XII*—HOW TO MEASURE THE STANDARD METRE

by Nathan Salmon

I

> There is *one* thing of which one can say neither that it is one metre long, nor that it is not one metre long, and that is the Standard Metre in Paris.—But this is, of course, not to ascribe any extraordinary property to it, but only to mark its peculiar role in the language-game of measuring with a metre-rule.

So says Wittgenstein (*Philosophical Investigations* §50). Kripke sharply disagrees:

> This seems a very 'extraordinary property', actually, for any stick to have. I think [Wittgenstein] must be wrong. If the stick is a stick, for example, 39.37 inches long (I assume we have some different standard for inches), why isn't it one meter long? (*Naming and Necessity*, Harvard University Press and Basil Blackwell, 1972, 1980, at p. 54).

Kripke goes on to argue that it not only would be correct to say of the Standard Metre that it is exactly one metre long, but the very fact about the Standard Metre that it is exactly one metre long, although it is only a contingent fact, is in some sense knowable *a priori*:[1]

> We could make the definition more precise by stipulating

* Meeting of the Aristotelian Society held at 5/7 Tavistock Place, London WC1, on Monday, 9 May, 1988 at 6.00 p.m.

[1] The present discussion is predicated on the common myth that the unit of length, one metre, was at one time fixed by the length of a particular bar used as a standard and kept in Paris. In reality, the Standard Metre is kept in Sevres, near Paris, and is considerably greater than one metre in length; the term 'metre' was defined as the length between two particular scratches that had been carefully cut into the bar. (How far apart? Wittgenstein: 'Don't ask'. Kripke: 'You want to know how far apart? One meter, what else?') The metre is no longer so defined. (Neither is the meter. Apparently it is now defined as the distance light travels in a certain fixed fraction of a second.)

that one meter is to be the length of S at a fixed time t_0. . . . [A] man who uses the stated definition [is] using this definition not to *give the meaning* of what he called 'the meter', but to *fix the reference*. . . . There is a certain length which he wants to mark out. He marks it out by an accidental property, namely that there is a stick of that length. Someone else might mark out the same reference by another accidental property. . . . Even if this is the *only* standard of length that he uses, there is an intuitive difference between the phrase 'one meter' and the phrase 'the length of S at t_0'. The first phrase is meant to designate rigidly a certain length in all possible worlds, which in the actual world happens to be the length of stick S at t_0. On the other hand, 'the length of stick S at t_0' does not designate anything rigidly. . . . [T]he 'definition', properly interpreted, does *not* say that the phrase 'one meter' is to be *synonymous* (even when talking about counterfactual situations) with the phrase 'the length of S at t_0' but rather that we have *determined the reference* of the phrase 'one meter' by stipulating that 'one meter' is to be a *rigid* designator of the length which is in fact the length of S at t_0. So this does *not* make it a necessary truth that S is one meter long at t_0. . . .

What, then, is the *epistemological* status of the statement 'Stick S is one meter long at t_0' for someone who has fixed the metric system by reference to stick S? It would seem that he knows it *a priori*. For if he used stick S to fix the reference of the term 'one meter', then as a result of this kind of 'definition' (which is not an abbreviative or synonymous definition), he knows automatically, without further investigation, that S is one meter long. On the other hand, even if S is used as the standard of a meter, the *metaphysical* status of 'S is one meter long' will be that of a contingent statement, provided that 'one meter' is regarded as a rigid designator: under appropriate stresses and strains, heatings or coolings, S would have had a length other than one meter even at t_0. . . . So in this sense, there are contingent *a priori* truths. (*ibid*., pp. 54–56.)

. . . The case of fixing the reference of 'one meter' is a very clear example in which someone, just because he fixes the reference in this way, can in some sense know *a priori*

> that the length of this stick is a meter without regarding it as a necessary truth. (*ibid.*, p. 63)[2]

Wittgenstein's claim that the sentence in question is unassertable because of the Standard Metre's 'peculiar role in the language-game' goes much further than the doctrine held by the empiricists that such definitions are devoid of proper cognitive, extra-linguistic factual content. By contrast with Wittgenstein, the empiricists argued that the sentence does indeed express *a priori* knowledge, but only because it does not express a *matter of fact* and instead expresses a *relation of ideas* (or a linguistic convention devoid of cognitive, factual content, etc.). Kripke's claim that the metre sentence is contingent *a priori* is significant, in part, because it contradicts this empiricist tradition. If Kripke is correct, the metre sentence expresses a matter of contingent fact. My chief concern in this paper, however, is not with the relation of either Wittgenstein's or Kripke's views to the doctrine of empiricism (vexing issues in themselves), but more directly with the apparent divergence between Kripke and Wittgenstein over the question of the assertability and epistemic justification of the metre sentence.

Either Wittgenstein is wrong or Kripke is wrong. For surely if one who defines 'metre' as the length of the standard S at t_0 can thereby know *a priori* that S is exactly one metre long at t_0, as Kripke claims, then *pace* Wittgenstein, one can correctly say of the standard that it is indeed one metre long at t_0. This follows from the trivial fact that knowledge entails truth and truth entails (is?) assertability. Who is right and who is wrong?

It must be admitted that Kripke has more plausibility on his side than Wittgenstein does. Still, my answer is that Kripke and Wittgenstein are probably both wrong to some extent. To the extent that Wittgenstein is wrong, some of what Kripke says is right. More interestingly, the extent to which Kripke is right suggests that in *some* sense, a significant part of what Wittgenstein says may also be right. Frankly, I suspect Wittgenstein is ultimately completely wrong regarding the Standard Metre.

[2] In a footnote to this passage Kripke acknowledges that his claim that such sentences as 'Stick S is exactly one metre long at t_0' express *a priori* knowledge (for one who so fixes the reference of 'metre') may seem implausible, and that some version or variant of its denial may be true.

Nevertheless, some of what I shall say here provides a measure of support (of some sort) for Wittgenstein's paradoxical observations concerning the Standard Metre. Specifically, I shall propose an epistemic paradox that might, to some extent, vindicate Wittgenstein's enigmatic remark. I make no claim, however, to be faithfully capturing Wittgenstein's intent. In the passage from which Wittgenstein's remark was extracted, he is discussing issues concerning our use of language as a means of representation, and is not explicitly concerned with the epistemological issues I will enter into here.

II

I argued in *Frege's Puzzle*[3] that the disputed metre sentence is (apparently contrary to Wittgenstein) true, but (apparently contrary to Kripke) contingent *a posteriori* rather than contingent *a priori*. In judging the sentence contingent, I followed Kripke in gainsaying the traditional empiricist claim that such definitional sentences do not express matters of extra-linguistic fact, but I went further than Kripke by rejecting even the less controversial (not to say *un*controversial) doctrine that such sentences express *a priori* knowledge.[4]

I shall not rehearse the full argument for a-posteriority. Instead, I shall merely sketch the main premisses, and leave their defence as a homework exercise for the reader. (Warning: This exercise should not be attempted by the squeamish.) For this purpose let us call the length at t_0 of S (that is, the length one metre or 39.3701 inches), 'Leonard'. Leonard is an abstract quality, a species of the generic Lockean primary quality *length*. We assume that the measurement-term 'metre' is introduced in such a way that a phrase of the form $\ulcorner\alpha$ metres$\urcorner$, where α is a term referring to some number n, is itself a singular term

[3] Cambridge, Mass.: Bradford Books/MIT Press, 1986, at pp. 140-142.

