Scientism as a Threat to Science: Wittgenstein on Self-Subverting Methodologies
[FINAL AUTHOR'S DRAFT]

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Wittgenstein is typically viewed as concerned with one particular variety of scientism: scientism understood as the threat posed by the application of scientific practices to areas of our lives in which they do not belong.[1] In this reading, Wittgenstein's primary concern about scientism is that science should not overreach its purview: the scientific approach is legitimate within the boundaries of scientific enquiry, but should not encroach into other areas, where different standards and procedures apply – in particular, into ethics, religion or philosophy. I will call this the 'dominant reading'.

This understanding of Wittgenstein's preoccupation with scientism is not unfounded and certainly comes to the fore at several junctures (e.g. CV 7). I propose to show, however, that too narrow a focus on this aspect of Wittgenstein's treatment of scientism distorts both his thinking on science and the nature of his preoccupation with scientism. This, at any rate, is the picture that emerges when we consider this question from the perspective of his early remarks on science, in the *Tractatus* and 'A Lecture on Ethics', presented at a meeting of *The Heretics Society* in Cambridge, in 1929.[2] (Although the *Tractatus* was written more than ten years before 'A Lecture on Ethics', Wittgenstein's position on a number of key issues did not substantially change in the interim. Indeed, many of the themes from the former, including his notion of a 'world book' – *cf.* TLP 5.631 – remain central to the latter.)

In section 1, I summarise the dominant interpretation of Wittgenstein's concern over scientism. In section 2, I revisit the *Tractatus*' discussion of scientific propositions and argue that the dominant interpretation misrepresents Wittgenstein's early approach to the natural sciences. In section 3, I defend the idea that Wittgenstein's preoccupation with scientism is part of a broader and more fundamental preoccupation with *self-subverting methodologies* and with the threat that these pose to all areas – including science itself.

1. *Scientism as the threat from science*

The dominant reading begins with a particular understanding of Wittgenstein's approach to science. In this view, scientific inquiry involves constructing senseful propositions that are truth-assessable, bivalent and bipolar. Senseful scientific propositions are characterised by at least one of the following:

1. They represent possible states, in particular obtaining ones – i.e. facts.
2. They give empirical descriptions of facts.
3. They make statements about possible states or facts based on inductive reasoning.
4. They give causal explanations or make statements about the causal relations – or causal mechanisms – that hold between possible states and/or facts.

With this understanding of Wittgenstein's approach to science in place, his concern over scientism is presented as the concern that the scientific approach – characterised by the generation of such propositions – should not be extended to areas of our lives in which it does not belong. In particular (though not exclusively): it should not be extended to religion and ethics (Phillips, 1993, esp. 57–58).

The early section of 'A Lecture on Ethics' is often cited as presenting this view:

> Our words used as we use them in science, are vessels capable only of containing and conveying meaning and sense, *natural* meaning and sense. Ethics, if it is anything, is supernatural and our words will only express facts; as a teacup will only hold a teacup full of water [even] if I were to pour out a gallon over it. (LE 3)

A similar idea can be extracted from Wittgenstein's discussion of a miracle later in the lecture:

> Take the case that one of you suddenly grew a lion's head and he began to roar. Certainly that would be as extraordinary a thing as I can imagine. Now whenever we should have recovered from our surprise, what I would suggest would be to fetch a doctor and have the case scientifically investigated and if it were not for hurting him I would have him vivisected. And where would the miracle have got to? For it is clear that when we look at it in this way everything miraculous has disappeared; unless what we mean by this term is merely that a fact has not yet been explained by science which again means that we have hitherto failed to group this fact with others in a scientific system. This shows that it is absurd to say 'Science has proved that there are no miracles.' The truth is that the scientific way of looking at a fact is not the way to look at it as a miracle. (LE 7)

I will call the concern that scientific approaches illegitimately encroach into other areas – notably those of ethics or religion – the concern over *scientism as a threat from science*. There is no doubt that Wittgenstein repeatedly expresses concerns over scientism as a threat from science. I propose to show, however, that we misunderstand his position when we read it as arising from hostility towards science, or as consisting primarily in the worry that science – as such – will dominate other areas.

I would like, firstly, to motivate the idea that the dominant reading involves an unduly simplified understanding of Wittgenstein's view of science and, secondly, show that there is a better way to understand his position on scientism.

2. *Wittgenstein's early writings on science*

Even in a text like 'A Lecture on Ethics', which is sometimes regarded as presenting the epitome of Wittgenstein's concern over STFS, his attitude towards science is subtler and more complex than is at times supposed. At the start of that lecture, Wittgenstein states:

> I should not misuse this opportunity to give you a lecture about, say, logic. I call this a misuse, for to explain a scientific matter to you it would need a course of lectures and not an hour's paper. Another alternative would have been to give you what's called a popular scientific lecture, that is a lecture intended to make you believe that you understand a thing which actually you don't understand, and to gratify what I believe to be one of the lowest desires of modern people, namely the superficial curiosity about the latest discoveries of science. I rejected these alternatives. (LE 3)

