

Chapter 21

Against Metaphysics

1. Introduction

The rejection of metaphysics has been a fixture in empiricist thought since at least the positivist precursors of modern empiricism in the nineteenth century. It became a rallying cry for the logical positivists of the early twentieth century. Small-e empiricism retains this rejection but without the extremism of the logical positivists' denial of meaning to propositions in metaphysics. The primary basis of this rejection is the familiar empiricist complaint. There is no way to learn contingent truths other than through experience. In so far as metaphysics seeks such truths prior to the consideration of experience, it is ill-fated from the outset.

This principal empiricist objection, developed in Section 2, is to non-empirical metaphysics specifically, which holds that it can recover foundational truths of the world without drawing on experience. Small-e empiricism entails the inevitable failure of this project. For once experience has been abandoned, the only resource left to non-empirical metaphysics is the logical consistency of its posits. Mere logical consistency is too permissive and allows many competing narratives. Non-empirical metaphysics has no further resources that can distinguish among these competing narratives. The inevitable result is that debates in metaphysics persist indefinitely. Criteria such as simplicity and explanatory power fail to resolve these debates non-empirically, for, as it is maintained in the material theory of induction, such criteria are only potent if they are surrogates for specific background facts that are in turn supported empirically. Section 3 illustrates such languishing debates in cases in which the metaphysical claims are so structured as to escape empirical scrutiny. They concern claims for the reality of possible worlds, the reality of the past and future and Platonic methods in thought experiments.

Section 4 addresses the emergence of so-called "scientific metaphysics." It seeks to derive results in metaphysics empirically after the manner of empirical science, in contradiction with the traditional conception of metaphysics as prior to empirical science. For an empiricist, its

project is most welcome, in so far as it seeks to employ empirical methods. They are the best and only way to secure contingent results of foundational importance. What is unwelcome is the label “metaphysics.” For what results is the identification of the empirically derived, foundational content of individual sciences as metaphysics. The one term, metaphysics, now embraces two different projects: the methodologically ill-fated, non-empirical project of traditional metaphysics and the fertile, empirical project of the sciences. The first failed project accrues some unearned legitimacy by its association with the second, while the second is compromised by its association with the first.

Section 5 presents a second objection to metaphysics of comparable importance that has a lesser presence in the literature. A foundational assumption of traditional metaphysics is that its subject matter is common to all the sciences. The claim that routinely follows is that we can abstract away all the details of the concepts that distinguish their roles in particular sciences and be left with a substantial general metaphysics of these concepts that applies universally. That this abstraction returns substantial results cannot be legislated in advance. It must be established on a case-by-case basis. The assumption fails for two significant cases discussed in Sections 6 and 7: the metaphysics of possibility and the metaphysics of causation. For them, the abstraction is fatal to the ambitions of traditional metaphysics.

Section 8 continues the scrutiny of the metaphysics of causation by reporting a striking example of the misplaced ambitions of investigations carried out prior to empirical research. We are supposed to learn from these investigations of the impossibility of closed causal loops, of causation backward in time and of time travel backwards in time. Empirical inquiry into these questions is declared pointless since they have been decided a priori.

The following Section 9 responds to a common objection that empiricism cannot refute metaphysics because empiricism is itself a metaphysics. This *tu quoque* objection fails. Merely labeling the empirically founded arguments of this chapter as metaphysics reveals no flaw in the arguments. The concluding Section 10 reaffirms that non-empirical metaphysics must fail in its efforts to recover foundational truths prior to experience precisely because it forgoes the guidance of experience.

2. The Arbitrariness of Non-Empirical Metaphysics

2.1. Non-Empirical Metaphysics

The difficulty facing an empiricist critique of metaphysics is to identify the target of criticism. Accounts of metaphysics routinely begin with a lament that it is difficult and perhaps even impossible to define metaphysics.¹ My impression is that this reflects the fluid scope of metaphysics. Its subject matter and methodology have varied historically and still varies today from metaphysician to metaphysician.

We can, however, find sufficiently serviceable formulations. Lowe (2002, p.v) offers “a fairly traditional and still very widely shared [conception]” which is:

... that metaphysics deals with the most profound questions that can be raised concerning the fundamental structure of reality. According to this conception, metaphysics goes deeper than any merely empirical science, even physics, because it provides the very framework within which such sciences are conceived and related to one another.

