

Rigid Designation and Natural Kind Terms, Pittsburgh Style
Michael P. Wolf, Washington and Jefferson College

Abstract

This paper addresses recent literature on rigid designation and natural kind terms that draws on the inferentialist approaches of Sellars and Brandom, among others. Much of the orthodox literature on rigidity may be seen as appealing, more or less explicitly, to a semantic form of "the given" in Sellars's terms. However, the important insights of that literature may be reconstructed and articulated in terms more congenial to the Pittsburgh school of normative functionalism.

I. The issues

Reflection on Frege's (1892/1980) account of sense led many analytic philosophers of language to view proper names and other apparently simple singular terms as covert clusters of descriptions. Thus, a proper name such as "Aristotle" had as its meaning some set of predicates and descriptions like "the author of *Nicomachean Ethics*, the teacher of Alexander the Great, the husband of Pythias..." The name (or other singular term) then refers to that object which satisfies all of the descriptions, or some suitable subset of them. Kripke (1980) criticizes this approach extensively, arguing that the meanings of proper names and natural kind terms could not be understood in such terms. While such descriptions might be *associated* with proper names and natural kind terms, those associations did not amount to synonymy. We might imagine other possible worlds — or discover in the actual world — that some or all of the descriptions in such a cluster were not true of the expression's referent. We might also imagine such instances where something else better fit the descriptions. If Aristotle forged the credentials listed above, he does not cease to be Aristotle; if someone else did all of those things, he does not thereby become Aristotle. The proper name refers to that person and only that person, whether the associated descriptions are true of him or not.

The notion was initially introduced in modal terms by Kripke (1980, 48): "Let's call something a *rigid designator* if in every possible world it designates the same object," while non-rigid designators would not do so. Such a designator may fail to designate at all (i.e., in some possible worlds, Aristotle never exists), but it does not designate something else if that thing happens to have other properties. Nor does something else (say, Aristotle's brother) turn out to be Aristotle if it meets more of the descriptions in the cluster. When we use the proper name "Aristotle," its reference is fixed for us in the actual world, and that reference remains fixed no matter what we may discover about this world or stipulate about others. Putnam (1973, 1975b) contemporaneously¹ extended many of these ideas to natural kind terms, while others have extended them to include still more classes of expressions such as indexicals and pronouns.²

¹ The dates of publication here may obscure the relation between Kripke and Putnam's works. Kripke's *Naming and Necessity* was first delivered as a series of lectures in 1972, around the time that Putnam would have been writing "Meaning and Reference" (1973), and Putnam mentions Kripke's work in passing (1973, 707). Kripke's revisions of *Naming and Necessity* were not complete until 1980, but both authors were working on these ideas independently around the same time in the early 1970s. There has been some controversy about how much of this can also be

Why should any of this trouble a normative functionalist? Many defenders of rigid designation's place in a theory of meaning have stated its nature in terms of the "object-involving" character of truth conditions for sentences in which they appear. That is, *the object itself* would figure in the truth conditions, rather than some means — functions, inference licenses, possible worlds, whatever the tools of the theory may be — for reidentifying and differentiating between potential referents. On a first pass, this would seem to involve an appeal to non-semantic items as elements of the semantic order; a more sophisticated reading would appear to involve appeal to a direct, unmediated word-world relation as an explainer in a theory of meaning. In Sellarsian dialects of Pittsburghese, this would amount to invoking the given in semantic form. Outside those circles, most analytic philosophers after Kripke would say that inferentialist accounts seem to preclude an appropriately direct involvement of objects in their semantic contents. Putnam and Sellars spoke directly to one another on this point, in fact. In 1974 at the APA Eastern meetings, Sellars presented his "Meaning as Functional Classification," a touchstone of normative functionalism in recent theory of meaning, and comments were offered by none other than Hilary Putnam. Sellars's views are discussed extensively elsewhere in this edition, but Putnam expressed significant reservations:

The normal-form description of the meaning of a word does include a description of the rules for the use of the word. ... The "rule" component gives the full specification of individual competence, or even of collective social competence at a given time; it fails to completely capture what is ordinarily called the meaning of the word and in particular it fails to capture the extension. The battery of rules, whether you take that in an individual or a social sense, does not determine the extension of the word. ... The determination of extension is a social matter, and also more than a social matter; it depends also on the contribution of the environment. (1974, 453-454).

