Wittgenstein on The Standard Metre

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In *Philosophical Investigations* §50 Wittgenstein says something about the standard metre stick that seems to puzzle many philosophers. According to Wittgenstein:

> 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.[1]

In *Naming and Necessity* Kripke finds this claim very strange. He thinks the standard metre stick is obviously a metre in length, although it might not have been. It is surely a contingent truth that this object (which Kripke calls 'S') is one metre in length. Specifically, it is contingent that S is one metre in length at a particular moment in time t_o – the moment when the term 'one metre' was first introduced into the language via the description 'the length of S at t_o'. However, according to Kripke, the person who performs this reference-fixing ceremony is in a position to know a priori the contingent truth that S is a metre long at t_o – simply by his reference-fixing act; and so we have an example of a contingent a priori truth.

Kripke here trades on the crucial (for him) distinction between a definite description that does not give a synonym but merely fixes a reference, as well as the distinction between epistemology and metaphysics. The statement:

(1) Stick S is one metre long at t_o

has the *metaphysical* status of a contingent truth because the stick's length might have been different at t_o. Its *epistemological* status, on the other hand, is that of an a priori truth. Kripke further argues that,

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1. At the same paragraph (§50) Wittgenstein also gives the example of the standard example of the colour sepia. It seems to me that this may not be the same kind of case as the case of a unit of measurement like one metre. In fact it seems highly dubious indeed.

although (1) may look like a definition of the term 'one metre', it is only a definition in a special sense. That is, the term 'one metre' is not synonymous with the reference-fixing description 'the length of S at t_o'. As Kripke puts it in *Naming and Necessity*, the person who performs such a ceremony is:

> . . . using this definition not to *give the meaning* of what he called the 'meter', but to *fix the reference*. (For such an abstract thing as a unit of length, the notion of reference may be unclear. But let's suppose it's clear enough for the present purposes). He uses it to fix a 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.[2]

This is a curious passage in that the person who introduces the term 'one metre' into the language seems to know what a metre is *before* he discovers the stick that is to serve as the standard. There is no question of this happening (a priori or otherwise), and the fact that Kripke thinks that it could shows that his argument is probably misconceived from the start. But we must not be too hasty. Kripke's claims here are not obviously specious and we must examine them in detail. They are certainly in step with most people's intuitions on this matter.

Nathan Salmon, in his (1986) and later in his (1988) also takes up the problem posed by Wittgenstein – even if Wittgenstein did not regard it as a problem. Although Salmon was initially of the opinion that the standard metre stick is indeed a metre in length, he differed from Kripke as to the epistemological status of (1). For Salmon (1986) (1) was a posteriori, only known by measurement. By the time of his (1988) Salmon has realised that the situation is more complicated than he originally thought and withdraws his claim that the length of S is known by measurement. In fact, he concedes, correctly it would seem, that the idea of measuring the standard metre stick at all is inappropriate. (More of this later).

In what follows I shall argue that, despite the intuitions of most people, Wittgenstein is in fact correct in claiming that we cannot say of the standard metre either that it is a metre in length or that it is not a metre in length. Kripke and Salmon are not only wrong, they simply fail to understand the very concept of measurement, as well as what it means to know the length of something. (Sadly, they are not alone among philosophers in their confusion on the subject).

2. 1980, 55.

A few points of clarification are in order at this point. First of all, we will not be concerned about whether (1) is necessary or contingent, or a priori or a posteriori, although sometimes philosophical discussions of these topics may shed some light on the problem at hand. Secondly, we must be clear that when Wittgenstein says that we cannot ascribe length to the standard metre stick, he of course means that we cannot ascribe length to it *in the metric system*, because of its special status in that system. (According to Wittgenstein it is a *means of representation* in the language game of measuring with the metric system*, not something that is represented* in the system). We can of course assign a length to the standard metre stick (stick S) in some *other* measuring system (the Imperial system, for example) because it has no special status or role in that system. Thus we can say that the standard metre stick is 39.37 inches in length, in the Imperial system of measurement.

This last point is probably one of the sources of confusion among philosophers and laymen alike when deciding how long the standard metre is. On page 54 of *Naming and Necessity* Kripke gives cause for concern when he asks the apparently innocent question: 'If the stick . . . is 39.37 inches long. . . . why isn't it one meter long?'. Someone else might pose a similar question along the lines of: 'My writing desk is a metre in length and stick S is the same length as my writing desk, so why isn't stick S one metre long?'

There are several points to note here. First, anyone who asks this type of question about the standard metre is really putting the cart before the horse. They are trying to make the standard conform to the system, when it should be the other way round. The system is supposed to conform to the standard. To argue that the standard metre must be a metre in length because some other object is a metre in length is like using the other object (the writing desk, for example) as the standard, while treating Stick S as an ordinary object. Secondly, in claiming that stick S must be a metre in length because it is 39.37 inches, or that it is the same length as the writing desk, is to argue in a circle, because the only way we can know that the writing desk is a metre in length is by measuring it in the metric system – i.e. by comparing it with the standard metre. Similarly, we can question how anyone can know that 39.37 inches is equivalent to one metre. It can only be because at some time or other someone compared an object that had been measured at 39.37 inches, in the Imperial system, with an object that was measured to be one metre

in length in the metric system. In other words it was compared with an object that had itself been compared with the standard metre. We are simply going round in circles here.