Two points are worth noting about this passage. The first is that Wittgenstein draws an analogy between his own task as logician and that of the scientist – and goes as far as to portray logic as a 'scientific matter'. This does not sit well with the suggestion that his concern over scientism in the 'Lecture on Ethics' stems from hostility towards *science*.[3] Indeed, it is striking that, in his discussion of the miracle example, he imagines *himself* as approaching the miraculous situation

in a scientific way: 'Now whenever we should have recovered from our surprise, what I would suggest [in the first person] would be to fetch a doctor and have the case scientifically investigated and if it were not for hurting him I would have him vivisected' (LE 9). Secondly, it is important to note the contrast that Wittgenstein draws between scientific explanations and popular science, the latter of which he seems to regard as distasteful – possibly even dishonest. I will return to this idea in section 3. Before I do, I would like to explore in more detail what might be behind the analogy that he draws between logic and science in the 'Lecture on Ethics'.

Why does Wittgenstein draw an analogy between logic and science in this text? Such an analogy makes little sense if we understand science in the manner portrayed by the dominant reading. For Wittgenstein certainly does not, during this period, regard the task of the logician – insofar as she has a task at all – to be that of constructing senseful propositions (let alone ones characterised by 1–4 – see above, section 1).[4] It would seem therefore that Wittgenstein either makes a mistake in drawing this analogy or that his understanding of science is quite different from that presented in the dominant reading – different in a manner that does, after all, support his analogy between logic and science. The *Tractatus*' discussion of science points to the latter idea, as we will now see.

Contrary to what is commonly suggested (*cf*. McGuinness 2002, 116–123), in the *Tractatus* Wittgenstein does not regard the natural sciences as circumscribed to the producing of senseful propositions. Indeed, in this text, Wittgenstein's interest in science is twofold. It is an interest in the *subject matter* of science (as expressed by the senseful propositions in 1–4). And it is an interest in the scientific *principles* constitutive of the (scientific) representational systems within which those senseful propositions are produced. This twofold interest and the two associated notions of proposition emerge clearly in the following entry from the *Tractatus*:

> Mechanics determine a form of description by saying: All propositions [*Sätze*] in the description of the world must be obtained in a given way from a number of given propositions – the mechanical axioms. It thus provides the bricks for building the edifice of science, and says: 'Any building that you want to erect, whatever it may be, must somehow be constructed with these bricks, and with these alone.' (TLP 6.341).

Imposing a unified form involves homing in on certain propositions (or 'axioms') that provide instructions, within a particular system, for the construction of other propositions (the latter being the 'propositions in the description of the world'). Although Wittgenstein uses the same term 'proposition' (*Satz*) in both cases, he clearly regards these two types of proposition as performing quite different roles: the former provide *instructions* for how to construct the latter; the latter are senseful propositions that are part of the 'the description of the world'. I will use the expression 'instruction-proposition' to refer to the former and to distinguish these from senseful propositions.

I suggest that Wittgenstein's notion of a principle (*Gesetz*) is precisely that of a proposition (*Satz*) that is used to provide instructions for the construction of senseful propositions within a given system.[5] Wittgenstein suggests that the principles of the natural sciences – i.e. these instruction-propositions – are *a priori*. He writes:

> All propositions, such as the law of causation, the law of continuity in nature, the law of least expenditure in nature, etc. etc., all these are a priori insights [*Einsichten*] of possible forms of the propositions of science (TLP 6.34)

In the previous entry, Wittgenstein is careful to note that the *a priori* insights in question are not *a priori* beliefs (or mental representations), but a type of *a priori knowledge*:

> We do not *believe* a priori in a law of conservation, but we *know* a priori the possibility of a logical form (TLP 6.33)

The understanding of knowledge at work in this remark is that of ability-knowledge or know-how (*cf.* Tejedor 2015a, 15–72; 91–118). This type of knowing does not consist in entertaining particular beliefs (i.e. ones that are justified and true) or mental representations; instead, it involves the ability to use signs in particular ways for specific purposes. *Knowing* the principles of a given natural science system therefore involves *being able to construct* senseful propositions according to a unified set of instructions – according to a 'single plan' (*TLP* 6.343). Our knowledge of these principles – and, therefore, our knowledge of the *form* in question – is *prior to experience*, not in that it must involve beliefs that are not derived from experience (where both experience and beliefs are mental representations), but in that it is a type of know-how: it is the know-how or ability to construct senseful representations (propositions, iconic pictures, but also mental representations, including beliefs and experiences) according to the instructions pertaining to a particular system.

Whilst Wittgenstein suggests that the form and associated set of principles of a given system are *a priori*, he also notes they are 'arbitrary' – or optional ('*beliebig*' in the original) (*cf.* TLP [PM] 6.341). As he writes:

> This form is arbitrary […] To the different networks correspond different systems of describing the world (TLP 6.341)

These different forms – with their different associated sets of principles or instruction-propositions – are optional in that we can move between them (and their associated principles) (TLP 6.341). I will return to this below.

