Weird fallibilism: feyerabend, lakatos, and justified true belief

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In the friendly dispute between the philosophers of science Paul Feyerabend and Imre Lakatos, both authors proclaim their allegiance to fallibilism: a term first coined by Charles Sanders Peirce, though often associated more strongly with Karl Popper. Yet Lakatos charges that Feyerabend's position amounts to scepticism rather than fallibilism, given that the latter accounts for theoretical change but not theoretical progress. Famously, progress for Lakatos occurs by way of a progressive research program, one that expands in scope over time, tackles an ever more challenging range of problems, and often yields surprising verifications of its theories. But fallibilism is cheap if it merely entails the truism that the scientific consensus of any given moment might turn out to be false. If we describe knowledge in terms of the ancient and still influential formula "justified true belief," there is good reason to hold that neither justification nor truth are attainable goals, and that they cannot even be approached asymptotically (as in the very different proposals of Alvin Plantinga and Martin Heidegger). Contra Lakatos this is not grounds for scepticism, but for what I term "weird fallibilism," using "weird" in a technical sense drawn from my book on the American horror writer H.P. Lovecraft. Weird fallibilism is characterized by two fundamental claims: (1) truth never corresponds to reality, and (2) objects never correspond to their own qualities, a point in direct conflict with the "bundle of qualities" theory of objects handed down from British Empiricism. On this basis, a modification of the "justified true belief" criterion for knowledge is briefly sketched.

Keywords: fallibilism, justified true belief, incommensurability, Karl Popper, Imre Lakatos, Paul Feyerabend, Thomas Kuhn, Edmund Gettier

Странный фаллибилизм: фейерабенд, лакатос и обоснованное истинное мнение

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В дружеском споре Пол Фейерабенд и Имре Лакатос заявляют о своей приверженности фаллибилизму. Однако Лакатос утверждает, что позиция Фейерабенда сводится скорее к скептицизму, чем к фаллибилизму, если учесть, что последний объясняет теоретические изменения, но не теоретический прогресс. Известно, что прогресс для Лакатоса осуществляется посредством развития исследовательской программы, которая со временем расширяется, включая более сложный круг проблем. Но фаллибилизм теряет ценность, если сводится к трюизму о том, что научный консенсус в любой данный момент может оказаться ложным. Если мы описываем знание в терминах все еще влиятельной формулы «обоснованное истинное убеждение», есть веские основания полагать, что ни обоснованность, ни истина не являются достижимыми

целями и что к ним нельзя приблизиться асимптотически. Вопреки Лакатосу, это приводит не к скептицизму, а к тому, что я называю «странным фаллибилизмом», используя «странный» в техническом смысле, взятом из моей книги об американском писателе, работавшем в жанре ужасов, Г.Ф. Лавкрафте. Странный фаллибилизм характеризуется двумя основными утверждениями: (1) истина никогда не соответствует реальности, и (2) объекты никогда не соответствуют своим качествам, что находится в прямом противоречии с теорией британского эмпиризма. На этой основе кратко намечена модификация познавательного критерия «обоснованное истинное мнение».

Ключевые слова: фаллибилизм, обоснованное истинное мнение, несоизмеримость, Карл Поппер, Имре Лакатос, Пол Фейерабенд, Томас Кун, Эдмунд Геттиер

The intellectual friendship between the "anarchist" philosopher of science Paul Feyerabend and the self-styled "rationalist" Imre Lakatos remains invigorating. Their irreverent correspondence, contained in a volume entitled *For and Against Method*, is notable for lively teasing on both sides of the exchange [Lakatos, Feyerabend, 1999, pp. 119–373]. At the beginning of the book, editor Matteo Motterlini also patched together a plausible-sounding dialogue between the two authors by assembling statements from elsewhere in their writings [Ibid., pp. 1–18]. Here Lakatos proposes "turn[ing] science from a mere game into an epistemologically rational activity; from a set of lighthearted sceptical gambits pursued for intellectual fun into a serious fallibilistic venture of approximating the 'Truth of the Universe.'" [Ibid., p. 7] Feyerabend expresses approval of this "candid fallibilism," before adding provocatively that "the task of scientists no longer lies in 'searching for the truth' or 'improving predictions,' but rather, in the words of the Sophists, 'in making the weaker case the stronger one, thereby to sustain the motion of the whole.'" He continues the thought as follows: "*The truth*, whatever it is, *be damned*. Play, fun, and fiction will make you free." [Ibid., p. 8] Rather than scolding Feyerabend for promoting the widely despised Sophists, Lakatos links his friend with a different school of Ancient Greek philosophy:

> Your position is just a colorful version of Pyrrhonian scepticism. You should look at the excellent book by [Richard] Popkin: *The History of Scepticism*. From a sceptic's point of view, scientific theories are a set of beliefs which have equal epistemological ranking to so many other sets of beliefs. There may be *change* in belief systems but no *progress* [Ibid., p. 13].