Van Brakel[3] highlights another confusion, which originates with Kripke, but also pervades the commentaries of many other philosophers, such as Salmon (1986); Harrison (1987); Kennedy (1987); and Bostock (1988). The confusion involves the difference between knowing that S is exactly a metre in length and knowing that it is *approximately* a metre in length. If we are to know that S is a metre in length then surely we must mean *exactly* a metre in length, not approximately. Measurements on the other hand are merely approximations. There is always a degree of tolerance in a measurement, which rules out our knowing that S is a metre in length by measurement because it surely makes no sense to say that the standard metre is a metre in length plus or minus a certain degree of tolerance.

There is more to the puzzle of the standard metre, then, than whether or not we can know its length by measurement. Even Salmon concedes this in his (1988) where he makes some concessions to Wittgenstein while realising that his earlier (1986) treatment of the problem may have been inadequate. As already mentioned, Salmon (1986) thinks it straightforwardly the case that to know that the standard metre is a metre in length is a posteriori – in fact he describes it as a paradigm of a posteriori knowledge, discoverable only by measurement[4]. In the (1988) paper Salmon abandons this view, conceding that physical measurement is not only unnecessary

3. 1990, 300 (Van Brakel's main thesis in his (1990) is an interesting one. It is that the statement

(A) One metre is the length of S

is a priori but necessary. He begins (p. 305) by dismissing the attempt to relativise the claim that S is a metre long to a particular moment in time as a useless way of defining a unit of measurement. We cannot restrict our unit to a single moment in time. He then goes on to claim that a statement like (A) is necessary because, not only is the term 'one metre' rigid, but so also is the reference-fixing description 'the length of S' (p. 307). According to Van Brakel such descriptions refer rigidly to a natural kind property such as

solid metallic rods of constant temperature and submitted to constant external forces have constant length. (p. 311)

Consequently, 'Definitions of units of measurement are like Kripke's examples of theoretical identities, except that the identity of two rigid designators is stipulated a priori instead of discovered a posteriori' (pp. 307, 308). Thus Van Brakel uses Kripke's own ideas on the necessity of scientific identities against his claims that statements such as (A) are contingent a priori.

but 'is in some sense inapplicable to this case'[5]. Salmon then goes on to claim that a hypothetical agent who has randomly chosen S as his standard for measurement would know that S is exactly one metre long 'simply by looking at it'[6]. This makes S 'epistemically unique'[7] and leads, according to Salmon, to an epistemological paradox as follows:

> . . . 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: know-able 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 arbi-trarily selected as the standard. These considerations invite the sceptical 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 sceptical 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.[8]

The key word here is 'only', as in "only tells him the ratio of that object's length to the length of S". This passage shows that Salmon, in common with perhaps the majority of philosophers, simply does not understand the concept of measurement. This lack of under-standing is presaged in a passage on p. 208 where Salmon argues:

> . . . 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.

4. 1986, 142.
5. 1988, 207.
6. (Ibid).
7. 1988, 209.
8. 1988, 210.

What Salmon fails to understand here is that measurement *simply consists in* determining (within a degree of tolerance) the ratio of one object's length to the length of some standard. To say that an agent *only* knows the proportion of the length of two objects (one of which is a standard), or that he can *only* determine the ratio of an object's length to the length of S, is to fail to grasp the concept of measurement. Measurement consists in nothing more than the comparison of the object of measurement with some (arbitrarily chosen) standard. If there is any more to measurement than this then I would like to know exactly what else is required. What else could there *possibly be* to measurement?

Perhaps Salmon's confusion arises from seeing a difference between measuring an object's length and knowing how long the object is – i.e. *really* knowing how long the object is. Salmon does seem to make such a distinction, which leads us to ask the question: What exactly is involved in knowing the length of anything? What does the question 'How long is x?' actually mean?

In a sense this is a strange question to ask if we can actually see the object in question, because we can *see* how long it is. It is *that* long (pointing at or gesturing toward the object). But this is not what we usually mean when we ask such a question. It is certainly not the answer we are looking for, whether we can see the object or not. So what answer are we looking for? There would seem to be three alternative answers to the question: 'How long is x?'.

(a) x is as long as it is
(b) x is *that* long (pointing to or gesturing toward the object)
(c) x compares *n* times with some standard of a system of measurement

(a) is not what we are looking for because it is trivial. (b) is not the answer we are usually looking for, although there is a sense in which it is not trivial. We do not want to be told that the object is *that* long if we can see it for ourselves – even though it *is* that long. It would seem that (c) is the correct answer to our question. When we ask how long an object is we want to know how it compares with a standard of measurement (within a degree of tolerance of course). The question: 'How long is x?' actually *presupposes* a system of measurement, such as the metric system, which itself presupposes a standard such as the standard metre stick. The standard metre (stick S)

is a necessary condition for the existence of the metric system. Seen in this way perhaps the statement:

Stick S is a metre in length

is synthetic a priori, to use Kant's terminology, but I don't know how useful this would be to the present problem.