For Wittgenstein, the notion of form is intimately connected with that of use: form – e.g. the form of a proposition, of a thought, of an iconic picture, of a name, etc. – is shown in the use of signs (*cf.* Tejedor 2015a, 15–45). Consider the logical form of a picture – that is, a picture's analysability into elementary pictures. Wittgenstein suggests that, when we use signs to express a senseful picture (be it a senseful proposition, a thought or an iconic picture), this use of signs *shows* the logical form of the picture. The use of signs shows that we are expressing a picture with a determinate sense and therefore a picture ultimately analysable into logically independent elementary pictures consisting of simple names. Wittgenstein indicates that logical form is an essential feature of senseful pictures *qua* pictures. Indeed, if our use of signs did not express a determinate sense and thereby showed logical form, in the *Tractatus* it would not count as expressing a picture at all: it would not count as representational.

Whilst Tractarian logical form is, in this respect, an essential feature of senseful pictures, representational form – say, that a proposition is expressed in English rather than Spanish – is not. Like logical form, the representational form of a picture is shown in our use of signs. However, the representational form of a picture is not essential to it *qua* picture. It consists in the accidental features of the picture, features that are not essential requirements of representation (TLP 3.34). These accidental features emerge as a result of the 'tacit conventions' that are 'a part of the human organism' (TLP [PM] 4.002). The fact that certain psychological, physiological, etc. traits happen to be distributed amongst human beings in the ways that they are, together with other

facts about our physical environment, constitute a 'human organism'. The conventions in question may therefore change over time, as the facts about human beings or the environment change.

For Wittgenstein, those aspects of the use of signs that show logical form circumscribe what counts – essentially – as senseful representation (in language, thought, or iconic depiction). In contrast, those that show representational form circumscribe what counts as expressing sense in a particular (optional) representational system.

I suggest that Wittgenstein's distinction between the essential and accidental aspects of form (his distinction between logical and representational forms) is central to understanding the notion of form that emerges in his discussion of the natural sciences. The forms of the natural sciences are optional in that they are accidental aspects of form. In this respect, scientific forms are akin to representational form but not to logical form. A senseful proposition generated according to the principles of a system in the natural sciences will thus display a variety of forms: insofar as it is senseful, it will display essential logical form; insofar as it is an English proposition, it will display a particular, accidental representational form (i.e. that associated with the conventions of the English language); and insofar as it depicts reality according to a particular system from the natural sciences, it will display the accidental form associated with that scientific system.

In order to illustrate this idea further, let us briefly consider Wittgenstein's discussion of causation in physics. In the TLP 6.3ff, Wittgenstein introduces three important related notions: the notion of *causal form* (TLP 6.32), that of *causal principle* (TLP 6.321) and that of *senseful causal proposition* (i.e. a causal claim or causal statement – a senseful propositions in a causal form, e.g. a causal description – *cf*. TLP 6.343). Wittgenstein's discussion suggests that causal principles are instruction-propositions that circumscribe which senseful propositions count as causal within a given system in physics. Put differently: causal principles are instructions for the use of causal signs within a particular system. It is part of the remit of physics to come up with such instructions or causal principles, and the principles that constitute the system may change over time.

Consider for instance the shift from the view that causation involves an exchange of particles to the view that causation involves an interaction between the force fields of particles. This amounts to a shift from one set of instructions to another: the latter set of instructions allows for action at a distance, the former does not. Say that we are looking at the conjunctive proposition 'the earth's mass is *m* at *t* and the ball falls when I let it go from *s* at *t*', where *m* is a particular mass, *t* a point in time and *s* a spatial location. Following the second set of instructions – i.e. the one that allows for action at a distance – involves counting this conjunctive proposition as a suitable candidate for translation into causal terms. This system allows for the claim 'the mass of the earth being *m* at *t causes* the ball to fall when I let it go from *s* at *t*'. In contrast, the set of instructions associated with the view that causation involves an exchange of particles, excluding as it does action at a distance, rules out this *translation* of the conjunctive proposition into causal terms.

This is reminiscent of Wittgenstein's remark in 'A Lecture on Ethics' to the effect that when a 'fact has not yet been explained by science [this] means that we have hitherto failed to group this fact with others in a scientific system' (LE 10–11). Translating the conjunctive proposition into the causal one involves grouping facts according to one particular 'scientific system'. It seems likely that, in Wittgenstein's view, the process of moving from one system to another involves the kind of relative (i.e. instrumental, means-ends) evaluative judgement which is thinkable and describable in language.

In 'A Lecture on Ethics' he certainly aligns this form of relative evaluative judgement with the natural sciences. He writes that the 'scientific book' (LE 6 – *cf*. TLP 5.631) would be such as to 'contain all relative judgments of value and all true scientific propositions and in fact all true propositions that can be made' (LE 8). Although Wittgenstein does not discuss this idea explicitly in the *Tractatus*, it is likely that he regards shifts from one optional scientific system to another to be based on precisely such 'relative judgements of value' performed against the background of the facts (*cf*. McGuinness, 2002, 129–130).