What is important for present purposes is that, at least a sizeable community of metaphysicians, hold that metaphysics is inherently non-empirical. Lowe’s survey (2002) develops the characterization:

But metaphysics is not at heart an empirical science—it does not typically appeal to experimental or observational data in support of its claims. (p.2)

... metaphysical knowledge-claims are akin to mathematical knowledge-claims, which are likewise held to be non-empirical, in the sense that they are not answerable to empirical evidence for their support or confirmation. (p. 10)

The final assessment is that there is a division of labor and methodology between metaphysics and science. Metaphysics proceeds non-empirically to provide the framework of possibilities. After metaphysics has laid this essential groundwork, science proceeds empirically with the task of picking out which possibility is actualized: (p. 11, his emphasis)

Thus metaphysics, like mathematics, does have a non-empirical subject-matter, to the extent that it is the intellectual discipline whose concern it is to chart the

¹ The opening line of van Inwagen et al. (2025) is “It is not easy to say what metaphysics is.”

possibilities of real existence. Metaphysics is concerned to discover what the totality of existence *could* embrace: that is to say, what categories of entities could exist and which of them could co-exist. Having charted the possibilities, the question will remain as to which of many mutually incompatible possibilities for the fundamental structure of reality *actually* obtains-and this question can only be answered, if at all, with the aid of empirical evidence, and then only tentatively and provisionally.

This distinction between metaphysics as non-empirical and science as empirical is not uncommon. Kit Fine for example states it as: (2011, p.9)

It [metaphysics] is distinguished, in part, from physics and other branches of science by the a priori character of its methods. The claims of science rest on observation; the claims of metaphysics do not, except perhaps incidentally. Its findings issue from the study rather than from the laboratory.

Section 6 below provides a striking example in the metaphysics of causation. Its results are recovered antecedent to empirical investigations, yet they are supposed to restrict what empirical investigations can recover. None, we are assured, can affirm empirically closed causal loops, causation backward in time and time travel backward in time, for prior metaphysics has precluded them.

2.2 The Empiricist Critique: An Inevitable Failure

In so far as metaphysics seeks deep truths of the world non-empirically, then the empiricist critique is immediate and automatic. The *only* way we can learn of these deeper truths of nature is empirically, through experience. This restriction is the defining characteristic of small-e empiricism as developed above in Chapter 12. If non-empirical metaphysics seeks to inform us about contingent facts in the world that are not accessible to experience, it necessarily fails.

What happens if we persist with non-empirical investigations that seek to establish contingent facts that are not accessible to empirical investigation? Once the constraints of experience are removed, according to small-e empiricism, all that remains is the constraint of logical consistency. (There have been proposals for other constraints. I will discount them in Sections 2.5 below.) Mere logical consistency is too weak a constraint to produce definite results. The best outcome that can be achieved is an internally consistent system of putative

facts. Logical consistency admits very many such systems that differ widely in their factual content. We have no means to decide which among them is actual. One system may prevail in the literature through the rhetorical prowess of its promoters. It may remain so until their efforts are eclipsed by the prowess of their detractors. From this perspective, it is not at all surprising that results in non-empirical metaphysics are unstable and that endless, inconsequential debates persist in non-empirical metaphysics. The field has no enduring means to decide them.

This instability applies to debates over contingent propositions that are inaccessible to experience. If the propositions are accessible to experience, then empirical investigations can override the a priori considerations. A striking example is recalled in the discussion of causal metaphysics below, in Section 5.5. No lesser figure than the great Isaac Newton declared on a priori grounds that gravitation could not be an action at a distance. Extensive empirical investigations in the nineteenth century gave strongest support to gravitation as an action at a distance. These empirical investigations simply eclipsed a priori hesitations about action at a distance. It was established, at least temporarily, as empirical science.

This power of empirical evidence to decide questions is routine in the empirical sciences. In areas in which sufficient empirical evidence is available, a unique science emerges and remains stable. That stability is not lost because someone finds a more convincing way to reframe the science. Mature sciences with rich empirical foundations easily resist such efforts. It takes novel empirical evidence to overturn them.

2.3 Conceptual Analysis

Might it be that non-empirical metaphysics can escape this empiricist objection when the analysis is limited to conceptual analysis? Here Jackson has defined conceptual analysis as: (2021, p. 396)

... conceptual analysis is in the business of clarifying and explicating what it takes, or if you like, how something has to be, to fall under some concept or other.

He has defended conceptual analysis as a part of metaphysics.