Although it would be a pleasure to quote further from this amusing dialogue, it has already provided the basic elements we need for this article. Lakatos opposes a scepticism that is said to put all beliefs on the same level, upholding instead a form of scientific rationality distinguished by its commitment to progress. He calls this a "fallibilism" capable

of "approximating" the truth of the universe, though he puts both terms at a distance through the use of scare-quotes. For Feyerabend's part, he sides with "play," "fun," "fiction," and even the Sophists themelsves, as opposed to scientific truth and accurate prediction. As he famously puts it elsewhere, in science "anything goes": it is simply a "power struggle" where magic, witchcraft, and ancient science are on essentially the same footing as the modern science of which we are all so proud [Lakatos, Feyerabend, 1999, pp. 116–117]. Laid out in this way, the disagreement between Lakatos and Feyerabend might look like a standard comic book opposition between rationality and irrationality. Yet the true situation is more interesting than this: not because the two friends agree and are both right, but because they disagree and in important respects are both wrong.

As we have seen, one term saluted equally by Lakatos and Feyerabend is "fallibilism," referring to the view that all scientific truth is subject to refutation at any moment. Here I will use the term "weird fallibilism" to refer to an important aspect of the fallibilist problem that both thinkers partly miss. This is not my first use of the term "weird" in a philosophical context [Harman, 2012]. But while some of my critics have pretended to find this word either unintelligible or emptily trendy, it has a precise technical sense [Gironi, 2012, pp. 317–318]. By "weirdness" I refer to the effect that arises from a pair of ineffaceable gaps in reality: (1) the difference between an entity in its own right and its appearance to perceivers or its role in causal relations; (2) the difference between an entity and its own qualities. The first point is a challenge not only to correspondence theories of truth, but even to assymptotic theories that imagine us approaching truth ever more closely, even if incompletely. The second amounts to a renunciation of David Hume's theory of objects as bundles of qualities [Hume, 1978].

Justified True Belief

It seems commonsensical to link knowledge with truth. What else could knowledge be, if not access to the truth? But a number of qualifications are already needed, and therein lies the intricacy of the problem. In Plato's *Meno* and *Theatetus*, early efforts are made to exclude the lucky guesser from the sphere of knowledge in the strict sense [Plato, 1992]. An octopus might swim to the logo of Argentina the day before the 2022 World Cup Final while avoiding the French flag also present in its aquarium, thereby "predicting" the victory of Lionel Messi and the Argentinian squad. Of course, only the most superstitious observer would think that the octopus was acting on "knowledge." Something more is clearly needed, and thus from Plato onward it became customary to speak of knowledge as *justified* true belief. From the class of all those who hit

upon the truth, we must exclude those who reached it without sufficient evidence.

But there are problems with both of these terms: (1) justification, and (2) truth. We begin with justification. If an apparent truth is not convincing in its own right, we will normally ask for an external piece of evidence to shore up our belief. If it seems unbelievable to a young person today that Henry Kissinger was once awarded the Nobel Peace Prize, any standard reference book will be enough to confirm it. It is true that one could question further whether such books are reliable, and in that case additional inquiry might be needed, perhaps even to the point of paranoid conspiracy theory. Just this morning I was briefly tricked by a Photoshopped image into accepting the existence of the "rainbow jay," a multicolored but non-existent bird supposedly indigenous to the mountains of South America. With the rise of internet misinformation, responsible people have learned to be cautious about anything found online. But in principle, even scientific researchers might ask endless suspicious questions of their peers, as humorously imagined by Bruno Latour: "By now we have to imagine a [scientific] dissenter boorish enough to behave like a police inspector suspecting everyone and believing no one and finally wanting to see the real endorphin with his own eyes." [Latour, 1987, pp. 39–44] Yet the point is not only – as Latour argues – that the suspicious dissenter must stop somewhere in order to prevent other scientists from becoming increasingly angry and incredulous. Beyond this, even in purely theoretical terms there is no resting place able to bring our doubts definitvely to a halt; any supposed fact can always be questioned by asking for its supporting evidence.

In the history of philosophy this was pushed especially far in René Descartes's notion of an "evil genius" (with George Berkeley's God providing the contrary case of a "good genius") [Descartes, 1993]. Yet any attempt either to prove or disprove Descartes's hypothesis can be met with demands for further evidence at every step of the way; we need not endorse the French philosopher's own willingness to stop with whatever "clear and distinct" ideas he encounters on his path. There is no such thing as ultimate justification for any piece of knowledge, other than our eventual lack of interest in doubting it further. There inevitably comes a point when an inquirer simply concludes that they are in the presence of sufficiently convincing evidence; here they stop asking the further questions that might be posed by Latour's boorish scientific inspector. Among other things, this shows why analytic philosophy is on the wrong track in its obsession with "arguments" for any claim, given that arguments are just another form of justification, and every inquirer eventually ends in some purported piece of unarguable self-evidence. Many important philosophers – Nietzsche comes to mind – earn our allegiance less through stringent local argumentation than through direct proclamations of apparent truth bolstered by rhetorical flair. This same point will be

reached (though with lesser flair) by any aspiring Frege, Russell, or Quine as well [Nietzsche, 2001].

