

Making Sense of Science Making Sense of the World:
Ludwig Wittgenstein and Scientific Realism

Introduction

Ludwig Wittgenstein is of course best remembered as a philosopher of language. Over the course of his work, he explored the logical structure and logical limitations of language, descriptions of its usage, and exposition of the ways in which it has been misunderstood. He spoke not only of language and its "internal" form, but also of the various things that humans *do* with language; we use it to speak of art, science, philosophy, religion, and everyday life. In his later work, he downplayed the idea that language could even be said to have a logical form, and instead sought to demonstrate that it is, in fact, usage that entirely constitutes the form that language takes.

In this paper, I intend to explore a particular usage of human language, and to provide a uniquely Wittgensteinian perspective on the question. Specifically, I'd like to address the debate in the philosophy of science over the question of Scientific Realism. In brief, the central issues of the debate are as follows: Why are scientific theories successful? Is it because they approach scientific truths, or is it simply because they mesh well with that which we already believe? What does it mean for a theory to be "true", and

against what criteria should we measure it?

Wittgenstein believed all of the problems of philosophy to be based upon linguistic ambiguity and misunderstanding. I propose to extract his statements about natural science from the *Tractatus Logico-Philosophicus* and the *Philosophical Investigations*, and to use them to ask the question of whether Wittgenstein himself was what we would call a scientific realist. The point is not to hang a label on his work, but rather to use existing systems of philosophy as points of contrast to Wittgenstein's contribution. I then propose to apply his philosophy of language to the problem in order to determine whether the debate can convincingly be characterized as merely a linguistic disagreement.

Wittgenstein and Science in the *Tractatus*

Wittgenstein was quite explicit in the *Tractatus Logico-Philosophicus* about what he perceived to be the relationship between science, language, and logic. He likened natural science to a mesh through which we see a picture of the world. We have at our disposal different theories of how the world works (different "meshes"), and we lay each mesh over top our picture of the world to determine which "fits" best – to determine which most accurately and most simply describes the surface beneath. Wittgenstein claimed that the fact that we can describe the world with a theoretical system (the fact that such a mesh can be applied) tells us nothing about the world itself. What *does* tell us something about the world is the fact that one system can describe it more simply and more

elegantly than another. We do learn about the world through the practice of science, but we do so indirectly – it is not the world at which we look, but at how well our science fits the world. The scientific system that contains the fewest number of axiomatic propositions and is still capable of describing the world around us is, for Wittgenstein, the simplest (and therefore best) description.

It is useful to note that Wittgenstein did not think that philosophy was one of the natural sciences. Rather, "Philosophy sets limits to the much disputed sphere of natural science" (*Tractatus* 4.113). By this, he meant that the role of philosophy is not to enhance the natural sciences, but rather to make sure that they stay within their boundaries. If natural science is the exercise of crafting a mesh by which we describe the world, it should do so by the study of observables; it must be in some sense empirical, or at the very least propositional. The questions of God, the afterlife, and the greater "significance" of human life necessarily cannot be explored propositionally, and therefore not by natural science: "We feel that even when all *possible* scientific questions have been answered, the problems of life remain completely untouched. Of course, then there are no questions left, and this itself is the answer" (*Tractatus* 6.52.)

Despite the boundaries to what science can do in describing the world, it is clear that in the *Tractatus*, there is something "real" beneath the mesh of science. While we cannot access the world "directly", it is not the case that our development and evaluation of scientific theories are

completely arbitrary. We *do* lay that mesh over top of our picture of the world, and we *do* have some objective means by which to compare that mesh against other meshes at hand. It seems from this interpretation that Wittgenstein would view scientific progress is something real and non-subjective; as scientific theories improve, they provide us with a mesh which gives a simpler or more accurate description of the phenomena beneath. By non-subjective, I do not mean to suggest that the view expressed is non-contingent – if science is but a mesh, we have no reason to believe that any single mesh that we currently possess is the "right" (or "best") one, nor that we couldn't have a completely different mesh which would fit the world equally well (or equally simply). What Wittgenstein does seem to suggest is that our *comparison* between two theories is non-subjective, and that if something "better" were to come along, we would be able to identify it as such.

Wittgenstein and Science in the *Philosophical Investigations*

In the *Philosophical Investigations*, Wittgenstein has much less to say on the subject of natural science. Reference to it is not entirely absent, but it primarily plays the role of being a foil to logic and language – most of the mentions of natural science in the *Investigations* serve to show the type of thing that logic is *not*. For instance, in speaking of whether there could be an ideal (logically perfect) language: "Whereas logic does not treat of language – or of thought – in the sense in which a natural science treats of a natural phenomenon, and the most that can be said is that we *construct* ideal languages" (*Philosophical Investigations* 81.) From the contrast of logic and science, we can infer that Wittgenstein

believes logic to be constructed in a way in which natural science is not. He seems to imply that natural science describes natural phenomena in a non-constructed way. That is, we may *select* our natural science from the set of available descriptions, or we may even fabricate new descriptions, but we cannot do so entirely ad hoc. Whatever mesh we create, it must be accountable to our ability to apply it to the world.