Conceptual analysis escapes the empiricist critique as long as it is limited to *defining* the conditions under which some concept would be instantiated in reality. The cost of the escape is high. In this limited capacity, conceptual analysis is an a priori activity. Offering definitions does not take us to the goal of metaphysics, “the fundamental structure of reality.” The same difficulty facing non-empirical metaphysics remains. The a priori activity of defining concepts is

constrained only by logical consistency; and logical consistency is a weak constraint that admits vastly too many concepts. For any concept that may suggest a factual constraint on reality, there will be counter-concepts that negate them; and many more that mediate between them. The sheer enormity of choices is just too great for tractable exploration by an armchair theorist. Logical consistency gives us no way to decide among them.²

Conceptual analysis can illuminate the fundamental structure of reality if, in addition, we have some confidence that a select few of these many concepts are or may be instantiated in reality. That confidence cannot come from reflecting on concepts a priori. That confidence can only come, empiricism insists, from engagement with reality through experience. In this empirically informed practice, conceptual analysis no longer belongs within non-empirical metaphysics, but is an instance of an investigation, informed empirically in essential aspects.³

In practice, conceptual analysis has never been rigidly and exclusively a priori. Concepts are conceived and introduced in response to real puzzles in experience. How are we to think of the present, past and future? What can we say about the stuff around us? Things happen? Which? May they? Or must they? All these scenarios provide a posteriori guidance as to which few concepts of the many logically admissible may draw experiences into a unified account. As a result, these factual conditions drawn from experience are reflected in the concepts themselves so that the overall analysis has an ineliminable, a posteriori component.

In short, in so far as conceptual analysis is purely a priori, it escapes the empiricist objection, but is unable by itself to deliver the goal of metaphysics: to discern the fundamental

² For example, we may conceive, as they did in the 19th century, that causation is just determinism, so that a causal world must be factually deterministic. A counter-concept is that of a completely chaotic world in which any past regularity is a coincidence that may not be sustained in the future. A mediating concept proposes some partial dependency of the future on the past. We can eventually decide among the vast array of possibilities, but only by finding which is picked out by experience.

³ Kölbel (2023) has articulated a version of the tension between non-empirical and empirical conceptual analysis as a dilemma and has explored its consequences, along with a helpful inventory of relevant literature.

structure of reality. In so far as conceptual analysis can contribute to this goal, it relies ineliminably on a posteriori elements and thus extends beyond non-empirical metaphysics.

2.4 What this Critique is Not

The empiricist critique of non-empirical metaphysics developed here falls within a long-established tradition of empiricist critiques of metaphysics. That tradition inclines towards extremes that I find untenable. My goal has been to present a narrowly confined critique that retracts from the extremes of these earlier critiques. It depends only on the empiricist commitment to experience as the sole basis for learning about the factual world. It is inductively optimistic. We can learn inductively truths of the world beyond experience. We need not disparage propositions in non-empirical metaphysics as meaningless. They fail because of their arbitrariness.

In Chapter 2, we saw the repudiation of metaphysics in the nineteenth century positivist tradition of Comte and the sensationalism of Mach. Theirs was a blanket renunciation of everything in science that went beyond simple relations among observables. It is a form of anti-inductivism that contradicts small-e empiricism. Comte renounced abstract forces and Mach decried Absolute Space. Small-e empiricism is inductively optimistic. Abstract forces and Absolute Space are quite admissible, as long as there is good inductive support for them in experience. If an empirical investigation includes them, there is no objection of principle, for the empirical investigation is simply drawing here on what is responsible science.

In Chapter 3, we saw that the logical positivists of the early twentieth century introduced a still more extreme version of the empiricist critique in the form of the verifiability criterion of meaning. Initially, a proposition was judged meaningless if it could not be verified, that is proven true, by experience. Later versions moderated this extreme view. A proposition could be meaningful in Reichenbach's probability theory of meaning if some non-zero probability could be assigned to it. To assail the meaning of propositions is an excusable response when applied to the excesses of Carnap's idealistic contemporaries. Otherwise, it paints with too broad a brush. Consider propositions in ordinary discourse that assert the existence of God or that living beings are animated by a life force. We may differ on their truth, but they are clear enough to have a meaning. An account of meaning that cannot return this has failed ordinary discourse.

As already sketched in Chapter 12, Section 8 above, the small-e empiricist critique of non-empirical metaphysics takes no general position on the meaningfulness of the metaphysical

propositions. Some may well be meaningless and other meaningful. They fail, not for lack of meaning, but for their arbitrariness.

2.5 Naturalized Methodology

The small-e empiricist critique of non-empirical metaphysics is based on the assumption that there are only two resources available to a scientifically responsible metaphysics: inductive inference from experience and logical consistency. This assumption can be challenged. It is routine for scientists to resort to considerations of simplicity or explanatory power and in ways that may not seem to draw directly on the support of experience.