A better-known issue with justification stems from so-called "Gettier problems," after the unprolific but influential analytic philosopher Edmund Gettier (1927–2021) [Gettier, 1963, pp. 178–179]. Imagine that two men named Smith and Jones are interviewing for the same job. (Why always such boring names in philosophy examples? Why not Malvolio and Mephisto, or Archie and Stuke?) The company president thanks Smith for his interest in the position, but then reveals disappointing news: it is Jones who will be hired instead. Smith takes the news gracefully, and based on his bizarrely happening to know that Jones has exactly ten coins in his pocket, Smith thinks the following odd thought: "the man who will get the job has ten coins in his pocket." But Jones must have failed his background check, since Smith is suddenly and surprisingly offered the position that he thought was already lost. In a celebratory mood, Smith inexplicably empties his pockets and discovers that he has exactly ten coins as well. Does this mean that Smith "knew" that the man who would be hired was in possession of ten coins? Not really, and that is Gettier's point. For although Smith's belief in the success of a man with ten coins turned out to be true, something was obviously wrong with his justification for this belief. Smith did not just make a lucky guess, unlike Plato's hypothetical person who haphazardly gives us the proper directions to Larissa. Smith did have evidence justifying his prediction: a direct statement from no less a figure than the company president. Yet he ended up with the right result for the wrong reason, and this means that he had no knowledge in the strict sense of justified true belief. We note in passing that Gettier's article is aimed solely at the "justification" part of this formula. Nothing is said about truth itself, which functions as a sort of control in his thought experiment. Although perhaps only tactically, he depicts truth in his article as if it were a simple matter of correspondence between belief and reality.

Yet Gettier calls our attention only to some specific cases of lucky truths without justification, which leaves open the possibility that many justified true beliefs do in fact exist. Crispin Sartwell has argued instead that justification is irrelevant, so that true belief alone – as with Smith in Gettier's example – is enough to constitute knowledge, though it is hard to see how this escapes Plato's concerns about the lucky road to Larissa [Sartwell, 1992]. The opposite possibility, that knowledge would consist only of justified belief irrespective of whether or not it is true, is considered by Linda Zagzebski in her helpful article on Gettier problems. "On this approach," as she puts it, "the element of truth in the account of knowledge is superfluous and knowledge is simply justified (warranted) belief. S is justified in believing 'p' entails p," before adding that "[f]ew philosophers have supported this view." [Zagzebski, 1994, p. 72] The framework for her article is the observation that attempts to over-

come Gettier problems have generally taken one of two paths: (1) adding something extra to the definition of knowledge beyond justification and truth; (2) attempting to reconceive justification in a way that reliably yields knowledge, as with Alvin Plantinga's shift from justification to what he calls "warrrant" [Zagzebski, 1994, p. 65]. Among other things, this allows Plantinga to treat justification and truth as matters of degree, a maneuver whose darker continental analogue can be found in Martin Heidegger's theory of truth as a gradual unveiling that never fully reaches its goal [Heidegger, 1998]. Yet Zagzebski argues that options (1) and (2) both still lead inevitably to Gettier problems. As long as there remains a minimal gap between justification and truth, there will always be an element of luck involved in knowledge [Zagzebski, 1994, p. 69]. We are asked to consider another example. In the dim light of her house, Mary thinks she sees her husband in a chair and thus concludes that her husband is in the living room, even though the person she observes is actually her brother-in-law. But in a not-so-strange twist, it so happens that her husband is also sitting in the living room, though in a different chair not currently visible to Mary. Thus Zagzebski concludes that knowledge will always be plagued by this Gettier challenge unless we define it either solely in terms of justification, or go to the other extreme and link justification and truth so tightly together that mismatches between them can simply never occur. Much like Gettier himself, Zagzebski is concerned with clarifying our concept of justification and its link with knowledge; also like Gettier, she provisionally accepts a standard sense of truth as correspondence between belief and the world.