Wittgenstein suggests that scientific representational systems – for instance, causal ones – *obscure possibilities from view* (cf. TLP 6.342). As we will see, he does not regard this *obscuring* as something negative, though: on the contrary, obscuring certain possibilities from view goes hand-in-hand with rendering other possibilities salient to us – in particular, those possibilities instrumentally connected to our empirical survival.[6] Causal language and thinking obscure from view certain possibilities, rendering them (and the propositions that represent them) less visible or salient within that system. This remains a central plank of Wittgenstein's approach to causation and the natural sciences in later years. Consider, for instance, the following remarks:

> We are accustomed to think of things in terms of a very few definite possibilities. If two cylinders are such that one is smaller than the other, we say that one will turn inside the other. If it does not, we say something must be stopping it. It might be very puzzling why it does not turn and we might say that there must be a *cause* for it not turning. (AWL 82)

> We talk as though these parts [of the machine] *could* only move in this way, as if they could not do anything else.
>
> How is this – do we forget the possibility of their bending, breaking off, melting and so on? Yes; in *many* cases we don't think of that at all (RFM 84–85)

Part of the idea behind these remarks is that this obscuring of possibilities is needed in that, as a matter of (contingent) psychological fact, human beings are simply not geared to live life with all logical possibilities equally or plainly in view.[7] Interestingly, a similar process of obscuring possibilities from view occurs, according to the *Tractatus*, in the move from the fully analysed level of elementary pictures (which possess essential features only) to the level of non-analysed, everyday non-scientific natural languages (where propositions possess both essential and accidental features). Wittgenstein writes:

> It is not humanly possible to gather immediately from it what the logic of language is.
>
> Language disguises thought. So much so, that from the outward form of the clothing it is impossible to infer the form of the thought beneath it, because the outward form of the clothing is not designed to reveal the form of the body, but for entirely different purposes (TLP [PM] 4.002)

Although non-analysed everyday and scientific languages obscure possibilities from view, this *obscuring* does not result in nonsense for Wittgenstein. On the contrary:

> In fact, all the propositions of our everyday language, just as they stand, are in perfect logical order (TLP 5.5563)

> The totality of true propositions is the total natural science (TLP 4.11)

Whilst these systems obscure possibilities, they succeed in producing senseful propositions insofar as they are unified by logical form. In this respect, logic is, for Wittgenstein, the ultimate net – the ultimate system.

> How can the all-embracing logic which mirrors the world use such special catches and manipulations? Only because all these are connected into an infinitely fine network, the great mirror (TLP 5.511)

The logical net, rather than being akin to a mesh which inevitably obscures part of what it covers, is akin to a mirror that captures what it reflects in a perspicuous manner without obscuring any of its elements.

> Propositions cannot represent the logical form: this mirrors itself in the propositions.
> That which mirrors itself in language, language cannot represent.
> That which expresses *itself* in language, *we* cannot express by language.
> The propositions *show* the logical form of reality.
> They exhibit it (TLP 4.121)

That the logical net is more like a perspicuous mirror than like an inevitably obscuring mesh emerges again when we consider that logic is what enables us to move from the non-analysed level, where pictures have both essential and accidental features (and thus show both logical and accidental forms), to the fully analysed level of elementary pictures possessing only essential features and showing only logical form (TLP 3.323; TLP 4.0311). For Wittgenstein, only elementary pictures are capable of guaranteeing a complete description of the world – that is, a description of the world that presents all possibilities in a perspicuous manner. All representational systems produce, according to Wittgenstein, senseful pictures analysable into elementary pictures; but this means, in turn, that all representational systems are to an extent translatable into each other. Elementary pictures provide the translation interface for moving from any one such system to another.

> The specification of all true elementary propositions describes the world completely. The world is completely described by the specification of all elementary propositions plus the specification, which of them are true and which false (TLP 4.26)

> Suppose *all* elementary propositions were given me: then we can simply ask: what propositions I can build out of them. And these are *all* propositions and *so* are they limited (TLP 4.51)

The suggestion is therefore that a complete description of the world can only be guaranteed with one net – or system; in particular, the one that generates elementary pictures possessing essential features alone: logic itself. Beyond this level, all representational systems involve the obscuring of some possibilities. Wittgenstein indicates that we move from one system to another by means of translation rules:

> Definitions are rules [*Regeln*] for the translation of one language into another. Every correct

> symbolism must be translatable into every other according to such rules. It is *this* which all have in common (TLP 3.343)

This opens the way for a deflationary understanding of Wittgenstein's view that logic is transcendental:

> Logic is not a body of doctrine, but a mirror-image [*Spiegelbild*] of the world. Logic is transcendental. (TLP [PM] 6.13)

When Wittgenstein writes that logic is transcendental, he is not suggesting that logic is a *pre*-condition of either representation or the world. For the idea of a *pre*-condition is the idea of an external (mechanistic) relation: to suggest that logic is a pre-condition of representation is to suggest that logic is conceptually prior to representation, that it can be specified independently of representation so that logic could, in principle, be given in advance – that is, in the absence – of representation. Instead, logic is transcendental for Wittgenstein in that it is *internal to or constitutive of* representation and, thus, of the correlation between representation and world.