Might non-empirical metaphysics remain scientifically respectable if it relies on apparently non-empirical criteria such as simplicity and explanatory power? Emery (2023) has explored this possibility in what she calls “methodological naturalism.” (p.4) Its guiding principle is a laudable “whenever possible, use the same methodology that scientists use.” (p. 4) Emery found within this methodology “extra-empirical principles”: (p. 5)

Examples of potential extra-empirical principles are principles like “Choose the simplest theory that is consistent with the data” or “Choose the theory that provides the best explanation of the data.” These principles allow us to choose between multiple theories—all of which are consistent with the data—on the basis of other features.

The proposal is that such extra-empirical principles may allow us to decide metaphysical questions in a scientifically responsible manner, when the decision lies beyond the reach of empirical data: (p. 5)

For while it is unclear how the empirical data that we collect would ultimately decide debates about composition or personal identity or possible worlds, a principle like “Choose the simplest theory that is consistent with the data” might very well do so.

This is a view, Emery continues, that can be found already in nascent forms in the writing of established metaphysicians such as Quine, Sider, Zimmerman, Hawthorne and Paul.

The viability of such a naturalized methodology has already been challenged by earlier writers. A notable example is Bryant’s (2020) critique of what she calls “free range metaphysics.” It is metaphysics in which science has a merely nominal or minimal role. Its

analysis is constrained by extra-empirical principles comparable to those of Emery. Bryant considers: (p. 197)

consistency, simplicity, intuitive plausibility, and explanatory power

Bryant (Section 2) then argues for the failure of each of these vehicles. She argues, as I do above, that logical consistency is too permissive. Her objections to the remaining vehicles are substantial.

Here I can amplify them through a single consideration of principle. The material theory of induction, defended in my (2021, 2024), is founded on the claim that all such vehicles are epistemically potent only if they are surrogates for particular background facts in the domain of the specific inductive inference. These vehicles may appear to operate independently of empirical support from experience, but that is an illusion. Contingent assertions about the background are only epistemically potent if they are truths; and our only means to ascertain their truth is empirical. This consideration is quite general. It applies to the vehicles of Bryant's list and to any addition we may consider. They will turn out to be epistemically potent only if they depend indirectly on the empirical support of experience.

A brief examination of Bryant's list illustrates how this works. My (2021, Ch.6-7) reviews our failure to find any factual principle of simplicity or parsimony. A celebrated example of the application of simplicity is in curve fitting. The standard approach is to present a hierarchy of functions, such as the constant, linear, quadratic, cubic, etc. and to proceed stepwise up the hierarchy until one is found that fits the data well enough. The method depends critically on the particular hierarchy of functions chosen. Its selection, if done properly, must reflect the factual conditions of the particular problem. My (2021, Ch.8-9) closely examines the argument form of inference to the best explanation. The difficulty facing any general formulation of such an argument form is the range of different accounts of explanation, none of which is entirely satisfactory. In examining a list of notable examples of inference to the best explanation in the history of science, I found no case in which the result depended on an epistemically potent concept of explanation. Rather all the cases fitted a simpler model in which no philosophical account of explanation actually played a role. Finally, we may allow that intuitive plausibility can be epistemically potent, but only if the intuitions are informed by suitable experiences, for which they are surrogates. Otherwise, intuitive plausibility just reflects unguided hunches. The frailty of intuition has been explored further here already in Chapter 12, Section 7 above.

3. Languishing Debates

The ways in which non-empirical metaphysics outstrip empirical assessment is quite familiar to readers of the metaphysics literature. This section gives examples of a familiar, indecisive dynamic. Claims are made for which there is no empirical or experiential manifestation. Hence there is no way empirically to determine their truth. Cases can be made for and against each view. However, we lack the resources to mount a decisive case either way. The debate languishes. The mere logical consistency of a case is too weak; and the extra-empirical principles are too elastic to give univocal guidance.

3.1 Possible World Realism

David Lewis (1986) has proposed a realism about possible worlds. Imagine some fantasy world of the wildest fiction. It is real, Lewis insists, for (p. 2, his emphasis) “absolutely *every* way that a world could possibly be *is* a way that some world is.” One can of course construct elaborate narratives which favor the reality of a fantasy world with talking donkeys. Lewis defends this possible world realism for its parsimony and explanatory prowess in unification: (p. 4)

We have only to believe in the vast realm of *possibilia*, and there we find what we need to advance our endeavours. We find the wherewithal to reduce the diversity of notions we must accept as primitive, and thereby to improve the unity and economy of the theory that is our professional concern—total theory, the whole of what we take to be true. ... The benefits are worth their ontological cost. Modal realism is fruitful; that gives us good reason to believe that it is true.