Fallibilism

Invention of the term "fallibilism" is credited to Charles Sanders Peirce, who deployed it against claims – most famously, those of Descartes – to have direct intuitive access to truth [Peirce, 2011, pp. 42–59]. Yet I like to think of fallibilism as already present in an amusing passage from Aristotle's *Metaphysics*: "Theoretical knowledge concerning the truth is in one way difficult to get and in another way easy. An indication of this is that while none is capable of hitting upon it in the way it deserves, neither do all completely fail to hit it…" [Aristotle, 2016, p. 27] Nonetheless, I think it is necessary to uphold fallibilism in a more radical sense than usual. One common employment of the term might be called "naïve fallibilism," meaning the view that sometimes we are right and sometimes wrong and can never be sure when either of these is the case: a harmless but perfectly toothless stance. Next, let's use the phrase "moderate fallibilism" to refer to the concession – found even among scientistically minded thinkers, but equally so in Heidegger's assymptotic model of

truth – that although new discoveries and refutations of past truths will continue in the future, our current inadequate knowledge at least entails a "partial" access to reality [Brassier, 2007]. Finally, let's introduce the term "radical fallibilism" for the view that there is not even partial agreement between thought and reality. The latter option might seem to lead to skepticism, and even to those moments in Feyerabend and the early Latour where science seems to be treated as a mere power struggle. Incidentally, it is my view that Feyerabend is especially wrong to attribute this position to Thomas Kuhn, though he is far from alone in doing so [Lakatos, Feyerabend, 1999, p. 117; Latour, 1987; Kuhn, 2012; Latour, 1999, pp. 216–235; Harman, 2009, pp. 85–95].

Along with Peirce, another of the chief fallibilist thinkers in modern philosophy is Karl Popper [Popper, 1980]. Rejecting the verificationist principles of the Vienna Circle, Popper famously insists that while any theory (including "pseudo-scientific" ones) can easily find verifying evidence, a true scientific theory must actively try to survive conscious and sincere attempts to falsify it. Popper's view that even Marxism and psychoanalysis are pseudo-scientific stems from the failure of these schools to specify those conditions under which they would be willing to abandon their theoretical outlook. Both look for additional verifying evidence without facing the challenge of potential falsification: this is why Popper focuses so heavily on "crucial experiments" in the history of science. Nor does he agree with Kuhn that such risky science is relatively rare by contrast with workaday "normal science"; for Popper even the non-heroic, mid-level scientist must boldly face up to possible refutation at every stage of their work [Popper, 1970]. One important feature of Popper's view is that it treats scientific discovery less as a movement *toward* truth and more as one *away* from current scientific orthodoxy. In terms of our old chestnut "justified true belief," Popper shifts the balance of forces from truth back toward justification, primarily in the negative sense of the latter term. After all, he is more interested in what experiment forces us to abandon than in what quantity of truth (if any) we might currently possess. As Lakatos puts it: "the most rigorous observance of Popperian method may lead us away from truth, accepting false and refuting true laws." [Lakatos, 1978, p. 186] Elsewhere, Lakatos notes a related consequence of Popper's philosophy: that scientific theories can no longer be judged instantaneously or in isolation, but only over a considerable period of time, and only by comparing them with their rivals. Lakatos also made stunning application of Popper's fallibilist principles to the philosophy of mathematics in his celebrated *Proofs and Refutations*, whose title and subtitle (*The Logic of Mathematical Discovery*) show clear Popperian verbal and conceptual influence [Lakatos, 2015]. Indeed, Lakatos was initially a bit starstruck when he encountered the older thinker: "Popper's ideas represent the most important development in the philosophy of the twentieth century […] Personally, my debt

to him is immeasurable: more than anyone else, he changed my life. I was nearly forty when I got into the magnetic field of his intellect." [Lakatos, 1978]

Yet Lakatos did not remain a Popperian, and the reason why is crucially important for this article. In one sense, the innovation of Lakatos beyond Popper was simply to question whether "crucial experiments" really exist. Scientists never work with a single theory but with a "research program," a phrase referring to a general viewpoint on scientific problems beyond any specific theoretical commitments. One of the chief results of this shift is that while individual falsifications are treated by Popper as automatic crises for the adherents of a theory, Lakatos deems research programs to be robust to numerous falsifications as long as no better theory is available (a point already made by Kuhn, incidentally) [Kuhn, 2012, p. 80]. As Lakatos puts it: "Each research program, at every moment of its existence, has unsolved problems and undigested anomalies. All theories, in this sense, are born refuted and die refuted." [Lakatos, 1978, p. 5] This is true of even the greatest scientific figures: "When Newton published his *Principia*, it was common knowledge that it could not properly explain even the motion of the moon; in fact, lunar motion refuted Newton. [Walter] Kaufmann, a distinguished physicist, refuted Einstein's relativity in the very year it was published." [Ibid.] Whereas falsifications are precious gems for Popper, Lakatos regards anomalies as a dime a dozen, surrounding us at all times like the sellers of fake Rolex watches who crowd our bus terminals. In something of a paradox, this leads Lakatos back to the privilege of verifying evidence, which his former mentor Popper had so disliked in the Vienna Circle. That is to say, one of the best signs of a successful scientific research program is its ability to make surprising predictions that are eventually confirmed: the periodicity of Halley's Comet in the case of Newtonian physics, the bending of starlight and explanation of Mercury's anomalous perihelion for Einstein. Yet this is just one application of Lakatos's wider conception of research programs, which can be divided into two basic types: (1) progressive, and (2) degenerating [Harman, 2019]. Progressive research programs not only make occasional bold and successful predictions, but also grow larger over time, "bustling with activity" as they go [Lakatos, 1978, p. 128]. By contrast, degenerating research programs tend to invent *ad hoc* hypotheses to explain away any refuting evidence they might encounter. Although Lakatos holds that such *ad hoc* measures are also a sign of robustness shared by all programs, degenerating ones do little else but produce them.