[4] For a similar rejection of a-priority for definitional sentences like Kripke's metre sentence, see Michael E. Levin, 'Kripke's Argument Against the Identity Thesis', *Journal of Philosophy*, 72, 6 (March 27, 1975), pp. 149-167, at p. 152*n*; Alvin Plantinga, *The Nature of Necessity* (Oxford University Press, 1974), at pp. 8-9*n*; and Keith Donnellan, 'The Contingent *A Priori* and Rigid Designators', in P. French, T. Uehling, and H. Wettstein, eds., *Contemporary Perspectives in the Philosophy of Language* (Minneapolis: University of Minnesota Press, 1979), pp. 45-60. My own argument, while not exactly the same as Donnellan's, owes a great deal to his and has much of the same flavour.

referring to the length that is exactly *n* times as great as Leonard.[5] We assume further that the sentence 'The length at t_0 of *S*, if *S* exists, is one metre' has as its cognitive information content a Russellian *singular proposition* (David Kaplan) in which Leonard occurs directly as a constituent.[6] (This move in the argument presupposes a highly controversial theory of the nature of propositions, but Kripke is not prepared to reject it.) Let us call this singular proposition 'Peter'. For simplicity, we may assume that Peter has only two constituents: Leonard and the complex property of *being the length of S at* t_0 *if S exists*. (The fact that Peter actually has a somewhat more complex structure does not matter a great deal to the argument.) Peter is true in all and only those possible worlds in which the very stick *S* either does not exist at all, or does exist and has at t_0 the very length Leonard. To assert, believe, or know Peter is to assert, believe, or know of the length Leonard that if *S* exists, it is precisely *that* long at t_0. Therefore, the reference-fixer knows Peter, which is the cognitive content of the metre sentence, *a priori* only if he knows of Leonard without appeal to experience (beyond the experience needed merely to apprehend the proposition) that if *S* exists, it is

[5] The phrase $\ulcorner\alpha$ metres$\urcorner$ probably should not be regarded as a simple proper name. Whereas the '2' in the phrase '2 metres' seems to be replaceable by a variable for existential generalization on a sentence like 'The length of *S* is 2 metres', it is certainly not thus replaceable in a genuine name like 'R2-D2'. In *Frege's Puzzle*, I made the somewhat artificial assumption that the term 'metre' itself was a proper name referring to Leonard. A more plausible account parses the word 'metre' and its pluralization 'metres', as comprising a simple (non-compound) *functor* (like the 'squared' in the algebraic phrase 'three squared'), i.e., an operator that attaches to a singular term to form a new singular term. The functor would attach exclusively to number-terms ('three', '3', etc., with grammar determining the propriety of the singular or plural form) to form a compound term referring to a specific length. The function referred to is a systematic assignment of lengths to numbers, and has the entire class of lengths as its range. Measuring the length of an object is a way of determining the (or at least a) number corresponding to the given length. Thus units of measurement (such as the metre or the gram) for a generic quality (such as length or mass) are seen as systematic assignments of particular species of the genus to numbers (something like Gödel-numbering, or its converse). Although I shall not pursue the matter in this paper, the contrast between the two accounts of the logic of 'metre' is not altogether irrelevant to the issues discussed herein.

[6] I include the proviso 'if *S* exists' for the benefit of purists, who will point out that *S*'s having Leonard as its length entails *S*'s existence, and since one cannot know *a priori* that *S* exists, one therefore cannot know *a priori* that *S* has that length. The more cautious, conditional sentence does not entail *S*'s existence, and indeed is a trivial consequence of '*S* does not exist'. (This formulation presupposes a free logic.) In what follows, I will often ignore the complications that result from the inclusion of the proviso.

precisely that long at t_0. That is, the reference-fixer knows the content of the metre sentence *a priori* only if he knows of Leonard that *S*, if it exists, is precisely that long at t_0, without his belief that this is so being justified by means of experience. Yet it would seem that no matter what stipulations one makes, one cannot know without resorting to experience such things as that *S*, if it exists, has precisely such-and-such particular length at t_0. It would seem that one must at least *look at S*'s length, or be told that it is precisely that long, etc. Therefore, it would seem that the metre sentence is not *a priori* but *a posteriori.*[7]

Notice that someone who has heard of the stick *S* but has not

[7] Gareth Evans, in 'Reference and Contingency', *The Monist*, 62 (April 1979), pp. 161-189, defends Kripke's claim that such sentences as the metre sentence are *a priori*. Evans replaces Kripke's example with his own, in which a reference-fixer introduces the name 'Julius' for whoever uniquely invented the zip. Evans argues (pp. 172-173) that in putting forward such a sentence as 'If anyone uniquely invented the zip, Julius did' as not entailing the named entity's existence (see the preceding footnote), Kripke presupposes that the newly introduced name ('Julius') is a 'Fregean name', having descriptive content that may determine no referent. (The argument for this, which is largely implicit, appears to be that if the name contributed its referent, rather than a descriptive content, to the proposition expressed, then since a proposition cannot exist unless each of its constituents exist, the sentence could not be true with respect to a circumstance in which Julius does not exist.) Indeed, Evans defends the claim of a-priority by implicitly conflating the content of the sentence with something like that of the modally (nearly) equivalent, logically true sentence 'If anyone uniquely invented the zip, then the actual inventor of the zip did', in which the modal description 'the actual inventor of the zip', which has replaced the name 'Julius', has its indexical, modally rigid use. (See, for example, pp. 183-185, especially the last paragraph beginning on p. 184.) The alleged presupposition that the newly introduced name has descriptive content, in this sense, is something Kripke surely denies. Indeed, that proper names are not descriptive, in Evans's sense (even when their reference is fixed by description) might be regarded as the central thesis of *Naming and Necessity*. Cf. my *Reference and Essence* (Basil Blackwell and Princeton University Press, 1982), chapter 1, especially at pp. 14-16, 21-23. Contra Evans, the use of free logic involves no presupposition to the contrary. (The implicit argument for the presupposition is inapplicable to the phrase 'one metre' in any case, since Leonard presumably exists in every possible circumstance. More important, the argument is unsound; Peter does not exist in any possible circumstance in which *S* does not exist, yet it is true with respect to any such circumstance. Cf. *Naming and Necessity*, pp. 21*n*, 78. For related discussion, see *Reference and Essence*, pp. 35-40, and my 'Existence', in J. Tomberlin, ed., *Philosophical Perspectives I: Metaphysics*, Atascadero: Ridgeview, 1987, pp. 49-108.) The central question before us is whether the metre sentence is *a priori* for the reference-fixer when the phrase 'one metre' is presumed to *lack* descriptive content, in the relevant sense, and is presumed instead to have been introduced in the way Kripke explicitly proposed. Evans's conflation of such a sentence with a logically true surrogate conflicts with one of the main premisses of the argument just presented: that (something like) Leonard itself occurs directly as a constituent of the content of the metre sentence, rather than being represented therein by the content of a description, so that knowledge of the fact described by the metre sentence is *de re* knowledge of Leonard

yet seen it could still introduce the term 'metre' by means of the description 'the length of S at t_0'.[8] If the reference-fixer in this case has a wildly mistaken impression as to S's actual length (and so uses the description *referentially*, in Donnellan's sense, to refer to a very different length), or has no opinion whatsoever regarding S's length (and so uses the description *attributively*), it would clearly be incorrect to describe him or her as knowing *a priori* of Leonard that S, if it exists, is exactly that long at t_0. It is only after the reference-fixer sees S's length for himself (or is told it, etc.) that the proposition Peter becomes a piece of knowledge.