A critic can take these same criteria and come to the opposite conclusion. Stalnaker (1976) makes the obvious point that the considerations of parsimony can be found to speak against Lewis’ view: (p. 68)

Even a philosopher who had no qualms about abstract objects like numbers, properties, states and kinds might balk at this proliferation of fullblooded universes which seem less real to us than our own only because we have never been there.

Correspondingly, in a direct response to Lewis’ claim above, Stalnaker (1988) inverts Lewis’ assessment of the costs and benefits: (p. 121, his emphasis)

But I think the cost tends to undercut the benefit. Just as the nominalist may say to the fundamentalist Platonist, ‘how can propositions about *those* [mathematical] things be relevant to the practice and applications that are why we value mathematics?’ so we may say to the modal realist, ‘how can the existence of other worlds be relevant to the modal, probabilistic, counterfactual, mental and semantic concepts we use to describe ourselves and our actual environment?’

The decision reduces to differing prescriptions how the predicate “real” can be applied.

Competing narratives give competing prescriptions. There is no way to use experience to decide between them, for all the possible worlds, excluding the actual, are by supposition outside our experience.⁴

3.2 Presentism and Eternalism

The same problem of the arbitrariness of the attachment of the predicate “real” arises in the philosophy of time. The simplest form of the debate is between presentism and eternalism. Presentism holds that all that is real is the present moment of time. Eternalism holds that all moments, past, present and future, are equally real. There are further variations. The growing block model attributes reality just to the past and present, but not the future. The controlling difficulty is that all these models agree on the empirical physics of space and time. Whether we judge a past or a future event to be real or not makes no difference to how Einstein’s field equations of general relativity are applied and to the mathematical spacetimes that result.

The outcome is familiar. The debate between presentism and eternalism endures because neither side can produce decisive arguments. There is a frequent sense of matched forces. For example, both presentism and eternalism struggle with the problem of the truth-makers of propositions. What is it in the world that makes propositions true? Presentism is challenged to display the reality that makes propositions about the past true, since past events have no reality. Eternalism is challenged to explain why future events are not presently determined, since their

⁴ A complication is that the many worlds interpretation of quantum mechanics authorizes the reality of multiple worlds corresponding to a decomposition into components of the world’s Hilbert state vector. I leave open whether their reality enjoys empirical support. Lewis’ possible world realism extends well beyond, since it includes possible worlds in which all the fundamental constants of physics have different values.

truth-makers in future events are eternally true. In his introductory review of the *Oxford Handbook of the Philosophy of Time*, Callender (2011, p. 3) summarized the opposing positions as:

... the presentist's temporally impoverished resources are insufficient to allow him or her to say that statements about the past or future are truth-evaluable. The claim that "there were dinosaurs in the Mesozoic Age" is not made true or false by anything on the present time slice, or at least, not obviously so. So the presentist faces a quandary: the claim is true, yet there is nothing that makes it so.

Correspondingly, the eternalist faces the complications of a surfeit of real moments:

If the future is real, and our choices are "already" made, in what sense can we do otherwise? If I was "always" a philosopher in 2010, did I really have a choice about professions in 1990? Similarly, if the future is real, and the outcomes of our chancy processes are "already" occurrent, then in what sense is the chancy process genuinely chancy? If the coin "always" landed heads at a specific toss, in what sense did that roll have a 50 per cent chance of landing tails?

We need not linger over whether attributing reality to past and future events is meaningful. What matters here is that the attribution manifests in no way in experience; and that leaves presentists and eternalists without adequate means to make a decisive case either way. The debate will continue. Each side will develop an account of truth-making that favors their view, but the mere consistency of each is inadequate to preclude the other.

Many further considerations have been raised in this inconclusive debate. Eternalism finds comfort in the fact that our best theory of space and time, general relativity, employs a four-dimensional spacetime in which all events, past, present and future are treated equally.⁵

⁵ A complication is that relations of simultaneity in the special theory of relativity differ according to the inertial motion of the observer. This fact can be developed to argue against presentism and for eternalism. I have reviewed why the argument is tendentious in https://sites.pitt.edu/~jdnorton/teaching/HPS_0410/chapters/significance_3/index.html#L5178 In any case, the Minkowski spacetime of special relativity is exceptional. The sorts of spacetimes that are closer to that of our actual universe are ones like the Schwarzschild spacetime of a sun-

Presentism is favored by our subjective experience that the moment of the “now” is distinct from all past and future moments. Each view responds. Presentism objects that eternalism fails to distinguish any moment as this special “now.” Eternalism portrays the now awkwardly as a subjective experience of we sentient beings as our brains mete out the moments serially to our consciousnesses.