If we accept that knowing the length of something is to compare it with some standard of measurement (within a degree of tolerance) then this would surely favour Wittgenstein over Kripke and Salmon because it makes no sense to apply the standard metre to itself (especially if it is within a degree of tolerance). The question 'How long is the standard metre?' actually is not a proper question, if we are using the metric system. It is like asking what time it is on the sun, where we use the sun to tell the time. The person who asks a question such as 'What time is it on the sun?' or 'How long is the standard metre?' has asked a logically improper question. Quite simply, he has not understood the concepts being used. Since there can be no answer to an improper question, it makes no sense to say that the standard metre is or is not a metre in length.

There is no epistemic paradox of the kind proposed by Salmon. Knowing the length of an object simply involves comparing the object with a standard of measurement. This standard is arbitrarily chosen and agreed upon by the community. Only practical considerations bar us from using anything at all as a standard. If we had chosen a different stick as our standard metre, as we might have done, then a metre would be a different length. This arbitrary nature of standards of measurement seems to be lost on many philosophers.

Not only is the standard of measurement arbitrarily chosen but standards of measurement are 'artificial' concepts – as opposed to 'natural' concepts like 'tiger' or 'dog'. Although we invented the word 'tiger', we did not invent the concept of a tiger. This is something we discovered when we discovered tigers and decided to name them. Not so with the concept of a metre or a kilogram. Although we discovered the concepts of *length* (and mass) we *invented* the concept of a metre for our own convenience; as a means of making judgements about length, which we could record and/or communicate to others. The length 'one metre' was not waiting to be discovered by us in the way that tigers were. (If it was, then how do we square that with the fact that standards of measurement are *arbitrarily* chosen?). We

simply chose a length that we found convenient and *called* it a metre. That is all there is to choosing a standard of measurement. This means that whatever we call a metre, or would have called a metre, is/would have been, a metre. Contrast this with a natural concept like 'tiger'. A tiger is not whatever is called a tiger. A metre *is* whatever is called a metre.

There are other ways in which we can show that Wittgenstein is correct. We could, for example, argue that the standard for a system of measurement is a *criterion* for measuring in that system, and it makes no sense to apply a criterion to itself[9]. In the case of the standard metre, therefore, we cannot say that it is a metre in length or that it is not a metre in length.

We could also examine the term 'one metre' as it is applied to the standard and as it is applied to other objects. It seems to me that when the term 'one metre' or 'a metre' is applied to an ordinary object, such as my writing desk, it is functioning as a *predicate*, as in:

My writing desk is one metre in length

When applied to the standard metre stick, on the other hand, the term 'one metre' is a singular term. It is simply *a name* for the length of that stick, not a general term. Once again it makes no sense to ascribe length to it in the metric system.

In conclusion, then, Wittgenstein is quite correct when he claims that we cannot say that the standard metre either is a metre in length or that it is not a metre in length, despite what our intuitions may tell us. The very question 'How long is x?' (in the metric system) actually presupposes the standard for that system (which is a necessary condition for the existence of the system) and literally means 'How does x compare with the standard (within a degree of tolerance)?'. Seen in this way it makes no sense to ask such a question of the standard itself. It would be like asking what time it is on the sun where we use the sun to tell the time. As Wittgenstein says, the standard is a *means of representation* in the language game of measuring with the metric system, *not something that is represented* in the system. We could also regard the standard for a measuring system as

9. The idea that a criterion cannot be applied to itself could be used to bolster Russell's Theory of Types. Instead of saying that self-referring statements make no sense, as Russell does, we could say that a self-testing test (criterion) makes no sense. Thus, it makes no sense to say of a set either that it is or is not a member of itself.

a criterion by which we judge how long an object is. It would seem to make no sense to apply a criterion to itself, and so, once again we cannot say of the standard either that it is or is not a metre in length.

Kripke and Salmon simply do not understand the concept of measurement. Kripke certainly does not seem to understand how a standard is chosen for a measuring system when he suggests that the person who chose the standard for the metric system already knew what a metre was before he had chosen the standard for the system. There is no question of this happening. Standards are arbitrarily chosen.

Similarly, Salmon is wrong to argue that there is an epistemic paradox about measuring an object or knowing how long an object is. When he claims that comparing an object with a standard for measurement only tells him the ratio of that object's length to the length of the standard it is obvious (to me, at least) that Salmon just does not understand the concept of measurement. What more could he possibly require here?

Finally, anyone who says that the standard metre must be a metre in length because it is the same length as some object that has been measured to be a metre in length has got things the wrong way round. They are using an ordinary object to measure the standard, and that is not allowed. The person who asks the question 'How long is the standard metre?', or who says that the standard must be a metre in length does not understand the concept of measuring. Wittgenstein is correct. If this violates our intuitions then I maintain that it is our intuitions that are mistaken.

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