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that S, if it exists, is that long at t_0. (As I have said, Kripke is not prepared to reject this premiss.) I do not deny that the corresponding logically true sentence 'The length at t_0 of S, if it exists, is the actual length at t_0 of S' is contingent *a priori*. By the same token, however, knowledge of the fact it describes is not *de re* knowledge concerning Leonard. (See footnotes 10 and 11 below.)

[8] David Kaplan recommended that Russell's friend who had a trying exchange with a touchy yacht owner might have done something exactly like this in order to convey what the yacht owner refused to understand him as saying. See Kaplan's 'Bob and Carol and Ted and Alice', in J. Hintikka, J. Moravcsik, and P. Suppes, eds., *Approaches to Natural Language* (Dordrecht: D. Reidel, 1973), pp. 490-518, at p. 501. If Kripke were correct that doing so makes the specification of the length of the object an *a priori* truth, the yacht owner's original reply would still be apt and Kaplan's recommended strategy would be unsuccessful. There is considerable tension between this passage from Kaplan and some of his other writings—e.g., in 'Dthat', in P. French, T. Uehling, and H. Wettstein, eds., *Contemporary Perspectives in the Philosophy of Language*, pp. 383-400, at p. 397, and especially in 'Demonstratives', in J. Almog, J. Perry, and H. Wettstein, eds., *Themes from Kaplan* (Oxford University Press, forthcoming 1988), sections XVII ('Epistemological Remarks') and XXII ('On Proper Names')—wherein something close to Kripke's position is explicitly endorsed.

My own view (which is similar in this respect to Donnellan's—see footnote 4 above) is that Kaplan's examples ('the shortest spy', 'the first child to be born in the twenty-second century', 'the length of your yacht') might be used to *demonstrate* that the reference-fixer in Kripke's story does not know of Leonard *a priori* that it is the length at t_0 of S (or that 'one metre' refers to it, in his present idiolect, etc.). In this I agree with Kaplan's former view, enunciated in 'Quantifying In', in L. Linsky, ed., *Reference and Modality* (Oxford University Press, 1971), pp. 112-144, at pp. 126-127, and especially 135. Unfortunately, the view has become controversial. In addition to Kaplan's more recent writings see Ernest Sosa, 'Propositional Attitudes *De Dicto* and *De Re*', *Journal of Philosophy*, 71 (December 1975), pp. 883-896. Quine's views have also taken a turn towards a kind of latitudinarianism much like Sosa's. See his 'Intensions Revisited', in P. French, T. Uehling, and H. Wettstein, eds., *Contemporary Perspectives in the Philosophy of Language*, pp. 268-274, at pp. 272-273. (But see footnote 17 below.) A more extreme latitudinarian view has also been endorsed, for example by Stephen Schiffer in 'The Basis of Reference', *Erkenntnis*, 13 (1978), pp. 171-206. (The paper, however, involves a curious inconsistency on that point, among the definition in note 4, the proposal on p. 202, and the example on pp. 203-204.) Kripke has an example that, I believe, decisively refutes extreme latitudinarianism.

In his description of the reference-fixing situation, Kripke had in mind a case in which the reference-fixer sees S there in front of him and uses the description referentially to refer to that length.[9] In such a case, it is correct to say that the reference-fixer knows Peter, but, it would seem, only because he has had the experience needed to acquire this knowledge.

The reference-fixer can know without looking at (or being told, etc.) S's length that the length at t_0 of S, if it exists, is the length he means (in his present idiolect, as determined by his own overriding intentions) by 'one metre'. Perhaps this even qualifies as genuine *a priori* knowledge; it depends on whether one's knowledge of one's own intentions is ultimately justified by appeal to experience. For the sake of argument, let us agree that it is *a priori*. The reference-fixer could infer from this that the length at t_0 of S, if it exists, is one metre (and thereby know of Leonard that S, if it exists, is precisely that long at t_0) if only he knew of Leonard that the phrase 'one metre' refers to it (in his present idiolect, if S exists). But this is precisely what the reference-fixer apparently cannot know, without having an appropriate experience in which S plays a significant role. Pending this additional experience, all that the reference-fixer knows is the general proposition that the phrase 'one metre' refers (in his present idiolect) to whatever length S has at t_0, if S exists (and is non-referring otherwise).[10] In fact, the natural

[9] This was confirmed by Kripke in conversation.

[10] If this is correct, the reference-fixer cannot know, without some experiential contact involving S, such basic semantic facts about his own word 'metre' as that the phrase 'one metre' refers (in his present idiolect) to one metre (if S exists, and is non-referring otherwise), or that the metre sentence is true (in his present idiolect) if and only if S (if it exists) is one metre long at t_0. In this sense, without additional experience involving S the reference-fixer does not even understand his word 'metre' or any sentence, such as the metre sentence, using (as opposed to mentioning) the word—though he may be in a position to use the word in *asserting* (without apprehending) propositions involving Leonard. (Perhaps, for this reason, use of the phrase 'his idiolect' may not be fully appropriate here; pending suitable experience involving S, the reference-fixer has introduced a version of English that he himself does not fully understand. There may be a weaker sense of 'understand' in which the reference-fixer 'understands' the word 'metre' simply by knowing that it was introduced in such a way that 'one metre' refers to whatever length S has at t_0, if S exists. But understanding 'metre' in this weak sense does not give one the basic semantic knowledge that 'one metre' refers, if S exists, specifically to one metre.) He can know, without experiencing S and simply by knowing a bit of semantics, that the metalinguistic *sentences* 'The phrase "one metre" refers in my present idiolect to one metre' and 'The sentence "S, if it exists, is one metre long at t_0" is true in

order of things is just the reverse: the reference-fixer would ordinarily rely on additional experience to discover first that S has Leonard as its length at t_0, and then infer that 'one metre' refers to Leonard. Both pieces of knowledge are apparently *a posteriori*.

If the claim that the metre sentence is *a priori* is to be maintained in the face of these considerations, its defence must come from fastening onto an important epistemic distinction: the distinction between experience that plays a peculiar role in the *epistemic justification* of a belief (which is relevant to the

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my present idiolect if and only if S, if it exists, is one metre long at t_0' (in this perhaps extended sense of 'idiolect') are themselves true (in his present meta-idiolect). But his knowledge of these metalinguistic facts is in the same boat as his knowledge that the metre sentence itself is true. He knows that these sentences are true, but pending the additional experience, he does not understand them—he does not know what they mean or what facts they describe (in the stronger sense)—and he does not know those facts themselves.