In a reaction to the arbitrariness of the attachment of “real” to events in spacetime, I proposed (2015) the “burning fuse” model of time. In it, future events are real, but lose their reality when they pass through the present to become past. I wrote it as a spoof and offered what I thought were parodies of the sort of arguments used in the presentism-eternalism debate. I have since found that the model appears in inventories of views about time as the “shrinking block” model, although described (in Ney, 2014, p. 143) as “a rarely held position.”

These last considerations are just a small part of the enduring but inconclusive debate over the non-empirical metaphysics of time. The *Oxford Handbook* cited above has 23 chapters and the question of the reality of the past and future appears in one way or another in almost all of them. Neighboring debates concern McTaggart’s A and B series for time. The A series attributes the predicates “past,” “present” and “future” to events. The B series attributes only the relations “earlier than” and “later than” to pairs of events. Another is the debate over endurantism and perdurantism. Endurantism asserts that objects exist wholly at each moment of time, whereas perdurantism asserts that it is only a temporal part of each object that exists at each moment. The debates over these positions persist because nothing in experience can decide them.

3.3 Thought experiments

A third example can be reviewed briefly. Brown (1991) has argued that we can learn non-empirically of the laws of nature through a thought experiment. The vehicle is Platonic vision. Through certain sorts of thought experiments we are able to intuit, that is, see in our minds, the laws of nature as they reside in the Platonic world of forms. As a counterpoint, I have defended an empiricist account of thought experiments. They are merely picturesque arguments that can inform us of the world only because they rely on empirically founded premises. In (2004), I challenged the Platonic view with pairs of thought experiments, such that each member of the

like object and the Friedman-Lemaître-Robertson-Walker spacetimes of cosmology. They all admit a unique relation of simultaneity.

pair arrives at a conclusion that negates the other. My empiricist account can determine which, if either, succeeds, most commonly by identifying fallacious reasoning. The Platonic account has no intrinsic means to separate the successful from the unsuccessful thought experiments. We are to assume that Platonic vision in at least one case was clouded, but how we are to separate clouded from clear vision is left open.

The difference between presentism and eternalism has no empirical expression in our best physical theories of space and time. Correspondingly, whether the Platonic account of thought experiments is true or not makes no difference to the practical analysis of thought experiments. All that can usefully be said about the epistemology of time and of thought experiments is already captured in their empiricist analyses.

4. Scientific Metaphysics

4.1 Scientific Metaphysics is not Traditional Metaphysics

That metaphysics does or even should proceed non-empirically is not a view universally held. The problem raised above for non-empirical metaphysics provides good reasons for the hesitation. The response is work in a field called variously “scientific metaphysics” or “empirical metaphysics” or “naturalized metaphysics” or “experimental metaphysics.” It is distinguished by its use of the sort of empirical evidence common in the sciences and by efforts to mimic the methods routinely used in science.

Kincaid (2013, p. 3), in the introduction to a collection of papers on scientific metaphysics, gave this characterization:

... 1) an extreme scepticism about metaphysics when it is based on conceptual analysis tested against intuition, and about any alleged a priori truths that such intuitions and analyses might yield; and 2) the belief that scientific results and scientific methods can be successfully applied to some problems that could be called metaphysical.

In so far as these scientific results and scientific methods are committed to proceeding empirically from experience, they are most welcome to an empiricist like me. Empirical methods are the best and only way to secure contingent facts at the foundations of science.

What is concerning is the continuation of the use of the term “metaphysics.” There is a fundamental tension between the worthy project of proceeding empirically in the manner of

empirical science and the traditional conception of metaphysics. For metaphysics is traditionally defined in a manner that contradicts an empirically founded conception of scientific metaphysics. The methods of metaphysics are traditionally understood as non-empirical. Its analyses are prior to that of any empirical science and its results are at a level of generality that transcends any one science, but extends to all of them.

This ambitious conception is stated routinely when the scope of metaphysics is defined. Here are some instances of it. Lowe (2002, p.2) allowed that metaphysics deals with topics also dealt with in empirical science, such as the nature of space, time and causation. However, he insisted that its methods are not empirical: (p. 2)

But metaphysics is not at heart an empirical science—it does not typically appeal to experimental or observational data in support of its claims.

