall that it makes no difference if the phrase ‘the Empire State Building’ is used as a name for Carroll in  $V$ . How the name is used in  $V$  is altogether irrelevant.)

By contrast, the names ‘Lewis Carroll’ and ‘Charles Lutwidge Dodgson’ designate the same thing (*viz.*, Carroll) with respect to all worlds, including Jones’s inconsistent epistemically possible worlds. However,  $GI$  does not sanction the conclusion that the sentence ‘Carroll = Dodgson’ is true with respect to Jones’s wild world  $W$ , or even that ‘Carroll = Carroll’ is. Intuitively, given that Carroll is not Carroll in  $W$ , the latter sentence is in fact false with respect to  $W$ .

Anti-Millians hold that it is likewise epistemically possible for Smith that Carroll is not Dodgson. They could cite the case of Jones as philosophical precedence for their verdict about Smith. However, the present considerations demonstrate that *it cannot be that Carroll is not Dodgson in any world that is epistemically possible for Smith*. The sentence ‘Carroll  $\neq$  Dodgson’ is true with respect to all and only those worlds, like  $W$  and  $V$ , in which Carroll is not Dodgson. By  $GI$ , for any such world  $w$ , the designatum of ‘Carroll’ with respect to  $w$  needs to be distinct *in*  $w$  from the designatum of ‘Dodgson’ with respect to  $w$ . But Smith knows that Carroll is Carroll, as well as that Carroll is not distinct from Carroll. Since ‘Carroll’ and ‘Dodgson’ are epistemically rigid, any such world as  $W$  is in contradiction with Smith’s knowledge, and hence is not epistemically possible for Smith. The sentence ‘Carroll is Dodgson’ is true with respect to every world that is epistemically possible for Smith, since Smith knows of Carroll that he is himself. Carroll is indeed identical with himself in every such world.

Though the names ‘Carroll’ and ‘Dodgson’ have the same designatum with respect to every world, as we have seen there are those worlds in which Carroll is not Dodgson. These are precisely the worlds in which Carroll is not himself, and some of these worlds are epistemically possible for Jones. But any such world contradicts Smith’s knowledge of Carroll that he is himself. It follows from  $FT$  that for anyone who, like Smith, knows either that Carroll is Carroll or that Carroll is not distinct from Carroll, there simply is no epistemically possible world in which Carroll is not

<sup>23</sup> Andrea Bianchi and the other anonymous reviewer for *Noûs* reply that despite Jones’s ignorance concerning Carroll, Jones knows that Carroll is self-identical. See the immediately preceding footnote. This reply illegitimately contradicts the hypothesis that Jones is epistemically unconnected to Carroll. It is open to my opponent to argue that it is impossible for anyone to be completely ignorant about a given thing. However, this claim flies in the face of the fact that there are countless trillions of grains of sand, specs of dust, molecules of water, planets orbiting stars in distant galaxies, etc. that no one other than an omniscient god is in any position to refer to specifically or to think about. (Correcting a reviewer’s error, if asked whether Carroll is Carroll, Jones would agree that he is. This does not mean, however, that the prospect of Carroll not being Carroll is epistemically impossible for Jones. The moment Jones is asked about Carroll, Jones is thereby *de re* connected to Carroll and knows that Carroll is Carroll. By hypothesis, no such connection has ever been established.)

Dodgson. For every world that is epistemically possible for Smith, the designatum of ‘Carroll’ with respect to it and the designatum of ‘Dodgson’ with respect to it are the same person in it, because in every such world, that person is himself. A world with respect to which ‘Carroll is Dodgson’ is false contradicts anyone’s knowledge that includes that Carroll is Carroll, and is contradicted by anyone’s knowledge that includes that Carroll is not distinct from Carroll. Despite Smith’s sincere denials, it is epistemically necessary for Smith that Carroll is Dodgson, epistemically impossible that Carroll is not Dodgson.