Donnellan's argument mentioned supra in footnote 4 is criticized by Evans, *op. cit.*, at pp. 171-176 and *passim*. Evans's criticism, however, seems to be based on a serious misunderstanding of the argument. Specifically, Evans charges (p. 173) that Donnellan's argument (which is, in this regard, essentially the same as the one involving Leonard and Peter) gratuitously assumes the doubtful thesis that the name 'Julius' in Evans's example (see footnote 7 above) cannot have been introduced through fixing its reference by means of the description 'the inventor of the zip' in such a way that 'Julius' is thereby given descriptive content, since one cannot understand this name unless it has a referent. Evans counters that a successful introduction of this sort is indeed possible, and has the consequence that the reference-fixer understands the name 'Julius' whether or not it has a referent. (Donnellan uses a different example.) By contrast, Donnellan explicitly allows, at pp. 47-49, that 'Julius' *could* be introduced as a 'descriptive name', in Evans's sense, stipulated to be shorthand for 'the actual inventor of the zip'. Who is to stop us from doing so? To repeat a point made above, the relevant question is whether the metre sentence is *a priori* when the phrase 'one metre' is presumed *not* to have been introduced as a shorthand description, and is presumed instead to have been introduced in the way Kripke explicitly proposed, without taking on descriptive content. (Perhaps Evans denies the legitimacy, or even the possibility, of stipulating the use of the word 'metre' in this way. But who is to stop us from doing so?) Moreover, Donnellan's general argument allows that a speaker can understand the phrase 'one metre' (in a strong sense of 'understand'), so introduced, even if it is non-referring—simply by learning that it is non-referring. What the argument denies is that the general sort of semantic knowledge acquired through introducing the word 'metre' in the way Kripke envisages (the knowledge that the phrase 'one metre' refers to whatever length S has at t_0, if S exists, and is non-referring otherwise) is sufficient, without additional sensory experience involving S, for the more specific semantic knowledge of Leonard that 'one metre' refers (if S exists) to it. Contrary to the impression created by Evans, the question of whether the former knowledge qualifies as *understanding* the word 'metre' is quite irrelevant to the argument. (Use of the word 'understand' in this connection is apt to cause confusion, in light of the potential ambiguity alluded to in the preceding paragraph.)

question of whether the knowledge is *a priori* or *a posteriori*), and experience that merely serves to place the believer in a position to apprehend the proposition in the first place (by giving him or her the requisite concepts, for example), and does not play the relevant role in the epistemic justification of the belief. Thus, for example, the fact that one must have some experience in order to acquire the concept of a bicycle, and so to apprehend the proposition that all bicycles are bicycles, does not alter the fact that the proposition is known *a priori*. One might maintain that the reference-fixer's visual experience of *S* in the introduction of 'metre' likewise enables the reference-fixer to apprehend Peter but plays no further role in justifying that belief.

The case for a-priority along these lines, however, is far from clear. The reference-fixer's visual experience of *S* *can* play an important role in enabling him to apprehend propositions directly concerning *S*, but it does play a crucial role in justifying his belief of Peter. Suppose the reference-fixer has got himself into a position of being able to apprehend propositions directly concerning Leonard somehow *other than* by looking at *S* and conceiving of Leonard as the length of *S*. He comes into the situation of the introduction of 'metre' already grasping the generic concept of length. Suppose that he conceives of Leonard as '*this length here*', pointing to some object other than *S* yet having the very same length. Even if the reference-fixer came to believe of Leonard (so conceived) that *S*, if it exists, is also exactly that long at t_0, but did so somehow solely through contemplation and reflection on his concepts without experiential justification (i.e., not by estimating *S*'s length from its appearance etc.), he still could not properly be said to *know* this of Leonard. At best, it seems more like extremely lucky guesswork. It is only by seeing *S* and its length that the reference-fixer comes to know that *S* (if it exists) is just that long.

Whereas the reference-fixer's visual experience of *S* certainly plays a crucial role in the justification of his belief of Peter, it is arguable that the experience *need not* play the *sort* of role that would disqualify the belief from being *a priori* knowledge. The issue is quite delicate; a great deal depends on the exact meaning of '*a priori*'. It is even possible that the issue is, to some extent, merely verbal. Ordinarily, at least, it would be quite odd to say that one can know *a priori* concerning a certain length that a particular stick (if it exists) is exactly that long. I conjecture that Kripke, in his discussion, either failed to distinguish properly between the *a posteriori* content of the metre sentence, i.e. Peter, and the arguably *a priori* truth that the length at t_0 of S is referred to (in the reference-fixer's present idiolect) as 'one metre' (or something similar, such as the proposition that the metre sentence is true in the reference-fixer's idiolect), or else he failed to appreciate that the reference-fixer's visual experience of S in the very introduction of the term 'metre' is a crucial part of the justification for the reference-fixer's belief of Peter.[11]

[11] In *Frege's Puzzle* I allowed (p. 180) that Kripke had given at least the outline of a mechanism for generating certain contingent *a priori* truths through fixing the reference of a name by means of a definite description, in cases where the description is of a special sort that involves a *de re* (or *en rapport*) connection with the thing described. One example might be 'If I am visually perceiving anyone in the normal non-illusory way, then I am perceiving Irving', where 'Irving' is introduced by the speaker as a name for whoever he is visually perceiving. (This is derived from a similar example proposed by Kripke in a lecture at a conference on Themes from David Kaplan at Stanford University in March 1984, in which Kripke responded to Donnellan's argument and developed and modified his position on the contingent *a priori*.) Kripke has suggested (in the Stanford lecture, and more recently in conversation) that his metre example can be bolstered through the use of a suitable description, perhaps 'the length of the stick presented to me in the normal way by this visual perception', used with introspective ostension to a particular veridical visual perception of S.

Although it is quite unlikely, the speaker *could* come to believe the proposition that is the content of such a sentence without proper epistemic justification: Suppose, for example, that the speaker, who is offering a reward for the return of his lost pet cat named 'Sonya', is shown several cats that are indistinguishable from Sonya, and looking coincidentally at Sonya, thinks to himself (with more hope than justification) 'If I am visually perceiving a cat, then I am seeing none other than Sonya herself'—conceiving of Sonya not as '*this* cat I see here in front of me, whether or not it is Sonya' but in the more familiar, everyday manner in which he conceives of the beloved pet. Here the proposition in question is certainly not a piece of *a priori* knowledge, since it is not even a piece of knowledge. If the speaker were to come to believe this same singular proposition, this time conceiving of the cat in the former way rather than in the latter, the belief so formed would be epistemically justified in the appropriate manner. Since the speaker cannot be in a position to conceive of the cat correctly in the former way unless he sees the cat, his occurrent visual experience of the cat would therefore play a crucial role in the epistemic justification of the belief so formed. In some sense, the speaker would know of the cat in this case that she ('*this* very cat') is the cat he is looking at (if such exists), in part, by *looking* at her. Nevertheless, it is arguable that if the speaker conceives of the cat in the former way (as 'this cat I see here, whoever she is' and not as 'my pet Sonya', etc.), then he believes the singular proposition in question by virtue of the fact that he believes the more general proposition, which is knowable *a priori*, that if he is visually perceiving a cat, then he is perceiving *whichever cat he is perceiving*—together with the external fact that he is perceiving Sonya. If the visual experience does not play the sort of role here that would make the example *a posteriori* rather than *a priori*, then it is arguable that Peter is knowable *a priori* after all—*provided that* S is conceived of not as 'the stick I learned of