Lowe stressed that the subject matter of metaphysics transcends any specific science: (pp. 2-3, his emphasis)

... its central concern is with *the fundamental structure of reality as a whole*. No special science—not even physics—can have that concern, because the subject-matter of every special science is identified more narrowly than this: for instance, biology is the science of living things, psychology is the science of mental states, and physics—as I have already indicated—is the science of those states and processes (energetic states and dynamic processes, for example) which are apparently common to all things existing in space and time.

Earlier in the text, Lowe had already described how metaphysics precedes empirical investigation since it provides a framework within which empirical investigations can proceed: (p. v, his emphasis)

According to this conception, metaphysics goes deeper than any merely empirical science, even physics, because it provides the very framework within which such sciences are conceived and related to one another. A core text in metaphysics written from this point of view must aim, first and foremost, to elucidate certain universally applicable concepts—for example, those of *identity*, *necessity*, *causation*, *space*, and *time*—and then go on to examine some important doctrines which involve these concepts, such as the thesis that truths of identity are necessary and the claim that temporally backward causation is impossible.

Le Poidevin (2009, p.xx) gave a characterization of metaphysics in terms of its subject matter:

[It is] concerned with what it is to be or be real, with what things there are, with the way that they are, and with the connection between the way things are and what things there are. And all this is pursued at a higher level of abstraction than typifies any of the special sciences like physics, geology or chemistry.

Williamson (2013, p. 3) repeats the conception of metaphysics as antecedent to those of empirical science:

What is metaphysically necessary is what could not have been otherwise, what would have obtained whatever had obtained; not even the laws of physics can be assumed to be metaphysically necessary in this sense.

4.2 Individual Sciences as Metaphysics

These last characterizations of metaphysics characterize the content of metaphysics as antecedent to empirical science and more general than any particular science. In the later part of the twentieth century, an alternative conception became common in philosophy of science. The mere study of the foundations of a particular science came to be called “metaphysics.” This alternative conception directly contradicts those just reported in the last subsection. It is the most important manifestation of what is now called scientific metaphysics.

How this variant usage arose in philosophy of science requires more detailed investigations than have been carried out here. However, we can track major moments in the transition. To begin, the logical positivists’ disparaging of metaphysics in the earlier twentieth century left an enduring cloud over metaphysics in philosophy of science. Metaphysics continued to be discussed in many places, but commonly with hesitant qualifications. Consider its treatment in Neurath’s *International Encyclopedia of Unified Sciences*. Morris (1938-1955) in his contribution “Scientific Empiricism” to Volume 1, Part 1, dismissed metaphysics with: (p. 73)

All knowledge forms in principle one unified whole, and there exists no system of knowledge (such as metaphysics, aesthetics, ethics, religion) alongside of or superior to unified sciences.

Metaphysics then still had a small enough presence in philosophy of science for Ernest Nagel’s 1961 *Structure of Science* to include the word just once in an incidental role (p. 187) in all its 618 pages.

The concept of metaphysics retained a comparably dubious status in philosophy of physics. Philipp Frank's (1938-1955) article, "Foundations of Physics," in Volume 1, Part 2, of the Neurath encyclopedia identified dubious understandings of quantum mechanics as "metaphysical interpretations." He wrote, under that heading: (p. 481)

49 Metaphysical Interpretations of Wave Mechanics

Quite a few authors have maintained that by the new mechanics an "irrational element is introduced into physics" or that "physics is now supporting an idealistic word [*sic*, "world"?] picture" or that "physics is now in agreement with the doctrine of free will" or even that "by the wave mechanics for the first time in the history of human thought the conflict between religion and science has been settled." If we pursue precisely the analysis of the logical structure of the new mechanics, we will understand that there is no foundation for all these philosophical interpretations of the new mechanics.

The fortunes of the term "metaphysics" soon reversed. In his 1978 "Metaphysical Problems in the Foundations of Quantum Mechanics," a leading philosopher of physics, Abner Shimony, identified key novelties in the foundations of quantum mechanics as "metaphysical."⁶ A decade later, Shimony (1989) amplified this casual use of the term "metaphysics" into something more programmatic. The principal application remained the foundations of quantum mechanics. However, Shimony now expanded the applications to other sciences. They included (pp. 63-64) general relativity for its demonstration that spacetime has substance-like properties through its dynamical interactions with matter; and molecular biology for its elimination of the need for vitalistic conceptions of life. Shimony summarized his view as: (1989, p.64, his emphasis)

It is legitimate, in view of all these rich results, to speak of the enterprise of *experimental metaphysics*.