The crucial point that Putnam's comments miss about a Sellarsian account is the normative character of the functional classification. (To be fair to Putnam, Sellars (1974) does not address this extensively.) His emphasis on *individual* competence suggests a kind of causal functionalism — each speaker must have approximately *this* organization of internal states to produce *these* patterns of behavior. Dummett (1974) seized upon Putnam's remark that the "causal" theory of reference (as this account was then being called) would more suitably be called a "social" theory of meaning, noting that making good on this refinement would be a much different project than the one Putnam imagined.³ While we may grant Putnam's point about the "division of epistemic

traced back to ideas presented by Ruth Barcan Marcus a decade before these works, but settling that dispute is well outside the bounds of this paper.

² There is an additional, rarely discussed category of rigid designators: those that are rigid de facto. For instance, definite descriptions are not generally rigid designators, but "the square root of 373,248" picks out the same item — 72 — in every possible world. But such items are not rigid as a matter of their semantic or syntactic category, as proper names, pronouns and other items are, so there has been less interest in them as a group. But don't worry. There are only infinitely many of them.

³ In a similar vein, McDowell (1998c) expresses concerns that Putnam's conception of the mind may not go far enough in stepping away from traditional accounts of representation and mentality. Discussion of this is a bit too far

labor" and acknowledge that meanings "ain't in the head," their introduction into the language cannot determine their extension wholesale in advance of the alterations our theoretical conception of them that subsequent collective epistemic labor will produce. (MacBeth (1995) follows this line even further, asserting that natural kind terms are not truly semantically rigid and do not form actual identities in sentences like "Water is H₂O.")

More charitably, we might say that Putnam's concession that descriptions of meaning include rules for the use of a word would suggest that he reads the rules and inferential roles Sellars describes as necessary and sufficient conditions — an exhaustive and final account of the meanings of those expressions, against which individual competence could be evaluated. And here we see how rigid designation might be problematic for a Sellarsian account. If the language entry, intra- and exit rules for an expression like "fish" — its inferential role, if you prefer — were fixed by English speakers in, say, 1700 CE, then its extension will be fixed incorrectly to include whales and other cetaceans. This is a substantial objection that merits serious attention. One can probably see a Sellarsian objection lurking in the shadows here, too. The "contribution of the environment" is a rather murky suggestion. If we take it very literally — that the very essence of kinds and particulars directly shapes the meanings of names, kind terms and other rigid designators — then we have the given in a remarkably bare form. If we take it that calling on the "contribution" here simply entails that the extension is a matter that we must determine empirically by involving ourselves with the environment and remaining open to new evidence to expand or contract the extension, then there is nothing particularly objectionable about that point for the inferentialist. The uptake of the environment is what we should concern ourselves with here, and that will still be achieved and articulated in the inferential terms sketched out by Sellars.

What is needed from the normative functionalist is an account that characterizes the inferential role of these expressions without recourse to a given. Such a response need not be a rejection of the very idea of rigid designation, of course, but only to interpretations of it that invoke direct relations to objects in such ways. Nor should we think that these reservations support the descriptivism that Kripke and Putnam rejected for these expressions. What we want is an account of these expressions as singular terms whose usage is appropriately governed by *attention* to their referents, rather than solely to our linguistic practices. That attention will be inferentially articulated with additional provisions to assure that our commitments are treated fallibly and remain open to appropriate revision. Much of the epistemic groundwork for this is laid out in Sellars (1956/1997, 1974; see also Brown (1986) and Wolf (2006b)) and I will not review this at length here. The starting point for the semantic account I review will call upon results from a number of important sources within the Pittsburgh school (Sellars (1980), Brandom (1984, 1987, 1994)) on the articulation of inferential roles and the technical machinery for characterizing the roles of subsentential expressions — including singular terms such as rigid designators — within such accounts. The rest of the account will involve spelling out what we as speakers and as a community must do in order to use a designator rigidly.