I claimed in *Frege's Puzzle* that actual measurement of *S*'s length by someone is required in order for anyone to know that *S* has Leonard as its length. I did not mean that one must do the measuring oneself. One could be told *S*'s length by someone else who actually measured it, etc. But I thought that at some point an actual measurement by someone was required. Kripke allows in his discussion that the inch may already be in use as a unit of length, independently of the introduction of the metre by the reference-fixer. One function that is filled by the institution of using a unit of length, such as the inch, is that it provides *standard* or *canonical names* for infinitely many otherwise unnamed abstract entities (the particular lengths), exploiting names already in use for the numbers ('39.37 inches', etc.). It seems plausible that if one is a member of a community of speakers for whom there are one or more units of length in use at a particular time, then at least in the typical sort of case, one would count as knowing exactly how long a given object is only if one is in a position to specify the object's length correctly by means of one of its standard names, given in terms of a conventional unit and the (or at least a) correspondingly appropriate numerical expression. It would follow that one counts as knowing exactly how long *S* is at t_0 only if one is able to specify *S*'s length in some such manner as '39.37 inches' or '3.28 feet', etc. Having this ability would seem to depend on *S*'s length having been previously measured—either by oneself, or by an informant, or by someone else who is the ultimate source of the information.

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earlier' but in the appropriate *de re* manner as 'this stick here' (or 'the stick I see here in the normal way', etc.), and Leonard is conceived of not as 'the length of the stick I learned of earlier' nor even (as in Kripke's original example) as 'the length of this stick here' but as 'this *length* here', with ostension to *S*'s length *via S* itself. Otherwise, Peter is known by the reference-fixer only *a posteriori*. Against this, one may be inclined to maintain that, even if *S* and its length are so conceived, the reference-fixer knows only *a posteriori*, by seeing the stick's length, that the stick he sees in the normal way (if it exists) has the length he sees, so that Peter remains *a posteriori*. As I have said, though, the issue may be to some extent merely verbal. There is a great deal more to be said about this sort of case. (I am indebted to Eli Hirsch and to Kripke for fruitful discussion of these, and related matters. Kripke has informed me that he independently arrived at conclusions similar to many of those presented in this paper and discussed them in a lecture on these topics at Notre Dame University in 1986. I have not heard the Notre Dame lecture and am unsure as to the extent of agreement between us. There seems to be a good deal of convergence, though I have the impression that some significant differences between the account given in Kripke's Notre Dame lecture and the present treatment may remain.)

By the time *Frege's Puzzle* made its appearance in print, I realized that this piece of reasoning was flawed by overstatement. When one looks at an ordinary, middle-sized object, one typically sees not only the object; one typically also sees *its length*. To put it more cautiously, one typically thereby enters into a cognitive relation to the length itself, a relation that is analogous in several respects to ordinary visual perception, but that (because perceiving subjects may stand in the relation to abstract qualities like lengths) may not correspond exactly with the relation, standardly called 'seeing', between perceivers and the concrete objects they see. One also typically thereby sees (perhaps in some other extended sense) *the fact* that the object has that very length. Of course, merely perceiving an object will not always result in such empirical knowledge. Perhaps in order to see an object's length one must be able to take in the object lengthwise, from end to end, in one fell swoop. Perhaps the visual presentation cannot be under circumstances that create optical illusions (such as might be created by surrounding the object with miniature artifacts, each reduced to the same scale, etc.). Perhaps not. In any case, if the reference-fixer does indeed see S under the required circumstances, he can thereby know of its present length, Leonard, that S is presently exactly that long.[12] No physical measurement is required beyond merely perceiving the object (taking it in lengthwise in one fell swoop, etc.). But some sensory experience in which S plays a crucial role seems to be required. The metre sentence is apparently *a posteriori*, even if physical measurement is not required for its verification.

The error in my argument for the necessity of measurement was the plausible assumption that to know of Leonard that S (if it exists) is exactly that long at t_0 is to know exactly how long S is at t_0 (provided it exists). I suppose that anyone who knows exactly how long a given object is ordinarily knows of its length that the object is exactly that long. But the converse is not universally true; one can know of an object's length, just by looking at the object (and its length, under appropriately favourable circumstances), that the object is exactly that long.

[12] Thus I cannot accept the argument proposed on my behalf by Ralph Kennedy in 'Salmon Versus Kripke on the *A Priori*', *Analysis*, 47, 3 (June 1987), pp. 158–161.

Assuming there is a unit of length in use independently of the object in question, one does not thereby learn exactly *which* length the object's length is, as one would (for example) by physically measuring the object in terms of the conventional unit. Knowing exactly how long something is typically requires more than merely perceiving the object.

III

This brings us to Wittgenstein's paradoxical observation concerning the unassertability of the metre sentence. Wittgenstein claims that one can say of *S* neither that it is one metre long, nor that it is not one metre long. With part of this, there can be no quarrel. One assuredly cannot properly say of *S* that it is not one metre long, since that would be straightforwardly false. Why, then, can one not properly say of *S* that it is one metre long?

Let us modify Kripke's story slightly. Suppose there is no standard unit of length in use by the reference-fixer's community. Suppose the reference-fixer is a very clever caveman who is attempting to devise for the first time a precise method for specifying various lengths. He hits on the brilliant idea of establishing a convention of specifying every length whatsoever as a multiple (whole or fractional) of some one, specially selected length, which will serve as the standard unit of length. He arbitrarily selects for this purpose the length at that moment t_0 of a particularly straight and sturdy stick *S* that he picks up from among a pile of sticks and holds in his hands. He calls its length 'one metre'. His fellow tribesmen agree to his scheme. The length at t_0 of stick *S*, i.e. Leonard, happens to be 39.3701 inches, though of course, no one is in a position prior to the reference-fixer's flash of brilliance to specify its length using inches or any other unit of measurement, since there was no such thing until the historic moment t_0. Using a compass and a straightedge, the reference-fixer carefully scratches calibrations onto the stick, marking them '½', '¼', '¾', etc., down to a very fine degree, say 128ths. The clever caveman knows that with this new tool, given any middle-sized object and sufficient time, anyone can now determine the object's length with a very high degree of precision. His people have a new prize possession, the only standard measuring rod on Earth. Soon the measuring rod is in such great demand that every household has its own, carefully crafted duplicate—each carefully measured against the original. A new institution has been born: measuring with a metre-rule.