This helps to shed light on Wittgenstein's understanding of the relation between logic and science – the question that emerged in our initial discussion of 'A Lecture on Ethics'. For the principles of logic and those of the natural sciences, together with the conventional principles of natural languages, share important aspects in common. Firstly, all of these principles *can be used* to provide instructions for the construction of senseful pictures within particular systems. It is in this respect that they all count as *principles*. In connection to logic, Wittgenstein writes:

> The proposition constructs a world with the help of logical scaffolding, and therefore one can actually see in the proposition all the logical features possessed by reality *if* it is true (TLP 4.023)

> If we are given the general form of the way in which a proposition is constructed, then thereby we are also given the general form of the way in which by an operation out of one proposition another can be created (TLP 6.002)

In connection to the principles of the natural sciences, he writes:

> Mechanics determine a form of description by saying: All propositions in the description of the world must be obtained in a given way from a number of given propositions—the mechanical axioms. It thus provides the bricks for building the edifice of science, and says: 'Any building that you want to erect, whatever it may be, must somehow be constructed with these bricks, and with these alone' (TLP 6.341)

In connection to the conventional principles of everyday, natural languages he writes:

> Man possesses the ability to construct languages capable of expressing every sense, without having any idea how each word has meaning or what its meaning is—just as people speak without knowing how the individual sounds are produced.
>
> Everyday language is a part of the human organism and is no less complicated than it. […]
>
> The tacit conventions on which the understanding of everyday language depends

> are enormously complicated (TLP [PM] 4.002)

Secondly, our knowledge of the principles of logic, the natural sciences and natural languages is *a priori*: it is *prior to experience*, not in that it involves having beliefs not derived from experience, but in that it is a particular type of *know-how*. Knowledge of these principles is knowledge of a *form*: it involves being able to construct senseful pictures (propositions, iconic pictures, but also mental representations) according to the instructions pertaining to a particular system.

> We do not *believe* a priori in a law of conservation, but we *know* a priori the possibility of a logical form (TLP 6.33)

In the above remark, Wittgenstein draws on a distinction between logical form as such and *a* logical form: logical form consists in the analysability of a picture into elementary pictures (those that form the translation interface between systems); *a* logical form, in contrast, is any unified form or system that generates senseful pictures possessing accidental as well as essential features (or logical form). In this respect, causal form is *a* logical form, as are particular representational forms (e.g. the representational form of the English language):

> Every picture is *also* a logical picture. (On the other hand, for example, not every picture is spatial) (TLP 2.182)

Whilst the principles of logic, the natural sciences and natural languages share these aspects in common, there are also important respects in which they differ. The central point of difference is, of course, that whereas the principles of logic are essential to representation, the principles of scientific systems and those of natural languages are not. The principles of logic are essential to representation in that a use of signs that is not logical is simply not a representational use of signs: it does not *count* as expressing a representational picture. A proposition can, however, be senseful without being causal, or without being expressed in the English language.

This relates to a further disanalogy between the principles of logic and those of the natural sciences and natural languages. For since the latter two are *optional*, expressing these principles by means of propositions can be *informative* in a manner that logical principles never can. For Wittgenstein, the only purpose to be served by presenting an instruction of logic in the form of a proposition is the *psychological* purpose of reminding us of a know-how we already possess, insofar as we already have mastery of language and thought. In other words, the need to express logical principles arises only by virtue of the fact that our memory happens, as a matter of psychological fact, to fail us (*cf.* Tejedor 2015a, 15–72, 119–137). In contrast, expressing the principles of the natural sciences or the conventions of natural languages by means of propositions can serve an *additional* purpose, namely that of *stipulating* and *informing* that a new system – out of the various optional ones – is now in play.

The role that scientific and natural language principles serve in this respect is quite distinctive: it is genuinely informative, in the sense of being capable of conveying something new. This helps to explain why Wittgenstein is comfortable with the idea that axioms play a genuine role in the natural sciences, but not in logic. Indeed, Wittgenstein is consistently negative about the notion of *logical* axioms:

> Propositions like Russell's 'axiom of reducibility' are not logical propositions, and this

> explains our feeling that, if true, they can only be true by a happy chance (TLP 6.1232)
>
> We can imagine a world in which the axiom of reducibility is not valid. But it is clear that logic has nothing to do with the question whether our world is really of this kind or not (TLP 6.1233)
>
> So all problems disappear which are connected with such pseudo-propositions.
> This is the place to solve all the problems with arise through Russell's 'Axiom of Infinity'.
> What the axiom of infinity is meant to say would be expressed in language by the fact that there is an infinite number of names with different meanings (TLP 5.535)

In contrast, there is no hint, in his discussion of mechanics and the natural sciences, that he regards the notion of an axiom, in this context, as problematic.

> Mechanics determine a form of description by saying: All propositions in the description of the world must be obtained in a given way from a number of given propositions—the mechanical axioms (TLP 6.341)

Insofar as scientific principles capture *optional* instructions or stipulations, they are informative in a way that Russell's purported logical axioms could never be. And, insofar as they are informative, they serve a genuine *purpose*. This notion of purpose is central to Wittgenstein's early thinking, as we will now see.