Unlike Jones, Smith knows both the names ‘Lewis Carroll’ and ‘Charles Lutwidge Dodgson’, but Smith remains ignorant of the fact that the two names co-designate. It is epistemically possible for Smith that ‘Lewis Carroll’ and ‘Charles Lutwidge Dodgson’ designate different people. Despite this, the prospect that Carroll is not Dodgson is not epistemically possible for Smith. The reason it is not is straightforward. Smith knows that Carroll is Carroll. Carroll is Carroll in every world that is epistemically possible for Smith. It follows that there is no world  $w$  that is epistemically possible for Smith such that the designatum of ‘Lewis Carroll’ with respect to  $w$  is anything different in  $w$  from the designatum of ‘Charles Lutwidge Dodgson’ with respect to  $w$ . Both names designate Carroll with respect to every epistemically possible world for Smith, and Carroll is indeed himself in every such world. It is epistemically necessary for Smith that Carroll is Dodgson. By an exactly analogous argument, it is epistemically impossible for Smith that Carroll is, whereas Dodgson is not, an author of entertaining fantasies.

The identity fact that Carroll is Dodgson is very different from the fact that the name ‘Lewis Carroll’ designates the same thing as the name ‘Charles Lutwidge Dodgson’. Though Smith is ignorant of the latter fact, he knows the former. In fact, Smith knows a priori that Carroll is Dodgson. The fact that Carroll is Dodgson is not a fact about names. It is simply the fact that Carroll is Carroll. Smith knows this fact a priori.

The argument proceeded from Kripke’s relatively uncontroversial observation that since proper names are nondescriptive they are rigid designators, ultimately to the highly controversial thesis that indeed proper names are Millian designators. The argument cannot be short-circuited by inferring Millianism directly from the premise that proper names are nondescriptive. Such an argument would be fallacious; it tacitly assumes as a further premise that if a proper name is nondescriptive then it is also Millian. A number of philosophers have rejected that assumption. (Kripke did not accept it. For that matter, neither did Mill. See footnote 2.) The argument presented here does not rely on it, explicitly or implicitly. Rather, *it may be regarded as a deduction of it* from other premises. In particular, the deduction invokes the following: (i) Since proper names are nondescriptive, they are rigid; (ii) if (i), then proper names are not merely metaphysically rigid but absolutely rigid, hence also epistemically rigid; and (iii) epistemically rigid designators are Millian designators (as illustrated by the case of Smith). So it is that there exists a road, long and winding, from modality to Millianism.

## 7 | STATEMENTS AND DECLARATIONS

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## REFERENCES

- Chalmers, D., *Constructing the World* (Oxford University Press, 2012).
- Kripke, S., "Semantical Considerations on Modal Logic", *Acta Philosophica Fennica*, 16, (1963), pp. 83–94.
- Kripke, S., *Naming and Necessity* (Oxford: Blackwell, 1972, preface added 1980).
- Kripke, S., "A Puzzle about Belief," In A. Margalit, (Ed.), *Meaning and Use* (Dordrecht: D. Reidel, 1979), pp. 239–283.
- Lewis, D., *Counterfactuals* (Harvard University Press, 1973).
- Lewis, D., *On the Plurality of Worlds* (Oxford: Blackwell, 1986).
- Mill, J. S., *A System of Logic* (London: John W. Parker, 1843), Book I "Of Names and Propositions".
- Priest, G., "Thinking the Impossible," *Philosophical Studies*, 173, 10 (2016), pp. 2649–2662.
- Salmón, N., *Essentialism in Current Theories of Reference* (doctoral dissertation, University of California, Los Angeles, University Microfilms International, 1979).
- Salmón, N., *Reference and Essence*, Second Edition (Amherst, NY: Prometheus, 1981, 2005).
- Salmón, N., *Frege's Puzzle* (Atascadero, Ca: Ridgeview, 1986, 1991).
- Salmón, N., Critical Review of (Lewis 1986), *The Philosophical Review*, 97, 2 (April 1988), pp. 237–244; reprinted in Salmón, N., *Metaphysics, Mathematics, and Meaning*, pp. 122–128.
- Salmón, N., "The Logic of What Might Have Been", *The Philosophical Review*, 98, 1 (January 1989), pp. 3–34; reprinted in Salmón, N., *Metaphysics, Mathematics, and Meaning*, pp. 129–149.
- Salmón, N., *Metaphysics, Mathematics, and Meaning: Philosophical Papers I* (Oxford University Press, 2005).
- Salmón, N., *Content, Cognition, and Communication: Philosophical Papers II* (Oxford University Press, 2007).
- Salmón, N., "Synonymy", in Alessandro Capone, Roberto Graci, and Pietro Perconti, eds, *New Frontiers in Pragmalinguistic Studies: Philosophy, Cognition and Pragmatics: Perspectives in Pragmatics, Philosophy & Psychology* 34 (Switzerland: Springer Nature, 2024), pp. 45–52.
- Salmón, N., "Singular Concepts", *Synthese*, 204, 20 (2024), <https://doi.org/10.1007/s11229-024-04624-w>
- Soames, S., "Actually", *Proceedings of the Aristotelian Society*, Supplementary Volume, LXXXI (2007), pp. 251–277.
- Stalnaker, R. C., "Possible Worlds", *Noûs*, 10, (1976), pp. 65–75.