II. Anaphoric theories of reference, existential commitments and substitution inferences

afield for the present paper, however. See also McDowell (1998a, 1998b) for a less inferentialist account of some features of rigid designation.

We may begin this account following Brandom (1987, 1994, 2007) in treating singular terms as a class of expressions characterized by their roles in material substitution inferences. Beginning with simple declaratives, singular terms will be distinguished by sorting themselves into equivalence classes whose expressions are taken up in symmetrical material substitution inferences; predicates will be distinguished by being taken up (almost) exclusively in asymmetrical material substitution inferences. Thus, such an equivalence class might include both the expressions "Elvis Costello" and "Declan Patrick McManus" and where one may infer from "Elvis Costello was born in Liverpool" to "Declan Patrick McManus was born in Liverpool," one may also infer from the latter to the former. This may be seen as an inference by substitution of a portion of a sentence, as opposed to inferences between sentences without such overlapping parts of their sign designs. Inference licenses for such equivalence classes are expressed as identity statements, e.g., "Elvis Costello is Declan Patrick McManus." Predicates may also be seen as portions of sentences substituted in making inference, but they will almost always permit inferences in only one "direction," e.g., one may infer from "Elvis Costello is a guitarist" to "Elvis Costello is a musician," but not vice versa. Proper names, natural kind terms and other standard candidates for rigid designators evidently fit in as singular terms here. What we seek is a more specific, nuanced account of the restrictions on substitution inferences involving them that distinguishes them from other singular terms and a sense of why this inferentialist approach is a preferable alternative to accounts that call upon word-world relations or direct inclusions of objects in propositions.⁴

What distinguishes rigid singular terms from non-rigid ones? Rigidity must be thought of as a particular sort of *openness* to the world and to experience that manifests itself in ways that we use those expressions.⁵ It is a type of commitment that we make in taking up the use of such expressions. We do not simply happen to pick out the same object with those, we are obliged to, and to correct ourselves or others when a regime of reidentification and substitution commitments fail to do so.⁶ We take up inferential commitments in using non-rigid designators, as well, but for non-rigid expressions, reidentification and identity conditions are fixed prior our engagement with their referents and we do not take up commitments to revise other inferential commitments by virtue of the referent we determine.

Paradigmatically, definite descriptions assign inferential commitments according to their various subsentential components. Speakers using (or hearing) the expression "the shortest American President" take up inferential commitments in virtue of the component expressions: "the" implies uniqueness, which may be articulated in substitutional terms; "shortest" implies that a name may be substituted into the subject position of the frame "___ is shorter than ___" with each other potential names substituted on the other side in turn. But these commitments *dictate* a referent to us where they succeed in determining one at all; we would not take up some commitment to revise our usage of "shortest" if the description turned out to refer to James Madison (or anyone

⁴ The details that follow in the remainder of this section and the next are presented in greater detail in Wolf (2002, 2006a and 2007).

⁵ Cf. Brandom (1994, 468-473)

⁶ An emphasis on inferential roles of sentences and expressions is common to normative functionalist views, but the terms "commitment" and "entitlement" are part of Brandom's program.

else, for that matter). But we might revise our descriptive and reidentification commitments for "Aristotle" if some of them conflict in our ongoing inquiry. (Attention to observation and empirical commitments is especially important here, but not exclusively. Shifts in other theoretical terms may have the same effect.) The commitments surrounding a rigid designator are sensitive to inquiry, empirical and theoretical, at their very heart. But this sensitivity is first and always a matter of inferential commitments. The apparent bareness of ostensive "baptisms" of names, natural kind terms and other rigid designators is a reflection of this openness. It amounts to a readiness on the part of speakers and communities to withdraw commitments when incompatibilities arise. Putnam's suggestion of a "stereotype" here may be instructive (1975a, 1975b, 249-252); he suggests it as a sort of portfolio of descriptions that most speakers will have at their disposal for a term, but not a defining set of properties in the vein of analytic truths. As far as this goes, the normative functionalist should have no objections. But in Putnam's account, this would suggest a shabby, provisional character for the inferential commitments surrounding a rigid designator. What our account here suggests is that this pragmatic flux is the stuff of meaning, and that the rigid character of such expressions is a goal for which speakers will be held *responsible* as they make use of them.