3. *Scientism as a threat to science*

Wittgenstein's discussion of the principles of the natural sciences casts serious doubts on an assumption present in much of the literature: the assumption that in the *Tractatus*, if a proposition is neither senseful nor senseless, it must be automatically nonsensical.[8] The *Tractatus*' discussion of scientific principles suggests that this misrepresents Wittgenstein's position. Note indeed that the propositions that express these laws or principles – the instruction-propositions from the various natural science systems – are *not* senseful, senseless *or* nonsensical in his view. These propositions are *a priori*, optional and not truth-assessable: they are *a priori* insofar as they are used as instructions (akin to imperative commands) for the *generation* of senseful (linguistic, mental or iconic) pictures within unified systems; they are *optional* in that the instructions in question belong to systems that can be opted in or out; and finally, unlike both senseful and senseless propositions, they are not truth-assessable, since their role is not to represent possibilities, but to *stipulate* representational systems.

Although for Wittgenstein, the instruction-propositions of the natural sciences are neither senseful nor senseless, at no point does he suggest that they are, for this reason, *nonsensical*. This gives us a key into Wittgenstein's early understanding of nonsense: a proposition that is neither senseful nor senseless is not, for this reason, automatically nonsensical; rather, a proposition is nonsensical when it *fails to serve a purpose*. The purpose served by our use of signs *need not* be that of expressing senseful propositions; it can also be that of *stipulating* – that is, of conveying a new, optional, *a priori* instruction. Senseful propositions and the (neither senseful nor senseless) instruction-propositions of the natural sciences serve a purpose in that they are integral parts of working systems of representation, systems that are instrumentally valuable to us. For this reason, they are not nonsensical.

Nonsense, for Wittgenstein, is generated when signs are used *to no purpose*. Using signs to no purpose – i.e. nonsensically – is not always negative or to be avoided, though: indeed, using signs purposelessly can be entirely unobjectionable, according to Wittgenstein, when it is done in full awareness or in a deliberate manner – as, for instance, in certain forms of humour. This is exemplified by the postcard messages sent by Wittgenstein to Gilbert Pattison, which the former characterises as 'nonsense' (Monk 1990, 265 & Figure 42). Wittgenstein's postcard messages are humorous precisely because they involve using signs to no purpose – i.e. *nonsensically*. Wittgenstein at no point suggests that this form of nonsense is in any way problematic, though. Nonsense only becomes pernicious when it arises from and promotes confusion.[9] This typically occurs in situations where we think that we are using signs for a purpose, but our use in fact defeats this putative purpose: when we are under the illusion that we are engaged in a purposeful activity, but we are not. For Wittgenstein, this particular version of nonsense – let us call it self-subverting nonsense – is central to a number of traditional philosophical practices that need to be overhauled: in metaphysics, the philosophy of mind, the philosophy of language, logic, and ethics, amongst others.

In logic, it emerges in Russell's approach to logical entailment, logical variables and formal concepts, where logic is presented as the most general of natural sciences – a move that defeats itself, according to Wittgenstein (McGinn 2006, 53–74). It also emerges more broadly in metaphysics. For Wittgenstein, metaphysics attempts to combine philosophical and scientific practices in ways that are ultimately self-defeating.

One of the legitimate aims of the natural sciences is to carry out empirical investigations of contingent facts and to generate descriptions of these facts (TLP 4.11). The facts that make up reality include contingent mechanisms involving external relations between facts and/or possible states. Consider for instance, the mechanism in a piano that connects a key to the hammer that strikes the string. This mechanism is contingent in various respects; in particular, it is *possible* that a different type of mechanism should connect the key to the hammer and deliver the same result. Part of the aim of the natural sciences, for Wittgenstein, is to identify and describe contingent mechanisms as they obtain in reality. Indeed, any questions concerning mechanisms – any questions as to how things *happen* to work or be produced or be caused in reality – are the purview of the natural sciences.

Traditional metaphysics results in nonsense because it attempts to answer, in an *a priori* manner, empirical questions that are the purview of the natural sciences (cf. BB 35; Z §458). Wittgenstein suggests that traditional metaphysical questions are modelled on scientific questions concerning mechanisms. Consider for instance Wittgenstein's discussion of metaphysical solipsism, in TLP 5.6ff. Solipsism, in this context, is the view that the subject is the necessary condition of representation and therefore of the world as given in representation. Wittgenstein suggests that, as a philosophical position, this is problematic. For it represents an attempt to answer the question 'By virtue of what mechanism *must* representation occur?' The question 'By virtue of what mechanism *does* representation (as a matter of contingent fact) occur?' is a well-formed question – it is the legitimate purview of the natural sciences, a question that might well be asked, for instance, in psychology. The metaphysical question 'By virtue of what mechanism *must* representation occur?', by contrast, is not. The metaphysical question presents itself as informative: it is posed as if different options might genuinely be available to us here, different possible metaphysical answers (e.g. solipsism, idealism, realism) with their corresponding different possible mechanisms (respectively: *I*, *we*, reality). This creates the impression that there is clear purpose to asking this question: the question is asked for the purpose of selecting the correct metaphysical option out of those available. This apparent purpose is subverted, however,

by the suggestion that we are looking for what *must* – necessarily – be the case. It would seem that we are looking for the only answer possible – that which is *necessary*; but we are doing so in a manner that presumes that different options are possible. (There are several other respects in which such metaphysical positions are self-subverting, according to the *Tractatus*. I discuss this in more detail in Tejedor 2015a, 73–90.)