Over time degenerating programs become narrower and more self-abosrbed, to the point that Lakatos recommends refusing both funding and publication avenues to degenerating work. But how can we know when a research program has become truly undeserving? Here we find one of the main points of criticism aimed by Feyerabend at his friend Lakatos:

> [T]here is no rule that tells the scientist to remove a degenerating pro-
> gram – and rightly so, for a degenerating program may recover and come
> out on top […] It is "rational" to pursue a research program on its degen-
> erating branch even after it has been overtaken by its rival. There is there-
> fore no "rational" difference between the methodology of Lakatos and
> the "anything goes" of the anarchist [Lakatos, Feyerabend, 1999, p. 116].

Lakatos himself seems somewhat conflicted about how to deal with non-progressive research programs. Alongside his volcanic threats to bar degenerating programs from the sphere of legitimate scientific society, we also find statements of remarkable tolerance and patience: "[T]he method-ology of scientific research programs does not offer instant rationality. One must treat budding research programs leniently: programs may take decades before they get off the ground and become empirically progres-sive." [Lakatos, 1978, p. 6] This obviously cuts against the grain of La-katos's harsher policy, showing that the Hungarian-born philosopher is no less committed than Feyerabend to lengthy suspensions of judgment in the face of new research programs. Yet something in Lakatos clings to the idea of a less tolerant "rationality," and it is not hard to understand why: as seen earlier, he views Feyerabend as a sceptic in the mold of the ancient thinker Pyrrho [Lakatos, Feyerabend, 1999, p. 296]. For Lakatos, this not only has the epistemological downside of treating all opinions as inherently equal; it also leaves us defenseless against the power of the strong. For "there is only one type of political philosophy consistent with scepticism: the philosophy that equates *might* with *right*. This is why many sceptics be-came well-paid courtiers of the bloodiest tyrants in history." [Ibid., p. 13] Similar critiques have been made of Latour, as I have discussed elsewhere [Harman, 2014]. Lakatos's claim, in short, is that good politics requires po-litical *knowledge*, or at least convincing progress towards such knowledge. Far from denying these charges – though he saw himself as politically benevolent – Feyerabend seems to relish the accusation of scepticism. Against his friend's claims on behalf of rationality, Feyerabend exclaims "the truth be damned," while praising both "mob psychology" and Dadaism [Lakatos, Feyerabend, 1999, pp. 249, 257, 295]. Yet Feyerabend prefers the label of "anarchist" to that of "sceptic." In his own words: "[w]hile the sceptic either regards every view as equally good, or equally bad, or desists from such judgments altogether, the epistemological anar-chist has no compunction in defending the most trite, or the most outra-geous statement." [Ibid., p. 14] It was presumably in this same spirit that Feyerabend would sometimes invite a warlock or an astrologer to address his classes at the University of California at Berkeley, a rebellious practice he clearly enjoyed reporting to others.

Incommensurability

What we seek in this article is fallibilism without scepticism. As mentioned, fallibilism often entails the harmless but inadequate view that we have a certain amount of knowledge ("justified true belief") at our disposal even though much still remains – at least for now – unknown. We still find such a view defended for instance by Markus Gabriel, a prominent contemporary New Realist philosopher [Gabriel, 2024]. An alternative seems present in Feyerabend's anarchist standpoint, though he seems to remain a sceptic anyway through his distrust of the word "truth." Since a short article like this one is ill-equipped to deal with Feyerabend's major books *Against Method* and *Farewell to Reason*, we turn instead to "Consolations for the Specialist," solicited for a 1965 London conference devoted to Thomas Kuhn's masterpiece *The Strucutre of Scientific Revolutions* [Feyerabend, 2010; 1988; Kuhn, 2012].