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## APPENDIX I

### Chalmers's Modus Tollens

My *modus ponens* is Chalmers's *modus tollens*. He writes, “ ‘Hesperus’ and ‘Phosphorus’ are not *epistemically rigid*: they do not pick out the same entity in all epistemically possible scenarios . . . . If they did pick out the same entity in all scenarios, then ‘Hesperus is Phosphorus’ would be true in all scenarios and therefore a priori, which it is not” (“Constructing Epistemic Space”, p. 238). Chalmers mistakenly presupposes that *CI* applies to epistemically possible worlds (“scenarios”), and overlooks that there are epistemically possible worlds in which Venus is not Venus. See footnotes 18, 19, and 21 above. Chalmers and I also disagree concerning whether ‘Hesperus is Phosphorus’ is relevantly a posteriori. However, the primary focus of disagreement between us is the thesis that since proper names are nondescriptive they are absolutely rigid. I regard this as no longer open to reasonable doubt since Kripke's *Naming and Necessity*.

Chalmers confirmed at the 2022 Hudson workshop that on his view, with respect to an epistemically possible world in which Hesperus is not Phosphorus, ‘Hesperus’ and ‘Phosphorus’ designate different things, typically neither one any actual planet. Chalmers's view, taken together with trivial facts, has the unacceptable consequence that in believing that Carroll is not Dodgson, Smith does not thereby believe anything *de re* of Carroll. Rather than maintain against the facts that proper names are epistemically non-rigid, modern-day anti-Millians could instead insist that there are epistemically possible worlds even for Smith in which Carroll is not himself. This stance can acknowledge that proper names are epistemically rigid. However, it is committed to the erroneous judgment that Smith does not know that Carroll is Carroll. Since names are absolutely rigid, there is no epistemically possible world in which ‘Lewis Carroll is Lewis Carroll’ is true but ‘Lewis Carroll is Charles Lutwidge Dodgson’ is not.

## APPENDIX II

### Doxastic Modality and Pierre on Londres

The notion of a doxastically possible world for *S* is not so easy to capture as that of an epistemically possible world. This is because all of us are extremely likely to harbor conflicting *de re* beliefs concerning someone or something. Following the definition of an epistemically possible world, suppose we say that a world *w* is “doxastically possible for” a subject *S* iff *S* does not believe otherwise, either positively or negatively, with respect to any proposition true in *w*. Now consider Brown, who believes that Cicero is an orator whereas Tully is not. Brown believes of Cicero, *de re*, both that he is an orator and that he is not. (Take care. Brown does not thereby believe of Cicero that he both is and is not an orator. That would be highly peculiar.) Any world in which Cicero is an orator is such that Brown believes otherwise of Cicero, negatively. On the other hand, any world in which Cicero is not an orator is also such that Brown believes otherwise of Cicero, albeit positively. Insofar as worlds are yes/no-complete, no world is “doxastically possible” in the proposed sense for Brown; every proposition is deemed both doxastically necessary and doxastically impossible for Brown. An exactly similar situation arises in connection with Kripke's bilingual Pierre, who believes on the basis of misleading travel brochures that the city he calls ‘Londres’ is pretty, and on the basis of his first-hand observations, that the city he calls ‘London’ is not pretty.