Elsewhere in the *Investigations*, Wittgenstein quotes Augustine's *Confessions*: "quid est ergo tempus? si nemo ex me quaerat scio; si quaerenti explicare velim, nescio." (Roughly: "What then is time? If nobody asks me, I know; but if asked to explain it, I don't know.") Wittgenstein then follows the quote with the statement: "This could not be said about a question of natural science ('What is the specific gravity of hydrogen?' for instance)" (*PI* 89). His point is that logic and language are fluid things, and to describe them, we need to employ logic and language themselves. We cannot get outside of language to "say" something independent about it. Natural science, however, works differently. For questions of natural science, we can give definitive answers which are considerably less fluid than questions of language. If asked the specific gravity of hydrogen, we can provide a straightforward (and empirically verifiable) answer. Wittgenstein believes natural phenomena to have an objective reality to them that logical "phenomena" do not.

This difference is further reinforced in proposition 109. While pondering the question "What is a word really?", Wittgenstein says that "our considerations could not be

scientific ones." He states that the question is not one that we can study empirically, and "There must not be anything hypothetical in our considerations." Again, by way of contrast and implication, we can take him to be saying that science (unlike language) is something that we access empirically, and that it does test hypotheses. This is because the objects of natural science have a metaphysical reality that words and language do not.

Finally, on page 195 of the *Investigations*, Wittgenstein makes some further enigmatic remarks on the relationship between language and science. He puts forth the idea that if our concepts are formed by observation of facts of nature, then shouldn't we look to nature for the basis of grammar? This idea is then rejected:

Our interest certainly includes the correspondence between our concepts and very general facts of nature. (Such facts as mostly do not strike us because of their generality.) But our interest does not fall back upon these possible causes of the formation of concepts; we are not doing natural science; nor yet natural history...(*Investigations*, p.195)

Wittgenstein describes an interaction between language, science, and the natural world which is non-deterministic, but also non-arbitrary. Science *does* talk about the world, but our study of language cannot focus upon the "natural" origins of concepts. Wittgenstein does not explicitly reject the notion that if our natural world were different, our language and our science would look different, as well. However, the form of nature is not the primary factor influencing the formation of our language. Natural science is presented in contrast to this, implying that it *is* the world which is the primary factor in giving natural science its shape. However, while our scientific concepts about the world are less

socially dependent than language, they do still seem to be contingent – contingent not just upon what the world "looks like", but also upon our ability to describe it. In that sense, language and science, though distinct, have a close tie between them; to offer any description of the world (to talk about science), we must employ language. And so the practice of science is contingent upon both the natural phenomena and our ability to use language to describe those phenomena.

Can we then see any significant difference between the picture of science presented in the *Tractatus* and that in the *Philosophical Investigations*? It seems that the differences, if any, are slight, and probably amount to more of a difference in emphasis than a difference in substance. Both the *Tractatus* and the *Investigations* depict a science which describes the facts of the natural world, but does so indirectly. In the *Tractatus*, the means by which science does so is described explicitly; in the *Investigations*, it is described by negation and implication. Both texts suggest that science is a contingent (non-deterministic) activity, in which scientific theories are accountable to the facts of the natural world, but in which the theories themselves are *descriptions* of the facts, and are not the facts themselves. As such, we can imagine multiple theoretical descriptions of the same phenomenon, and the selection of one description over another will be based upon its ability to describe the world accurately and simply. This does not require that scientific theories are ever "true" in the absolute sense; rather, they are descriptions of phenomena which bear a better or worse "fit" to our picture of the world. Laws of nature appear law-like because they describe the facts of the world simply and

accurately, not because the laws themselves are somehow contained "in" the world.

Wittgenstein and the Question of Scientific Realism

So was Wittgenstein a scientific realist? Does his approach to philosophy contribute anything to the debate? In order to answer these questions, it is necessary to briefly sketch the positions of the combatants. While there are too many shades of gray in the philosophy of scientific realism to make any hard divisions, I shall divide the participants into three general camps. First, we have the Realists, who contend that scientific theories are true in the strong sense of the word. For them, the success of science is explained by its degree of correspondence with actual scientific laws – laws which are discovered, not invented. Next we have the Positivists, who would argue that scientific theories are not true in the strong sense, but only in a functional sense. To them, our science is one way of many that we can order reality, and the success of science is explained by its coherence and continuity in imposing order on the observable world. Scientific laws are our way of classifying and ordering observable phenomena, and competing theories with equivalent observational consequences mean the same thing. Finally, I will consider the Constructivists, who maintain that scientific laws are human conventions dependent upon human requirements. For the "strong" Constructivist, there is no such thing as truth in the world, and no such thing as objective observation or verification of facts. To them, all observations are value-laden, and the sole criterion for the success of science is that it satisfies the requirements of

the social institution. The division of philosophers into these three camps is admittedly simplistic, but will hopefully serve as an adequate background against which to compare Wittgenstein's own views.