Does the reference-fixer in this case know at t_0 that S is exactly one metre long? Yes, simply by looking at it. Surely he need not measure S against itself in order to determine its length as a multiple of the standard length. In fact, there is no clear sense to be made of the idea of measuring the standard itself by means of itself, or even against any of its facsimiles. Its length *is* the standard length, by stipulation. If the reference-fixer can know of S's length, Leonard, just by looking, that S is presently exactly that long, then in some sense he cannot fail to know that S's length is exactly one times that length—except by not seeing it under appropriately favourable circumstances. Physical measurement is not only unnecessary; the very notion is in some sense inapplicable to this case.[13]

But an interesting philosophical difficulty arises once we say that the reference-fixer does know that S is exactly one metre long. He has deliberately established a convention of measuring objects in order to determine their lengths, and of specifying those lengths as multiples of a standard unit of length. Within the framework of this institution or 'language-game', one counts as knowing *how* long something is (as opposed to merely knowing of its length that the object is that long), typically, if and only if one is in a position to specify its length correctly as a multiple of the standard length (for example, as '3 and $^{27}/_{32}$ metres')—within the degree of precision epistemically accessible to the community in the current state of scientific knowledge. It would seem that anyone who can correctly specify that a given object is exactly n metres long (with sufficient epistemic justification, understanding what the specification means, etc.) knows exactly how long that

[13] Of course, one may later measure the standard against (say) one of its duplicates in order to check whether the standard has *changed* in length over time (or, as Kripke and James Tomberlin pointed out, in order to verify that it is indeed the original standard)—provided one has reason to believe that the duplicate itself has not changed in length. But we are here concerned with how the reference-fixer knows *at* t_0 of Leonard that S is that long *at* t_0. The fact that the length of the standard does not remain fixed over time introduces a host of issues that are largely irrelevant to the purposes of this paper. The problem I shall discuss would arise even if S did not change in length over time and even if the reference-fixer knew this. For simplicity, I shall simply presuppose that the reference-fixer knows that S's length remains constant.

object is. Thus, if the reference-fixer knows that *S* is precisely one metre long, it would seem that he knows precisely how long *S* is. If Kripke's claim in this connection were correct, the reference-fixer would know exactly how long *S* is (provided it exists) *a priori*! This would be quite astonishing, but we have seen that Kripke's claim seems incorrect. In order to know that *S* is exactly one metre long, the reference-fixer must look at (or be told, etc.) *S*'s length. However, we still get a rather curious result, not unlike Kripke's claim that the reference-fixer knows *S*'s length *a priori*: if the reference-fixer knows without measuring and just by looking that *S* is precisely one metre long, then *he knows precisely how long S is without measuring and just by looking.*

Indeed, knowing that a given object's length is exactly *n* times that of another object (the standard) cannot give one knowledge of how long the first object is unless one already knows how long the second object is. If one knows only that the length of the first is *n* times that of the second without knowing how long the second object is, one knows only the proportion between the lengths of the two objects without knowing how long *either* object is. Thus, if measurement is ever to give one knowledge of how long an object is, one must already know how long the standard itself is. Yet we have just seen the reference-fixer could not have come to know exactly how long *S* is by actually measuring *S*. Physical measurement is out of the question. If he has this knowledge, he must have acquired it simply by *looking at S*'s length, under appropriately favourable circumstances.

Suppose the reference-fixer wishes to know exactly how long his spear is. Can he tell just by looking at its length, without taking the trouble to measure? It would seem not. Now that there is an institution of measuring with a metre-rule, he can do much better than estimating the spear's length solely on the basis of its visual appearance. He can physically measure it. In fact, it would seem that he *must* physically measure the spear if he wishes to know *exactly* how long it is. Why is measurement not equally required in order for him to know exactly how long *S* is? Because of its unique role in the language-game of determining length with a metre-rule. Measuring the stick itself is, in some sense, impossible. There is nothing to measure *S* against that is not itself measured ultimately against *S*.

The caveman could try to do the same thing for the spear that he did for *S*. He could scratch calibrations into the spear at its midpoint, and so on, proposing the spear as a second and rival standard of measurement. Would this little exercise make it possible for the caveman to know exactly how long the spear is just by looking at it, as he can in the case of *S*? If so, then it would seem that he does not need to measure *anything*—or at least any ordinary middle-sized object—in order to know precisely how long it is. He need only look at it and propose to use its length as a new unit of length. Clearly, this would defeat the purpose of the institution of measuring: it would violate the rules of the language-game. No, if the caveman wishes to know exactly how long his spear is, he must do much better than merely look at it and perform a little ritual. He must measure it against the standard *S*, or by proxy against one of the many facsimile measuring sticks that have since been constructed, etc.

This makes *S* epistemically quite unique *vis à vis* the reference-fixer. No other object is such that he can know precisely how long it is just by looking at it. Once an institution of measuring lengths is put into operation, knowing how long an object is—at least if the object is something other than the standard itself—requires a little elbow grease. This is true even of the duplicate measuring sticks. But how could *S* have become knowable in a way that no other object is knowable? The measuring rod *S* was chosen entirely arbitrarily by the reference-fixer to serve a special purpose: all lengths are to be specified as multiples of its length. Despite its 'peculiar role in the language-game', it is still a stick, a physical object subject to the same natural laws and knowable in the same way as any other. If the reference-fixer had selected some other stick in place of *S* as the standard—as well he might have— the other stick would play the special role in the language-game. Its length, rather than Leonard, would be the one in terms of which all others are to be specified. In order to know precisely how long *S* is, one would simply have to measure it (or be told by someone who measured it, etc.). The reference-fixer's accidental selection of *S* as the standard could not have made it knowable in some direct way, quite different from the way it would have been knowable if it had not been selected in the first place. The reference-fixer cannot simply *legislate* that he knows exactly how long *S* is, any more than he can legislate that he knows exactly how long his spear is. The accidents and whims of human history and culture do not alter the nature of our epistemic relations to external objects. The laws of epistemology (if there are any such things) are *universal*. They do not play favourites by singling out this or that arbitrarily selected, inanimate object as epistemically special. If the laws of epistemology say *in order that thou knowest how long a physical object is, thou shalt measure it*, they do not make an exception in the case of some favourite stick.[14]

Thus as soon as we say that the reference-fixer knows that *S* is one metre long, we are embroiled in a paradox. The language-game of measuring with a metre-rule involves a simple criterion for knowing how long something is. In order for the reference-fixer to know how long anything is, he must be able to specify its length in metres *and* he must know how long the Standard Metre is. Saying that he knows that *S* is exactly one metre long attributes to him knowledge of exactly how long the Standard Metre is. But he could not have acquired this knowledge through measurement. If he has such knowledge, he can only have acquired it by simply looking at *S*. This would require *S* to be what it cannot be: knowable in a unique way in which no other object is knowable and in which it itself would not be knowable if it had not been arbitrarily selected as the standard. These considerations invite the skeptical conclusion that the reference-fixer does not know after all that *S* is exactly one metre long. This, in turn, leads to an even stronger skeptical conclusion. For if the reference-fixer does not know how long *S* is, he cannot know, and cannot even discover, how long *anything* is. Measuring an object's length using *S* only tells him the ratio of that object's length to the length of *S*.