Normative functionalist theories of rigid designation also enjoy an explanatory advantage in accounting for the "reference-preserving causal links" alluded to by Kripke. Putnam sometimes piggybacks on Kripke's terminology here, and also speaks broadly of the "social" character of rigid designation, as in the extended quote above. Metaphorically, one might think of the "baptism" of an individual or kind — the introduction of an expression referring to it in the language — as a kind of "anchor" that fixes the reference, with chains of interrelated linguistic events (utterances, inscriptions, readings of inscriptions, etc.) in which the expression recurs. Noting that these links are causal tells us too little, though. Your utterance at t_1 may be followed by my utterance at t_2 , but almost any duration may separate those two events, and an untold variety of conditions may obtain in the interim. Some account of what sustains or "preserves" the reference must be offered.

Here, the work of Grover, Camp and Belnap (1975) and Brandom (1984, 1994, chap. 7) in developing richer and more sophisticated notions of anaphora is crucial. Expressions taken up anaphorically derive their content by occurring as stand-ins for expressions used in a context. For instance, "Jocelyn loves herbs. She grows her own." Here, the pronoun "she" has its content determined by its dependence on the name "Jocelyn." There are many more anaphoric forms, of varying interest to formal semanticists, but beginning with Grover, Camp and Belnap, it became clear that similar analyses could be offered of other expressions — pro-verbs and pro-sentences, in addition to pronouns — and that these could all be understood as forms of inheritance between speakers. What speakers inherit here is not some particular physical item or effect, but the sort of inferentially articulated commitments and entitlements familiar from normative functionalist accounts. The "chains of communication" invoked by Kripke's account and the social dimension of Putnam's account of rigidity involve causal interactions among speakers, but the import of these interactions are the transfers of commitments and entitlements among speakers — transfer and inheritance of *normative* statuses. As Brandom puts it, "causal-historical theories of proper names then appear as dark ways of talking about the sorts of anaphoric chains that link tokenings of proper names into recurrence structures" (1994, 470). (We may add natural kind terms and other rigid designators here.)

To speak in these terms of commitment and entitlement is not to speak of token performances or occurrent psychological states. Meanings still "ain't in the head" on this account. In fact, speakers may not be overtly, consciously aware of all the commitments and entitlements surrounding an expression. Even those they are consciously aware of may never be invoked in any sort of performance. And my token performance in using an expression may piggyback on yours. If I use a name, you may then use it as well and point in my direction if there are objections to our usage. Putnam's "division of labor" is now also less darkly understood: these are commitments and entitlements inherited from select social groups, such as scientists, relative to their expertise on our license to make some range of claims and inferences. Most importantly, we may think of all of these communicative exchanges as anaphoric chains stretching back to the origins of rigid designators in a linguistic community, or in ancestor communities using predecessors of the terms in the distant past. Those origins are often lost to the fog of history, though they are often idealized as "baptisms" in the literature on rigidity, and the nature of their introduction — the anchoring of those anaphoric chains — remains a point of interest.

Something must determine a referent in the introduction of a rigid designator (particularly names and natural kind terms). Deixis is frequently part of idealized introductions, but acts of pointing or drawing attention cannot be free of implicit commitments, either. Pointing at an expanse before me to draw the attention of another speaker does not amount to a semantically significant performance unless I'm implicitly invoking reidentification and theoretical commitments in other speakers that are roughly in line with my own. It is these commitments that tell us that I am dubbing a *kind* of stuff "water," rather than a particular body of it, or its phase state, etc.; or that we are naming this child, not *that other one* in the nearby crib, "Michael Padraic Wolf." Discussion of these ambiguities sometimes turns to the intentions of the baptizing speakers, but this approach threatens to put meanings back in the head. Where an appeal to intentions is useful at all here, it is as a way of speaking of the commitments a given speaker is covertly taking up and would oblige other speakers to take up as well. Most ostensive introductions of rigid designators are routine and leave the commitments implicit, but this reflects a shared set of cognitive dispositions involving joint attention and stage-setting by earlier statements in a context of conversation. They become apparent to us only on occasions of breakdown when explicit clarification is required. But without the inferential commitments of a normative functionalist account, there would be no fixing of referents at all.