Traditional metaphysics is problematic in that it attempts to bring together methodologies (from philosophy and the natural sciences) in a manner that is self-defeating: the apparent purpose of the activity falls apart in our hands. In this respect, metaphysics fails to generate a *unified* working system: there is no 'single plan' (TLP 6.343) at work here, since any such plan finds itself subverted. For Wittgenstein, approaches such as this pose a threat to philosophy (properly understood) and to other areas, such as ethics and religion. Most significantly for us, they also pose a threat to science itself.

This idea – overlooked in the literature – emerges at several junctures in Wittgenstein's writings. Consider, for instance, his *Remarks on Frazer's* Golden Bough (GB). There is no doubt that this text is partly devoted to Wittgenstein's critique of Frazer's approach to religion and magic, as has been aptly captured elsewhere, notably by Clack (1999). There is, however, a further dimension to this text, which often goes unnoticed, but which, I suggest, is just as important. For Wittgenstein's aim in the *Remarks* is not just to expose Frazer's treatment of religion and magic, but also his approach to *anthropology*. Frazer sets out to carry out an empirical investigation with the purpose of rendering the religious practices of the tribes he studies intelligible to himself and others. However, due to his own prior commitments (i.e. due to what *we* might call prejudice), Frazer ends up neither properly attending to the empirical evidence that is before him, nor bringing into play the subtlety and conceptual dispositional apparatus – the *understanding* of religious ritual – that would be required for his anthropology to bear fruit. Wittgenstein writes:

> It is very remarkable that in the final analysis all of these practices are presented [by Frazer] as, so to speak, pieces of stupidity. But it will never be plausible to say that mankind does all that out of sheer stupidity (GB 119)
>
> The same savage, who stabs the picture of his enemy apparently in order to kill him, really builds his hut out of wood and carves his arrow skillfully and not in effigy (GB 125)
>
> What a narrow spiritual life on Frazer's part! As a result: how impossible for him to conceive of a life different from that of the England of his time! (GB 125)

Wittgenstein is critical of Frazer, not just because, in his view, Frazer's approach distorts our understanding of religion and magic, but also because it makes for *bad science*. In particular, it makes for a self-subverting – i.e. nonsensical – attempt at *anthropology*.

> One could begin a book on anthropology by saying: When one examines the life and behavior of mankind throughout the world, one sees that, except for what might be called animal activities […] men also perform actions which bear a characteristic peculiar to themselves, and these could be called ritualistic actions.
>
> But then it is *nonsense* to go on to say that the characteristic feature of these actions is that they arise from faulty views about the physics of things. (Frazer does this

> when he says that magic is essentially false physics, or, as the case may be, false medicine, technology, etc.). (GB 129, my italics)

Frazer begins with the aim to carry out a detailed empirical study of a number of tribal religious practices. However, this aim is consistently defeated by the *a priori* commitments he brings to bear on his research – in particular, his commitment to the view that religion and magic *must* be understood here as (defective) forms of physics. This *a priori* commitment prevents Frazer's methodology from fulfilling its purpose: it renders Frazer unable properly to attend to the empirical data he so painstakingly collects or to render genuinely intelligible these practices to himself or others (stupidity being a limiting case of intelligibility). His treatment of the material thus ends up resulting in self-subverting nonsense.

If by scientism we mean the attempt to bring together scientific and other (often *a priori*) approaches in manners that are self-subverting, then scientism poses a threat to science itself – not just to ethics, religion, or philosophy. Wittgenstein's insistence that we should keep philosophical practices separate from scientific ones aims to protect science from distortion, as much as it aims to protect philosophy. This idea emerges repeatedly in Wittgenstein's writings. Consider, for instance, his somewhat exasperated reply to Russell's question about the *Tractatus*' remarks on thought, in a 1919 letter from Cassino:

> [Russell asks] '...But a *Gedanke* [a thought] is a *Tatsache* [a non-elementary fact]: what are its constituents and components, and what is their relation to the pictured *Tatsache*?' [To which Wittgenstein replies] I don't know *what* the constituents of a thought are […]. Again the kind of relation of the constituents of the thought and of the pictured fact is irrelevant. It would be a matter of psychology to find out. (NB 129 – letter to Russell, Cassino, 19.8.19.)

The claim 'It would be a matter of psychology to find out' is as protective of psychology (which Wittgenstein regards as a natural science – TLP 4.1121) as it is protective of philosophy: Wittgenstein is reminding Russell that his question serves a purpose when asked by a natural scientist, but not when asked by a philosopher – certainly not when asked by a philosopher with the emphasis that Russell lays on it (*cf.* Tejedor 2015a, 73–90).