The problem leads to an even more disturbing result. Suppose we grab the bull by the horns and deny that the reference-fixer knows the length of *S* or of anything else. Even if we say merely that *S* is *in fact* exactly one metre long, while not suggesting that

[14] Thus, apparently, the reasoning in *Frege's Puzzle* would not have been overstated if Kripke's example had included the feature that there are no rival units of length defined independently of the metre. As I said at the end of Section II above, if there is a rival system of measurement that supersedes the metric system, the reference-fixer's knowing of Leonard that *S* is exactly that long does not guarantee his knowing exactly how long *S* is. But where there is no rival system, to know that something is exactly *n* metres long is to know exactly how long it is, and knowing exactly how long something is apparently requires measurement. See footnote 19 below.

the reference-fixer knows this, we pragmatically implicate that *we* know that *S* is exactly one metre long, thereby opening the door to the same skeptical paradox. For if we know that *S* is exactly one metre long, then (assuming *S*'s length were the ultimate unit of length-measurement, in terms of which all other such units are ultimately defined) we must have come to know precisely how long *S* is simply by looking at its length, without measurement. This would make *S* inexplicably unique, differing in epistemic accessibility from all other objects, and from what it would have been if it had not been selected as the standard, solely by virtue of the special role it has arbitrarily come to occupy as the result of an accident of human history and culture. Since this is impossible, we are drawn to the skeptical conclusion that we do not know, and cannot discover, how long anything is! If this argument is sound, we are epistemically unjustified in saying of *S* that it is exactly one metre long at t_0. This comes very close to Wittgenstein's enigmatic claim.

There is a more general form of skepticism, of which the problem of the Standard Metre is only a special case. Analogous skeptical doubts can be raised in connection with other standards, such as the period of the earth's rotation on its axis, midnight Greenwich time, and so on. We may call the general form of skepticism exemplified by these examples *Does-anybody-really-know-what-time-it-is skepticism.*

This general problem arises in a particularly sharpened form in connection with the transcendental number π. Let us assume that the Greek letter 'π' was introduced as a standard name for the ratio of the circumference of a circle to its diameter, analogously to the introduction of 'metre'. We may then raise questions analogous to those raised in connection with the Standard Metre. First, do mathematicians know that π is the ratio of the circumference of a circle to its diameter? Notice that this is separate from the question of whether mathematicians know that 'π' refers to the ratio of the circumference of a circle to its diameter—which clearly should be answered affirmatively. What we are asking here is whether there is any number that mathematicians know to *be* the ratio of the circumference of a circle to its diameter. Questions arise concerning the various modes of acquaintance by which mathematicians are familiar with π. If mathematicians conceive of π as the ratio of the circumference of a circle to its diameter, or even as the sum of a particular convergent series, is their (or *our*) knowledge of π not merely what Russell called 'knowledge by description'? Or are mathematicians also acquainted with π in some more direct fashion, something like the way in which we are acquainted with 3 or 4 (or even 3.1416)? Presumably, despite the doubts that this line of questions raises, many will insist that mathematicians do know of π that it is the ratio of the circumference of a circle to its diameter. Indeed, the conventional wisdom is that mathematicians know *a priori* that π is the ratio of the circumference of a circle to its diameter. Very well, then, do they know *exactly* what number this ratio is? What exactly is the value of 'π'? The very question seems to demand what it is impossible to produce: a specification of π by means of its full decimal expansion. Providing the decimal expansion of a particular constant is analogous to measuring a particular object to determine its length. It is not enough here (perhaps by contrast with the case of measuring) merely to be able to set upper and lower bounds within a desired (non-zero) margin of error. Whatever margin of error one chooses, there remain infinitely many numbers that have not yet been ruled out. Given that the ratio of the circumference of a circle to its diameter lies somewhere among infinitely many other numbers between these bounds, do mathematicians know which number it is? Since one cannot know the full decimal expansion of π, there seems to be a sense in which no one can know what number π is.[15] It would follow that no one knows, or can even discover, given the diameter of a circle as a rational number, what the circumference is, or what the internal area is, etc. The well-known formulas for computing these values yield only their proportion to the unknown quantity π.

The threat of Does-anybody-really-know-what-time-it-is skepticism gives a point (whether or not it is the intended point) to Wittgenstein's counsel that we not say of S that it is exactly one metre long. Our not saying this about S would indeed mark its

[15] Even more analogous to the case of the Standard Metre is the transcendental number e, defined as the base of the logarithmic function whose derivative is the reciprocal function. Just as all lengths are specified in the metric system as multiples of Leonard, so all positive numbers are specified via the Napierian (or 'natural') logarithmic function as powers of e.

peculiar role in the 'language-game' of determining how long objects are with a metre-rule. But how does this help to solve the paradox? It does not.[16]

IV

The paradox revolves around the epistemic notion of *knowing how long* a given object is. This concept is philosophically problematic in precisely the same way as the concept of *knowing who* someone is. In fact, both concepts should be seen as special cases of a more general epistemic notion: that of *knowing which F* a given *F* is, where '*F*' is some sortal. Knowing-who is the special case where '*F*' is 'person'; knowing-how-long is the special case where '*F*' is 'length'.[17] A number of philosophers have held that the locution of 'knowing who' is highly interest-relative. Relative to some interests, simply knowing a person's name qualifies as knowing who he or she is: relative to other interests, it does not.[18] If this is correct, then the locution of 'knowing how

[16] 'This was our paradox: no course of action could be determined by a rule, because every course of action can be made out to accord with the rule.' The problem discussed in and around *Philosophical Investigations* §201 is not the same as the epistemological problem just presented. Wittgenstein's (alleged) paradox concerns the concept of following a rule, such as the rule (set of instructions) for determining the length of an object with a metre-rule; Does-anybody-really-know-what-time-it-is skepticism concerns the distinct concept of knowing which thing of a certain kind (e.g., which length) a specially designated thing of that kind is, and in particular, the question of whether the rule for determining length using a metre-rule applies in exactly the same way to the Standard Metre. Even if we have a solution to Wittgenstein's (alleged) paradox, the latter problem still arises.

[17] The relation of knowing which *F*, for a particular *F*, is a relation between a knower and (using the terminology of *Frege's Puzzle*) a singular-term information value, that is, either an individual ('knowing which *F a* is') or an intensional representation thereof ('knowing which *F* the φ is'). As in the special case of length, a distinction should be maintained between knowing of a given *F* that it is α and knowing which *F* is α. One may know of a given thief, without knowing who he or she is but simply by witnessing the crime, that he or she is the person stealing a certain book from the library. This distinction has often been blurred. See, for example, Donnellan, *op. cit.*, at pp. 52, 57–58; Jaakko Hintikka *Knowledge and Belief*, Ithaca: Cornell University Press, 1962, at pp. 131–132, and *passim*; and Quine, *loc. cit.* The distinction is upheld in Stephen Boër and William Lycan, *Knowing Who* (Cambridge, Mass.: Bradford Books/MIT Press, 1986), at pp. 132–133; David Kaplan, 'Opacity', in L. Hahn and P. A. Schilpp, eds., *The Philosophy of W. V. Quine* (La Salle: Open Court, 1986), pp. 229–289, at pp. 258–260; and Igal Kvart, 'Quine and Modalities De Re: A Way Out?', *Journal of Philosophy*, 79, 6 (June 1982), pp. 295–328, at pp. 300–301. Cf. also the closing paragraph of Section II above.