III. Natural kind terms and reconciling theoretical commitments

What has been said so far might be said as easily of natural kind terms as readily as we say it of proper names and most other rigid designators. But they are significantly different in some respects. They include both sortals ("electron") and mass terms ("gold"), and like other common nouns, they may be used both as singular terms and as components of predicates.⁷ We may say both "Gold is the corpse of value," and "Not all that glitters is *gold*." Note that the predicative form there is not an identity statement. We could use "gold" in an identity statement, e.g., "the element with atomic number 79 is gold," but that is not what is being said when I say, "My ring

⁷ They may also occur in complex predicates as direct or indirect objects, but we may think of those as simply other ways for them to appear as singular terms.

is *gold*." As singular terms, kind terms may appear as mass terms ("gold is a metal"), in definite descriptions ("The lion is a mammal"), indefinite descriptions ("A lion has four legs") and bare plurals ("Lions hunt in a pride").⁸ With some stage-setting in a context, the definite, indefinite and bare plural forms may also be used as singular referential expressions: "A lion attacked me"; "Honey, the *dog* wants to go out"; "*Weasels* ripped my flesh" (i.e., some particular group of them, not the species in general). While these are of genuine semantic and logical interest, we may take the singular usages to be abbreviated phrases or covert descriptions that are derivative of the kind-referring usages, so I will concentrate on the kind-level singular terms and the predicative usages here. As I said, natural kind terms share these features with non-natural ones that no one would assert are rigid designators. A great deal has already been said about the sensitivity of rigid expressions to the empirical, and this is certainly central to our openness to new evidence for the usage of terms like "electron" and "gold." But why would we use kind terms, with this curious combination of subsentential roles for this purpose? We might ask, what do the various features of kind terms described here do that makes them useful for the purposes that lead us to have rigid designators in the first place?

We may note that the singular term usage of natural kind terms has a duality of its own. On the one hand, it may serve as what Sellars called a "distributive singular term" (1974, 430-433). In such cases, we may read the singular term as entailing a conditional with the kind term switched to predicative usage in the antecedent and the predicate of the original sentence, e.g., "an electron has a mass of 9.1×10^{-31} kg" entails "if something is an electron, then it has a mass of 9.1×10^{-31} kg." (For more formal purposes, we might want to state this with quantifier phrases and open sentences, i.e., "For all x , if x is an electron ...". But we need not press that point for the moment.) We could then take designators for any member of the class and make substitution inferences with them as needed. Such strategies will be reminiscent of mid-century efforts at nominalist approaches to meaning via paraphrase, as deployed by both Sellars and Quine. Why not simply have predicative usages, then? Natural kind terms may also be used in reference to extant totalities of a kind in ways that will not reduce to such distributions among members of the kind, e.g., "The lion is disappearing from the Serengeti" or "Carbon dioxide is present in greater concentrations in the upper atmosphere and is increasing mean surface temperatures as a result." These are not predicates that can be ascribed to each member of a class via simple substitution inference schemes. They express a range of reports about indeterminate subsets of the kind, patterns involving whole populations, and many other possibilities. But they express and report various empirical facts that will be of substantial theoretical and explanatory interest to us, so we should not write them off as merely idiomatic. The predicative usages of natural kind terms serve as what we might call inferential *intersections*: various reports of observable conditions license them, and they in turn serve as gateways to a wealth of consequences via lawlike and statistical generalizations. Once we can say, "it is an electron," (or for other singular terms in the subject position) the resources of our best physical theories are at our disposal. Singular term usages for extant totalities permit substitution inferences across both the contingent facts that they report and the lawlike and statistical generalities of the sciences. Such

⁸ The ontology of species and other biological terms is a fiercely contested matter, and I take no position here on whether species are kinds, individuals, sets, etc. I make use of these biological expressions because they behave like the other kind terms and it is these semantic, inferential patterns that concern us.

inferential potentials are invaluable for the sort of theoretically mediated usage of a term characteristic of our adoption of it as a rigid designator.