The initial portion of the article gives the impression of Feyerabend as a stern and frustrated critic of Kuhn, if somewhat apologetically so [Feyerabend, 1970, p. 205]. Whereas Kuhn argues that the rigid work done under a scientific paradigm helps shape a profession positively, Feyerabend appears to view this as a sign of authoritarian leanings on Kuhn's part [Ibid., p. 198]. Although this verdict srtikes me as excessive, it does enable Feyerabend to make an interesting critical point. After all, it is true that Kuhn views the alternating rhythm of normal and paradigm-shifting science as stretched out in historical time, thereby implying that only certain periods in the history of science are appropriate moments for dissent. Against this, Feyerabend makes a solid case for treating normal and revolutionary (or "philosophical") science as existing simultaneously [Ibid., pp. 208, 211]. This allows him to place greater emphasis on the proliferation of multiple competing theories at any point in the history of science: a much better fit with his "anarchist" vision of anti-authoritarian and hedonistic humans pursuing their own passions rather than marching in lockstep with consensus tyranny [Ibid., p. 212]. Against the widespread assumption of a historical *Weltgeist* that smoothly links all simultaneous trends in a seamless whole, Feyerabend rightly emphasizes the way in which different portions of human knowledge exist "out of phase" with each other. Some fields are making rapid progress at any given moment, while others languish in crisis or bask in second-hand banality [Ibid., p. 205]. Offering a brief but brilliant case study, Feyerabend recalls how the physics of the mid-nineteenth century was actually made up of three separate but incompatible strands, their interactions eventually paving the way for the approaching downfall of classical physics at the hands of Max Planck and others from 1900 forward [Ibid., p. 207]. All this is well worth contemplating, since it poses a fundamental challenge to Kuhn's vision of how science unfolds in historical time.

Yet the main theme of Feyerabend's article emerges later, and concerns a point of basic *agreement* between him and Kuhn: scientific incommensurability [Feyerabend, 1970, p. 219]. Both authors refer primarily to the incommensurability of scientific theories with each other, rather than a lack of common measure between a theory and the world itself [Ibid., p. 204]. Feyerabend dismissed the direct comparison of theory with reality as relatively rare, while Kuhn remained puzzled to the end of his life about the extent to which he was or was not a realist who believed in a single outside world. The two were colleagues at Berkeley for a short time in the early 1960s, and clearly profited from their conversations there. They are on record as saying they have no clear memory of who first used the term "incommensurability," though both initially used the term in print in 1962 [Kuhn, 2012, p. 219]. One aspect of incommensurability, accepted equally by the two, is that knowledge need not be cumulative: a conceptual revolution loses as much as it gains, since the older paradigm it replaced will often have given brilliant explanations of many issues not even touched upon by the new one [Ibid.]. Consider the way in which modern medicine, for all its excellence, has lost an inestimable amount of knowledge concerning indigenous herbs and homepathic treatments, some of them dating back to hard-won Neolithic *sagesse*. Kuhn's favorite example is what he calls the incommensurability between the physics of Newton and Einstein. For example, although the word "mass" occurs in both systems, it does not refer to the same thing in the two cases, since for Newton mass is conserved while for Einstein it is convertible with energy [Ibid., p. 102].

Feyerabend echoes this sentiment with his claim – often made by Kuhn as well – that perfect translations are never possible [Feyerabend, 1970, p. 225]. Drawing on the child psychology of Jean Piaget, Feyerabend cites the difference between (a) what objects first mean for children, who initially regard them as something like fleeting visual afterimages, and (b) their later belief in self-enclosed material things independent of the mind [Ibid., p. 223; Piaget, 2013]. In any case, we cannot hold that our knowledge "resembles" the world, given Popper's estimable suggestion that discovery takes us *away* from previous theories rather than *toward* the truth: in other words, we cannot really speak of verisimilitude when assessing scientific claims [Feyerabend, 1970, p. 227]. This makes for a radical gap between theory and reality, thus ensuring that the "true" part of the phrase "justified true belief" comes under suspicion in a way not attempted in the arguments of Gettier or Zagzebski. Justification still remains operative, though in the primarily negative sense of justification via falsification of the alternative (Popper) or of contrast with other, less progressive theories (Lakatos). This is the first sense in which fallibilism must take on "weird" form, recalling once more that this is a technical term referring to the gap between any entity and itself. The gap in question is the one between supposed knowledge and its object, given

the impossibility of bringing them onto the same wavelength. It is much like the way that a globe and a map are not commensurable, since maps require distortion of either the shapes or sizes of the earth's land masses.