[18] Cf. W. V. Quine, *op. cit.*, at p. 273.

long' is equally interest-relative. In some contexts, knowing a length's standard name in the metric system counts as knowing which length it is; in other contexts, it does not. One way of spelling out this idea (though not the only way) is to claim that the locution of 'knowing which *F*' is *indexical*, expressing different epistemic relations with respect to different contexts.[19]

Interest-relative notions can easily lead to paradox, if we shift our interests without noticing it. Epistemic notions, if they are interest-relative, lead to skeptical paradox. Someone whose epistemic situation remains unchanged may be correctly described, relative to one set of interests, as knowing something that, relative to another set, he or she cannot be correctly described as knowing. The appearance of contradiction is due to a sort of equivocation, similar to that typified by the sentence 'Now you see it; now you don't'. If the indexical (or interest-relative) theory of knowing which *F* is correct, the skeptic is not really denying what we claim when we claim to know something. The skeptic merely has different interests; he or she

[19] An alternative account would treat the locution 'knows which *F*' as non-indexical but implicitly ternary-relational, with an additional argument-place for a specification of a particular interest or purpose. Cf. the account given in Boër and Lycan, *op. cit.* (I am indebted to James Tomberlin for pointing out that the interest-relative theory need not take the form of an indexical theory.)

Kripke (in lecture) has proposed several examples that appear to demonstrate the dependency (in at least most contexts) of the concept of knowing which *F* on such contextual factors as one's training and whether a name has become standardized through cultural entrenchment. The thesis that knowing which *F* is (at least usually) dependent on such factors, however, is largely independent of the interest-relative theory (according to which someone whose cognitive relations to a given *F* remain unchanged might be correctly described relative to one set of interests as knowing which *F* the given *F* is, and relative to another set of interests as not knowing which *F* the given *F* is). I believe the former; I am inclined to believe the latter as well.

I am disinclined to believe the analogue of the interest-relative theory with respect to the separate phenomena of *de re* knowledge and *de re* belief. The view that *de re* belief is interest-relative is proffered by Ernest Sosa, *op. cit.*, and endorsed by Quine, *loc. cit.*. *De re* belief, in my view, is simply belief of a singular proposition. In this (trivial) sense, my view makes *de re* belief into a species of *de dicto* belief, i.e. belief of a proposition. If the former notion were interest-relative, *ipso facto* so would be the latter. Cf. Kaplan, 'Opacity', *loc. cit.*, and Kvart, *loc. cit.*. Some philosophers have held that knowledge generally (knowledge of a proposition or fact, and not merely the special case of knowing which *F*) is indexical. See, for example, Alvin Goldman, 'Discrimination and Perceptual Knowledge', *Journal of Philosophy*, 73, 20 (November 18, 1976), pp. 771–791; Stewart Cohen, 'Knowledge, Context, and Social Standards', *Synthese* (forthcoming, 1987), and 'How to be a Fallibilist', in J. Tomberlin, ed., *Philosophical Perspectives II: Epistemology* (Atascadero: Ridgeview, forthcoming).

is changing the subject. There is no disagreement between us as to the facts of the matter.

It seems likely that the paradox outlined in the preceding section arises from some equivocation of this sort. In describing the caveman's situation, we invoke a notion of knowing-how-long for which a necessary and sufficient condition is, roughly, the ability to produce a standard name of the object's length, in terms of the standard unit, while understanding the meaning of that name. Within the confines of the caveman's language-game, knowing how long something is *just is* knowing the proportion of its length to Leonard. For every object but one, satisfying this condition requires actual physical measurement. but the reference-fixer *trivially* satisfies the necessary and sufficient condition for knowing how long S itself is, provided he sees its length. Knowing his own intention in introducing the term 'metre' gives the reference-fixer the ability to produce the standard name of S's length; seeing S's length gives him the understanding he needs of that standard name. (See footnote 10.) In the sense of 'measurement' in which knowing how long something is requires measurement against the standard, merely looking at the standard's length (under the appropriately favourable circumstances) counts as *measuring* the stick itself. In S's case, merely looking is a sort of limiting-case of measuring. The laws of epistemology are not violated; it is just that there are different ways of obeying them.

When we explicitly ask, on the other hand, whether the reference-fixer knows how long the standard itself is, we shift our focus from within the confines of his language-game to looking in on him from the outside. Without taking notice we have raised the ante. From our newer, broadened perspective, knowing how long S is seems to require physically measuring it against a higher standard—one that supersedes and overrides the reference-fixer's standard, one that (by hypothesis) is not available to the reference-fixer himself.

If we raise the same question with respect to our own, or our scientists', current standard, we may raise the ante beyond what anyone is currently in a position to pay. Perhaps there is a legitimate sense in which no one now knows *exactly* how long a metre is. Likewise, perhaps there is a sense in which no one *can* know exactly what number π is. But if there is a sense in which these instances of Does-anybody-really-know-what-time-it-is skepticism are true, what is true in this sense need not concern us. It is like shouting 'Fire!' in a crowded theatre merely because someone is lighting a cigarette. There is still the standard, everyday sense, in which everyone *of course* knows how long the Standard Metre is and everyone *of course* knows what number π is: the Standard Metre is exactly one metre long, and π is the ratio of the circumference of a circle to its diameter. We can expand on this by producing a metre-rule and thereby *showing* how long the Standard Metre is, or by producing a partial decimal expansion of π or instructions for computing its value to whatever number of places is desired. That is all one can have. To demand more than this is to change the rules of the game in such a way that nobody can win. At the other extreme, there are no doubt contexts in which it is true to say that the caveman knows how long his spear is just by looking at it. ('I'll get more respect when everyone sees how long my spear is.') The important fact is that we stand in such-and-such perceptual and cognitive relations to particular objects. In some (perhaps extended) sense of 'see', the caveman sees his spear's length by looking at the spear itself (lengthwise, in one fell swoop, etc.). Some of us are acquainted with π only by knowing an approximation to its decimal expansion. Perhaps there is even a (possibly metaphorical) sense of 'see' in which we may be said to see the ratio of the circumference of a circle to its diameter simply by looking at a diagram. In the end, what does it matter whether we dignify how we stand with the honorific 'knowing which *F*'?

If all of this is correct, there may be a better reason for not saying of the Standard Metre that it is exactly one metre long. In the circumstances of everyday, non-philosophical commerce, the proposition that the standard is just that long is something nearly everyone counts as knowing. But (in part for that very reason) merely uttering the sentence 'The Standard Metre is exactly one metre long' tends to raise the ante to a level at which its utterance becomes epistemically unjustified—and threatens to invoke the skeptic's favourite level, at which its utterance is in principle unjustifiable. If saying something that is trivially true leads us to say further things that sound much more alarming than they really are, it may be better to say nothing. In any event, this provides one sort of rationale for not saying of the Standard Metre that it is one metre long.

As I have said, however, I do not pretend that this rationale bears any significant resemblance to Wittgenstein's. It is unclear to me whether Does-anybody-really-know-what-time-it-is skepticism is connected with the issues discussed in and around *Philosophical Investigations* §50. If π occupies a unique role in the language-game of mathematics, analogous to the peculiar role of the Standard Metre in the language-game of measuring with a metre-rule, its peculiar role is (happily) not marked by any prohibition against saying that it is the ratio of the circumference of a circle to its diameter. Moreover, if the rationale I have suggested does bear some significant resemblance to Wittgenstein's, then his arresting remark itself is also something that sounds much more alarming than it really is, and in the absence of at least the minimal sort of explicit epistemological stagesetting I have provided here, is probably better left unsaid.[20]

[20] I am grateful to Graeme Forbes, Eli Hirsch, Saul Kripke, Mark Richard and Timothy Williamson for their comments on an earlier draft.