One last subject of concern for natural kind terms is their commensurability with past usage, as raised by Kuhn (1970). Kuhn noted that the linguistic and practical articulation of theoretical commitments involving natural kind terms (to use our terms, rather than his) were so different across the history of science that apparent uses of the same theoretical terms by different groups of scientists would be incommensurable with one another. Rigid designation has often been cast as a remedy for this worries, most explicitly by Putnam. Even if our theoretical accounts change over time, the extension of those natural kind terms remains the same and thus we have sufficient univocality for critical responses, i.e., we can say that scientists were wrong about water before 1700 CE without fear that our use of "water" does not line up with theirs. Kuhn (1990, 1996a, 1996b) has been critical of such appeals to rigid designation. The normative functionalist must give some account here, though. There *will* be disparities in the inferential commitments taken up by past and present speakers, indeed there will be disparities even among *co-present* groups of speakers.

To some degree, we should agree that such severe disparities are possible. What we translate from Aristotle as "force" ($\beta\iota\alpha$) may simply not reconcile with contemporary usage of the term, to take just one example. (I make no claim either way here.) There is no *a priori* reason that all terms must do so, and we should find any theory that had such a consequence suspect. However, this is not a fundamentally different scorekeeping problem than the sort we often encounter with other speakers. Where speakers do not agree on the usage of an expression, they dispute the commitments and entitlements to be assigned, and in the most mundane cases, they have their set of social practices to which to appeal. In more potent disputes, the appropriate forms of the practices themselves are in dispute. Assuming that both past and present sets of practices and the inferential commitments surrounding a natural kind term are well articulated, we can treat discrepancies as akin to present-tense disputes about the form practices should take going forward. Obviously, this requires a sympathetic idealization of the responses earlier communities might have made in such an exchange if it is not to degenerate into smug confirmation of progress. Where we undertake such discourse, we search for affinities, both at the level of particular inferences made with the term in hand, and at the level of explanatory strategies in which the distinction is deployed. Where there is sufficient affinity, we find ourselves in a position to take their terms to be our own and correct their commitments. (The more we agree with them, oddly enough, the more we can tell them where they are wrong.) With regard to "water," retrospective consideration of the usage of the natural kind term will involve comparison of the *microstructural* explanatory strategies implicit in modern conceptions of elements with, for instance, the *transformational* explanatory strategies of Stahlian chemistry (In this earlier approach, "principles" are distinguished by how they transform things, and water is thus distinguished by its *solvency*). But note that that earlier explanatory strategy is part of a larger set of commitments including things like drinking and collecting samples from lakes and streams that will overlap with present usage. This explanatory strategy purported to expand the extension of "water," and in doing so, it stakes a claim that must be treated with openness, and thus might simply be wrong. Whether such extensions part ways with our contemporary accounts and everyday usage of the past is a subtle and difficult historical question, but one that differs from ordinary questions about scorekeeping in degree and complexity, not in kind.