A similar idea emerges in Wittgenstein's critical remarks on popular science.[10] O. K. Bouwsma notes that Wittgenstein was not opposed to popular science as such, but only to specific forms of popular science, which he regarded as intellectually dishonest. Bouwsma writes:

> In fact, [Wittgenstein] recommended Faraday's *The Chemical History of a Candle* as an illustration of fine popular science. He objected to sensationalism, and what he called the cheating. [He thought that] Eddington and Jeans cheat. A fine work in this order would have to be very careful; analogies would be well chosen and nicely worked out. (1949-1951, 28)

The contrast alluded to by Bouwsma emerges with some force when one considers some of the texts in question. Faraday's *The Chemical History of a Candle* is a careful, painstaking piece that sets to explain with great clarity a narrowly circumscribed scientific matter: the chemical composition and functioning of candles. Consider, for instance, the following passage:

> Here is a frame, with a number of moulds fastened in it. The first thing to be done is to

> put a wick through them. Here is one … supported by a little wire. It goes to the bottom, where it is pegged in … At the upper part there is a little bar placed across, which stretches the cotton and holds it in the mould. The tallow is then melted, and the moulds are filled. After a certain time, when the moulds are cool, the excess of tallow is poured off at one corner, and then cleaned off altogether, and the ends of the wick cut away. The candles alone then remain in the mould, and you have only to upset them, … when out they tumble, for the candles are made in the form of cones, being narrower at the top than at the bottom: so that, what with their form and their own shrinking, they only need a little shaking, and out they fall. In the same way are made these candles of stearin and of paraffine. (1861, 15)

By contrast, Eddington's works of popular science, unlike his more specialised or academic scientific texts, are peppered with metaphysically-laden, often grandiose statements:

> Man is slightly nearer to the atom than to the star … From his central position man can survey the grandest works of Nature with the astronomer, or the minutest works with the physicist. … [K]nowledge of the stars leads through the atom; and important knowledge of the atom has been reached through the stars (1929 [1927], 9)

> Take the living human brain endowed with mind and thought … The physicist brings his tools and commences systematic exploration. All that he discovers is a collection of atoms and electrons and fields of force arranged in space and time, apparently similar to those found in inorganic objects. He may trace other physical characteristics, energy, temperature, entropy. None of these is identical with thought … How can this collection of ordinary atoms be a thinking machine? (1929, 258-259)

> We have found that where science has progressed the farthest, the mind has but regained from nature that which the mind has put into nature.
>
> We have found a strange foot-print on the shores of the unknown. We have devised profound theories, one after another, to account for its origin. At last, we have succeeded in reconstructing the creature that made the foot-print. And Lo! it is our own. (1921, 200-201)

For Wittgenstein, popular science texts such as Eddington's (*like* Frazer's anthropological writings, but *unlike* Faraday's *The Chemical History of a Candle*), present a self-subverting quality, a lack of clarity in purpose that renders them both dishonest (a 'cheat') and nonsensical. Eddington's popular science texts purport to serve a semi-metaphysical purpose and, in so doing, end up constituting neither (good) philosophy nor (good) popular science. Wittgenstein must have been thinking of what were, in his view, poor examples of popular science (such as Eddington's), when he decided to give a lecture on ethics rather than a (bad) 'popular scientific lecture' at *The Heretics Society* meeting in Cambridge, in 1929 (LE 4).

Scientism – understood as the self-subverting attempt to bring together scientific and other methodologies – distorts our understanding of science, just as it distorts our other practices. In this respect, Wittgenstein is as concerned with scientism as a threat *from* science as he is with scientism as a threat *to* science.

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Blackwell, 1981).

Notes

[1] See, for instance, Monk, 1990, 485–6; McGuinness, 2002, 116–130; Phillips, 1993, esp. 56–78).
[2] I will be using the Ogden translation of the *Tractatus* as my default in this paper: although the translation by Pears and McGuinness is in many ways superior to Ogden's, I find that Ogden's helps to shed light on key aspects of Wittgenstein's discussion of science. I will therefore be using 'TLP' as my abbreviation for the Ogden translation. When I quote from the Pears-McGuinness translation, I will signal this by using the abbreviation 'TLP [PM]'.
[3] Wittgenstein's claim (LE 4) that a '*superficial* curiosity' about science is associated with the '*lowest* desire' of modern people certainly allows for the view that deeper-level scientific curiosity might be associated with a higher form of desire. I am grateful to Ian James Kidd for drawing my attention to this point.
[4] Senseful propositions represent possible states and are bivalent and bipolar; senseless propositions, in contrast, are either tautological or contradictory. Nonsensical propositions, in turn, are neither senseful nor senseless. We will be revisiting Wittgenstein's notion of nonsense towards the end of this paper.
[5] I defend this view further in Tejedor, 2015a, 91–137.
[6] This obscuring is, in any case, not a *loss*, since any possibility hidden in this way can in principle be revealed again by means of logical analysis.
[7] In this respect, there are, I believe, important connections to be drawn between Wittgenstein's earlier remarks on the *form* of scientific systems and his later remarks on 'forms of life'. On this, see Tejedor, 2015b.
[8] See, for instance, Conant, 2000, 174–217 and Hacker, 2000, 353–355.
[9] A similar point is made by McGuinness, 2002, 359. Cf. Monk, 1990, 282. I am grateful to Jonathan Beale for drawing my attention to these.
[10] I am indebted to John Preston for first drawing my attention to this point: see Preston, 2012.