Pierre believes *of* London, *de re*, both that it is pretty and that it is not. (Although Kripke does not address these *de re* attributions in “A Puzzle”, I believe he would have agreed that Pierre has these conflicting *de re* beliefs concerning London.) It follows that no yes/no-complete world is “doxastically possible” in the proposed sense for Pierre, and no proposition is doxastically possible for Pierre. As Brown stands *vis-à-vis* the issue concerning Tully whether he is an orator, so stands Pierre *vis-à-vis* the issue concerning London whether it is pretty. But so stand all those who fail to recognize someone or something or other. And that is us all, everyone. No proposition is “doxastically possible” in the proposed sense for anyone. This serious collapse is indicative of a mistake.

Let us say instead that a world  $w$  is *doxastically possible* for a subject  $S$  iff  $w$  is a yes/no-complete superclass of what might be called ‘the world according to  $S$ ’. That is,  $w$  is the class  $B_S$  of propositions that  $S$  believes, such that  $(w - B_S)$  is not in contradiction with  $B_S$ —even if  $B_S$  is in contradiction with itself, and even if  $(w - B_S)$  is in contradiction with itself. In any doxastically possible world  $w$  for  $S$ , any contradiction in  $w$  is within  $B_S$  or within  $(w - B_S)$ , not between them. In this sense, some worlds in which Cicero is an orator are doxastically possible for Brown even though Brown believes otherwise of Cicero, and some worlds in which London is pretty are doxastically possible for Pierre even though Pierre believes otherwise of London. Trivially, if  $S$  believes  $p$ , then  $p$  is doxastically necessary for  $S$ . In fact, an argument parallel to the proof of *FT* proves that analogously,  $p$  is doxastically necessary for  $S$ , in the present sense, iff  $S$  either believes  $p$  or believes  $\sim\sim p$ , or both.

Since Pierre believes *of* London, *de re*, both that it is pretty and that it is not pretty, in the world according to Pierre, London is both pretty and not. Pierre’s belief class,  $B_{\text{Pierre}}$ , includes both singular propositions about London: that it is pretty; and that it is not. Since the co-designative names ‘London’ and ‘Londres’ are absolutely rigid, they designate the same thing—*viz.*, London—with respect to every doxastically possible world for Pierre. The French sentence ‘*Londres est jolie*’ is therefore true with respect to every doxastically possible world for Pierre, and the English sentence ‘London is not pretty’ is likewise true with respect to every doxastically possible world for Pierre. The solution to Kripke’s puzzle is that, for better or worse, Pierre harbors contradictory beliefs about London. To be sure, there are extenuating circumstances and mitigating factors. Pierre’s crime does not warrant censure. But contrary to Kripke, to convict Pierre of inconsistency is the correct verdict, fair and just.

### APPENDIX III

#### Kripke’s Final Views

See the Acknowledgments. On May 16, 2022, four months before his death, Kripke was a special guest speaker at a video-recorded meeting of a UCSB seminar given by Teresa Robertson Ishii and me. Kripke said that I had “almost persuaded” him that the names ‘Cicero’ and ‘Tully’ are “almost synonyms, where only the phonology of the two terms is different” (1:34:38). He also agreed with me, perhaps tentatively, that proper names are epistemically rigid (1:47:20: “I think yes, of course”). On May 25, in a video-recorded meeting of his own CUNY seminar, and again eight weeks later at the Hudson workshop (including significant participation from Chalmers), Kripke expressed sympathy with Chalmers’s claim that proper names are not epistemically rigid (36:43; 39:23). (Kripke had long regarded ‘Hesperus’ and ‘Phosphorus’ as special, potentially exceptions to the general rule that names are nondescriptorial. *Cf.* “A Puzzle about Belief”, at pp. 280–281n43.) On both occasions, I reminded Kripke that in the UCSB seminar he had agreed that names are of course epistemically rigid (CUNY, 42:00). On both occasions, Kripke admitted his inconsistency and confessed that he was unsure what to think about the issue (42:30).