Contact details: mwolf@washjeff.edu

References

- Brandom, Robert. 2007. *Between Saying and Doing: Toward an Analytic Pragmatism*. Oxford, UK: Oxford University Press.
- . 1994. *Making It Explicit*. Cambridge, MA: Harvard University Press.
- . 2001. "Modality, Normativity and Intentionality." *Philosophy and Phenomenological Research* 63 (3): 587-609.
- . 1984. "Reference Explained Away". *Journal of Philosophy* 81 (9): 469-92.
- . 1987. "Singular Terms and Sentential Sign Designs." *Philosophical Topics* 15 (1): 125-167.
- Brown, Harold. 1986. "Sellars, Concepts and Conceptual Change." *Synthese* 68: 275-307.
- Dummett, Michael. 1978. "The Social Character of Meaning." In *Truth and Other Enigmas*, ed. Michael Dummett, 420-430. Cambridge, MA: Harvard University Press.
- Frege, Gottlob. 1980. "On Sense and Reference." In *Translations from the Philosophical Writings of Gottlob Frege*, eds. Max Black and Peter Geach, 56-78. Oxford: Basil Blackwell.
- Grover, Dorothy, Joseph L. Camp & Nuel D. Belnap. 1975. "A Prosentential Theory of Truth." *Philosophical Studies* 27 (2): 73-125.
- Kripke, Saul. 1980. *Naming and Necessity*. Oxford, United Kingdom: Basil Blackwell Pub.
- Kuhn, Thomas. 1996a. "Commensurability, Comparability, Communicability." In *The Road Since Structure: Philosophical Essays 1970-1993 With an Autobiographical Interview*, eds. James Conant and John Haugeland, 33-57. Chicago: University of Chicago Press.
- . 1996b. "Possible Worlds in History of Science." In *The Road Since Structure: Philosophical Essays 1970-1993 With an Autobiographical Interview*, eds. James Conant and John Haugeland, 58-89. Chicago: University of Chicago Press.
- . 1990. "Dubbing and Redubbing: The Vulnerability of Rigid Designation." In *Scientific Theories: Minnesota Studies in the Philosophy of Science*, Volume 14, ed. W. C. Savage, 298-318. Minneapolis: University of Minnesota Press.
- . 1970. *The Structure of Scientific Revolutions*, 2nd ed. Chicago: University of Chicago Press.
- MacBeth, Danielle. 1995. "Names, Natural Kinds and Rigid Designation." *Philosophical Studies* 79 (3): 259-281.
- McDowell, John. 1998a. "De Re Senses." In *Meaning, Knowledge and Reality*, ed. John McDowell, 214-227. Cambridge, MA: Harvard University Press.
- . 1998b. "On the Sense and Reference of a Proper Name." In *Meaning, Knowledge and Reality*, ed. John McDowell, 171-198. Cambridge, MA: Harvard University Press.
- . 1998c. "Putnam on Mind and Meaning In *Meaning, Knowledge and Reality*, ed. John McDowell, 275-291. Cambridge, MA: Harvard University Press.
- Putnam, Hilary. 1975a. "Is Semantics Possible?" In *Mind, Language and Reality: Philosophical Papers Vol. 2*, eds. Hilary Putnam, & Stephen Schwartz, 139-152. Cambridge: Cambridge University Press.
- . 1975b. "The Meaning of 'Meaning'." In *Philosophical Papers, Vol. 2: Mind, Language and Reality*, ed. Hilary Putnam, 215-271. Cambridge: Cambridge University Press.
- . 1974. "Comment on W. Sellars." *Synthese* 27: 445-455.

Wolf, Michael P. 2012. "Rigid Designation and Natural Kind Terms, Pittsburgh Style." *Social Epistemology Review and Reply Collective* 2 (1): 133-142.
<http://wp.me/p1Bfg0-DC>

- . 1973. "Meaning and Reference." *Journal of Philosophy* 70, 699-711.
- Sellars, Wilfrid. 1974. "Conceptual Change." In *Essays on Philosophy and Its History*, ed. Wilfrid Sellars, 172-188. Dordrecht: D. Reidel.
- . 1956/1997. *Empiricism and the Philosophy of Mind*. Cambridge, MA: Harvard University Press.
- . 1980. "Inference and Meaning." In *Pure Pragmatics & Possible Worlds: The Early Essays of Wilfrid Sellars*, eds. Wilfrid Sellars and Jeffrey Sicha, 261-286. Atascadero, CA: Ridgeview Pub.
- . 1974. "Meaning as Functional Classification." *Synthese* 27: 417-437.
- Wolf, Michael P. 2007. "Reference and Incommensurability: What Rigid Designation Won't Get You." *Acta Analytica* 22 (3): 207-222.
- . 2006a. "Rigid Designation and Anaphoric Theories of Reference." *Philosophical Studies* 130 (2): 351-375.
- . 2006b. "Sellars on the Revision of Theoretical Commitments." In *The Self-Correcting Enterprise: Essays in Honor of Wilfrid Sellars*, eds. Michael P. Wolf & Mark N. Lance, 231-252. Amsterdam: Rodopi Press.
- . 2002. "The Curious Role of Natural Kind Terms." *Pacific Philosophical Quarterly* 83 (1): 81-101.