Retroactivity

The second of the gaps is found not in Popper, Lakatos, or Feyerabend, but is openly present in Kuhn, though he seldom emphasizes it enough. The topic arises twice in *The Structure of Scientific Revolutions*: first in connection with the discovery of oxygen, and then in the history of X-rays. In the former case, the two primary contenders for having discovered oxygen were Joseph Priestley and Antoine Lavoisier, though it is interesting that neither can make a clear claim to the honor: both scientists misidentified the gas at first, Priestley thinking it was nitrous oxide and Lavoisier "the air itself entire." Kuhn's conclusion is that oxygen was discovered at some point between 1774 and 1777, with no greater precision being possible. He toys with the important formula that it was first discovered *that* oxygen is before it was determined *what* it is, a pair he links tentatively with the familiar opposition between discovery and invention [Kuhn, 2012, pp. 66–67]. In the case of Wilhelm Röntgen and x-rays, a similar hesitant path was followed in the opposite direction, though it involved just one person over a much shorter period of time: "We can only say that X-rays emerged in Würzburg [Röntgen's home city] between November 8 and December 28, 1895." [Ibid., p. 58] These two examples can be treated as preludes to Kuhn's definitive treatment of retroactivity, in his book on Planck and so-called black-body radiation: the very topic from which quantum theory was born [Kuhn, 1987]. What Kuhn argues in his book is that Planck "discovered" the quantum in 1901, but only as a mathematical solution. Not until 1909, in the wake of objections from figures as weighty as Paul Ehrenfest and Albert Einstein, was Planck forced to "invent" the quantum as a genuine smallest physical unit of nature. These conclusions by Kuhn are stranger than they seem, since they entail that a theoretical object exists out of phase not just with reality, but even with its own qualities. This demonstrates the abiding problem with David Hume's dogmatic empiricist slogan that an object is merely a bundle of qualities: after all, we never really have a good handle on the qualities possessed by an object [Hume, 1978]. In this way, retroactivity provides a second argument for a weird fallibilism.

Given that theoretical objects fail to match up both with (a) reality, and (b) their own qualities, it is interesting to ask what this double criterion of weird fallibilism might mean for the old principle that knowledge is justified true belief. One immediate implication, I think, is that truth and justification simply cannot travel together. Since no piece of evidence

for anything can ever be final and unshakeable, justification can only pro-
vide mediated evidence that encourages something like provisional be-
lief. It should be clear that science is more a matter of justification than it
is of truth, given the fallibilist principle that there is always some degree
of mismatch between belief and reality. As for truth (at least in the sense
of correspondence), I suggest it to be impossible not "because there is no
objective reality," but precisely because there *is* such a reality. Most read-
ers will admit that there is a big difference between any given thing and
the knowledge of that thing. Even the most perfect concept of fire cannot
burn anything to the ground. But in what does this difference between
real and conceptual fire consist? The question is seldom posed, let alone
answered, though most philosophers seem to assume loosely that the real
fire differs from the conceptual sort by inhering in something called
"matter." But is it not far more likely that the qualities of fire in my mind
bear only a loose, quasi-visual resemblance to those of real fire? Yet here
we must stop, since the battle on this point will be with Immanuel Kant.
After all, the entire thrust of his argument against the ontological proof
for the existence of God is not so much his famous one-liner that "being
is not a real predicate," but Kant's openly stated view that imaginary and
real coins *do have the same qualities*, so that the difference between them
consists in their "position" relative to us [Kant, 1978]. The provisional
lesson of this article is as follows: despite his recognition of the gap be-
tween the in-itself and appearance, Kant is not enough of a fallibilist.

References

Aristotle, 2016 – Aristotle. *Metaphysics*, trans. C.D.C. Reeve. Indianapolis:
Hackett, 2016.

Berkeley, 1982 – Berkeley, G., K. Winkler (ed.) *A Treatise Concerning the Prin-
ciples of Human Knowledge*. Indianapolis: Hackett, 1982.

Brassier, 2007 – Brassier, R. *Nihil Unbound: Enlightenment and Extinction*. Lon-
don: Palgrave, 2007.

Descartes, 1993 – Descartes, R. *Meditations on First Philosophy*, trans. D. Cress.
Indianapolis: Hackett, 1993.

Feyerabend, 2010 – Feyerabend, P. *Against Method*. London: Verso, 2010.

Feyerabend, 1970 – Feyerabend, P. "Consolations for the Specialist," in: -
Lakatos, I. & Musgrave, A. (eds.) *Criticism and the Growth of Knowledge*. Cambridge,
UK: Cambridge University Press, 1970, pp. 197–230.

Feyerabend, 1962 – Feyerabend, P. "Explanation, Reduction, and Empiricism,"
in: Feigl, H. & Maxwell, G. (eds.) *Minnesota Studies in the Philosophy of Science*.
Minneapolis: University of Minnesota Press, 1962, pp. 29–97.

Feyerabend, 1988 – Feyerabend, P. *Farewell to Reason*. London: Verso, 1988.

Gabriel, 2008 – Gabriel, M. *Antike und moderne Skepsis zur Einführung*. Ham-
burg: Junius, 2008.

Gabriel, 2024 – Gabriel, M. *The Human Animal*, trans. K. von der Luft. Cambridge, UK: Polity, 2024.

Gettier, 1963 – Gettier, E. "Is Justified True Belief Knowledge?," *Analysis*, 1963, vol. 23.6, pp. 121–123.

Gironi, 2012 – Gironi, F. "Between Naturalism and Realism: A New Realist Landscape," *Journal of Critical Realism*, 2013, vol. 11.3, pp. 361–387.

Harman, 2014 – Harman, G. *Bruno Latour: Reassembling the Political*. London: Pluto, 2014.

Harman, 2018 – Harman, G. *Object-Oriented Ontology: A New Theory of Everything*. London: Pelican, 2018.