It does not seem convincing to include Wittgenstein with the hard Realists. If there is one lesson to be learned from the *Philosophical Investigations*, it is that the importance of context to Wittgenstein's later philosophy cannot be overlooked. For him, it is simply not possible for us to conceive of a thought in a vacuum – the very essence of having a thought is linguistic, and language is never *a priori*. For us to even systematize a scientific theory, we must think within a rule-following construct. This construct is not determined by the world alone; it is determined by our communal interactions with the world. As such, to say that scientific theories (which are necessarily linguistic rule-following constructions) can be *true* in the sense of correspondence directly with the facts of the world is improbable. However, I believe it would also be a mischaracterization of Wittgenstein to place him with the strong Constructivists. Based upon his description of science in the *Tractatus*, science is not completely subjective and not entirely dependent upon the whim of human preference and social requirements. While human beings may create the "mesh" of science, they are still obligated to press that mesh to the picture of the world, and to see how well the mesh fits the picture beneath. Comparison of competing theories does take place with respect to their ability to simply describe or account for the facts. So, while our access to the facts of the world's structure is indirect, we do have access, and do

have a non-subjective way of comparing the fitness of scientific theories.

Of the three philosophies mentioned above, Wittgenstein appears to best fit into the Positivist mold. Indeed, during his lifetime it was the Positivists in the Vienna circle who were the most vocal in their praise of the *Tractatus*. They viewed it as something of a Positivist manifesto. While Wittgenstein himself was cold to their overtures, it is easy to see why his philosophy appealed to the Positivist mind. The *Tractatus* clearly states that scientific laws are descriptions of phenomena, but not things in the world itself. Wittgenstein's comments on natural science also fit well with the Positivist view that science can only make distinctions about observables, and that theories which are about non-observable, non-testable entities are beyond the realm of scientific inquiry.

The more difficult question, however, is why Wittgenstein turned his back on the Positivists' praise. The answer to this is less evident. After the publication of the *Tractatus*, he felt that he had solved all of the problems of philosophy, and the rest was just misunderstandings of language. The *Investigations* sought to clarify just what those misunderstandings were, and how exactly they arose. Can the question of scientific theories and their relationship to reality be written off as a linguistic misunderstanding? Or is the debate necessarily about something substantial?

I believe that Wittgenstein would approach the question as follows: To even ask the question of what relationship

science has to reality, we must already possess language, which means that we must already be seated within some context. We cannot ask "what sort of thing is science?" without already possessing some presupposition of the answer. The way in which our language divides up the world and our peculiar usage of the word "science" is a precondition not just of the answer, but of the possibility of even asking the question. We cannot think about the issue outside of the restrictions which our language places upon us. Thus science isn't the sort of thing that we should essentialize by defining and talking about it. It is the sort of thing that we should *do*. Wittgenstein would probably argue that any answer that we could provide to the question "Does science tell us anything about the world?" would itself tell us nothing about the world; rather, it would tell us something about how our language divides up the world. As such, we cannot even pose the question in a sensible way.

Wittgenstein would probably also emphasize the point that science is a *practice*, not a thing. As such, it is appropriate to describe the types of things which science does, but meaningless to try to say the type of thing that science *is*. I doubt that he would lend much importance to the question of whether the theories held by science are true in the strong sense or not. The importance of science is contained within its practice – within the fact that it creates, tests, and applies theories. The "essence" of those theories and their relation to "reality" is a trivial non-question with no bearing on the activity of science. It therefore seems fair to say that Wittgenstein would indeed dismiss the debate as a misunderstanding of language, and not actually a discussion "about the world" at all.

Analyzing what Wittgenstein *doesn't* say on a subject is of course both difficult and dangerous. For most issues on which he chose to remain silent, it was through intent rather than neglect. Hanging a label on Wittgenstein based upon a point of view which he never articulated is more dangerous still. And so I don't mean to conclude by saying that Wittgenstein *was* a Positivist at heart, or that if he had written on the subject of scientific realism, he would have whole-heartedly agreed with the Positivist program. However, by using Realism, Positivism, and Social Constructivism as tools for comparison, I believe that we can learn something of how Wittgenstein viewed the world, which in turn may give us insight as to how we should view his philosophy. Likewise, on those issues on which he chose to remain silent, I believe that it is of value to understand *why* he chose to remain silent. This silence is itself Wittgenstein's answer.

References

Wittgenstein, Ludwig. *Philosophical Investigations*. Trans. G.E.M. Anscombe. Third edition. Oxford: Blackwell Publishers, Ltd., 2001.

Tractatus Logico-Philosophicus. Trans. D.F. Pears and B.F. McGuinness. Rev. edition. London: Routledge, 1974.