Harman, 2009 – Harman, G. *Prince of Networks: Bruno Latour and Metaphysics*. Melbourne: Re.Press, 2009.

Harman, 2019 – Harman, G. "On Progressive and Degenerating Research Programs with Respect to Philosophy," *Revista Portuguesa de Filosofia*, 2019, vol. 75 (4), pp. 2067–2102.

Harman, 2020 – Harman, G. *Skirmishes: With Friends, Enemies, and Neutrals*. Brooklyn, NY: Punctum, 2020.

Harman, 2012 – Harman, G. *Weird Realism: Lovecraft and Philosophy*. Winchester, UK: Zero, 2012.

Heidegger, 1998 – Heidegger, M. "On the Essence of Truth," trans. J. Sallis, in: *Pathmarks*. Cambridge, UK: Cambridge University Press, 1998, pp. 136–154.

Hume, 1978 – Hume, D. *A Treatise of Human Nature*. Oxford: Oxford University Press, 1978.

Kant, 1978 – Kant, I. *Critique of Pure Reason*, trans. N. Kemp Smith. New York: St. Martin's Press, 1978.

Kuhn, 1987 – Kuhn, T. *Black-Body Theory and the Quantum Discontinuity, 1894–1912*. Chicago: University of Chicago Press, 1987.

Kuhn, 1970 – Kuhn, T. "Reflections on My Critics," in: Lakatos, I. & Musgrave A. (eds.) *Criticism and the Growth of Knowledge.* Cambridge, UK: Cambridge University Press, 1970, pp. 231–278.

Kuhn, 2012 – Kuhn, T. *The Structure of Scientific Revolutions, 50ᵗʰ Anniversary Edition*. Chicago: University of Chicago Press, 2012.

Lakatos, 1978a – Lakatos, I. *Mathematics, Science, and Epistemology: Philosophical Papers, Vol. 2*. Cambridge, UK: Cambridge University Press, 1978.

Lakatos, 1978b – Lakatos, I. *The Methodology of Scientific Research Programs, Vol. 1*. Cambridge, UK: Cambridge University Press, 1978.

Lakatos, 2015 – Lakatos, I. *Proofs and Refutations: The Logic of Mathematical Discovery*. Cambridge, UK: Cambridge University Press, 2015.

Lakatos & Feyerabend, 1999 – Lakatos, I. & Feyerabend, P.; M. Motterlini (ed.). *For and Against Method.* Chicago: University of Chicago Press, 1999.

Lakatos & Musgrave, 1970 – Lakatos, I. & Musgrave, A. (eds.) *Criticism and the Growth of Knowledge.* Cambridge, UK: Cambridge University Press, 1970.

Latour, 1999 – Latour, B. *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge, MA: Harvard University Press, 1999.

Latour, 1987 – Latour, B. *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge, MA: Harvard University Press, 1987.

Nietzsche, 2001 – Nietzsche, F. *Beyond Good and Evil: Prelude to a Philosophy of the Future*, trans. J. Norman. Cambridge, UK: Cambridge University Press, 2001.

Peirce, 2011 – Peirce, C.S. "The Scientific Attitude and Fallibilism," in: Buchler, J. (ed.) *Philosophical Writings of Peirce.* Mineola, NY: Dover, 2011, pp. 42–59.

Piaget, 2013 – Piaget, J. *The Construction of Reality in the Child.* London: Routledge, 2013.

Plantinga, 1988 – Plantinga, A. "Positive Epistemic Status and Proper Function," in: Tomberlin, J.E. (ed.) *Philosophical Perspectives 2: Epistemology.* Atascadero, CA: Ridgeview, 1988, pp. 1–50.

Plantinga, 1993 – Plantinga, A. *Warrant and Proper Function.* Oxford: Oxford University Press, 1993.

Plato, 2012 – Plato. *Meno*, trans. G.M.A. Grube. Indianapolis: Hackett, 2012.

Plato, 1992 – Plato. *Theaetetus*, trans. M.J. Levett. Indianapolis: Hackett, 1992.

Popkin, n.d. – Popkin, R. *The History of Scepticism from Erasmus to Spinoza.* Berkeley, CA: University of California Press.

Popper, 1980 – Popper, K.R. *The Logic of Scientific Discovery.* London: Routledge, 1980.

Popper, 1970 – Popper, K. "Normal Science and its Dangers," in: *Criticism and the Growth of Knowledge.* Cambridge, UK: Cambridge University Press, 1970, pp. 51–58.

Sartwell, 1992 – Sartwell, C. "Why Knowledge is Merely True Belief," *Journal of Philosophy*, 1992, vol. 89 (4), pp. 167–180.

Zagzebski, 1994 – Zagzebski, L. "The Inescapability of Gettier Problems," *The Philosophical Quarterly*, 1994, vol. 44 (174), pp. 65–73.