The idea that the foundational results of quantum mechanics simply are results in metaphysics took hold, as did the idea that foundational work in quantum theory pursues "experimental

⁶ They were that the superposition principle entails that quantum systems may lack definite values for certain properties; and that the state of entangled systems may have no complete, local specification.

metaphysics.” The term was the title of a 1997 collection of papers⁷ in quantum mechanics, written in Shimony’s honor. Subsequently, it is became routine for foundational work in quantum mechanics to be identified as “metaphysical.”

It is interesting to speculate on the reasons for this reversal. My suspicion is that it stems from the enduring antipathy among physicists in the 1970s towards the sort of foundational work Shimony was pursuing in quantum theory. Those pursuing this sort of work found a more congenial intellectual reception among philosophers. That relieved them of the need to establish the value of their work among physicists. More metaphysically minded philosophers would, for their part, welcome a rehabilitation of metaphysics from novel work in the foundations of physics. Or so I surmise.

The idea that foundational work in a specific science can count as metaphysics has become commonplace in the decades after Shimony’s work. Here are two illustrations among many. Jackson (2021) has identified principal foundational results of the special theory of relativity (STR) as metaphysics: (p. 398)

STR is a thesis in metaphysics. This is because it is a thesis about the nature of the world we occupy. Among other things, STR holds that there is no absolute simultaneity at a distance. A victory salute in a soccer stadium in Brazil cannot be simultaneous with one in Italy in any absolute sense. The salutes can be simultaneous relative to some given inertial frame, but when they are, they will fail to be simultaneous relative to some other inertial frame.

In a short *Companion* entry, Leslie (2009) equated cosmology and metaphysics: (p. 195, his emphasis)

Cosmology. In a wide sense, *cosmology equals metaphysics*: reality studied philosophically. This entry will instead discuss the study of the cosmos at large scales, using data from astronomy and physics.

The idea of “experimental metaphysics” has spread beyond physics to work in so-called experimental philosophy, which is a study that draws heavily on empirical work in psychology.

⁷ Cohen, Horne and Stachel (1997)

A recent collection of papers (Rose, 2017) has the title, *Experimental Metaphysics*, and specifies its goal as: (p. 1)

The aim of this volume is to take up the question of how experimental philosophy can contribute to metaphysics.

4.3 Empirical and non-Empirical Metaphysics: a Misleading Unity

That empirically-based, foundational work in specific sciences is called “metaphysics” may seem benign. It does contradict the traditional conception. Should we just conceive of it as an expansion of the traditional conception? The worst harm, we may suspect, is just that the meaning of metaphysics is broadened and thus diluted into vagueness. Everything is metaphysics, as long as it is not too specific in its content.

From a small-e empiricist perspective, matters are otherwise. It is dangerous to expand the scope of metaphysics to encompass the empirically-derived foundations of individual sciences. For it combines activities of quite different legitimacy. One, non-empirical metaphysics, is so methodologically flawed as not to be a reliable way to learn contingent facts of the world. The other, empirical investigations, is, according to small-e empiricism, the only reliable way to learn contingent facts of the world.

Combining them risks the misunderstanding that both non-empirical and empirical methods are capable of achieving the same end, a unified body of foundational results called metaphysics. Under this misunderstanding, we would be free to use non-empirical or empirical methods to the same end. The choice is a matter of expedience and even personal preference. The combination masks the ineffectiveness of non-empirical methods and detracts from the effectiveness of empirical methods. It encourages the idea that an artful enough application of non-empirical methods might replace the vastly more onerous empirical methods. The proximity of well-supported results in empirically well-founded science lends an unearned legitimacy to the otherwise unfounded results claimed in non-empirical metaphysics. That same proximity detracts from the legitimacy of empirically well-founded results in a science, since they are grouped with results that do not enjoy the same legitimacy.

An analogy might capture the concern of small-e empiricism. Both astrology and astronomy deal with celestial phenomena. It would surely be most unwelcome to empirical astronomers for the two fields to be merged into a single field, called either astrology or

astronomy. For astrology is an enterprise that has failed in its methods and results, where empirical astronomy has enjoyed immense success in both. They do not belong together.

Are the risks sketched realistic? We have an example in the last subsection. I quoted Jackson's (2021, p.398) assertion that "STR is a thesis in metaphysics." The passage quoted reported Einstein's empirically well-founded result of the relativity of simultaneity. The passage quoted is followed immediately by a claim routinely made in writing on the metaphysics of time: (pp. 398-99)

A plausible thesis about the concept of existence implies that presentism and STR cannot be true together. ... There is no sense to something existing relative to such and such, but not existing relative to so and so. ... We have, therefore, a plausible example of a conceptual claim (about existence) telling us that one thesis in metaphysics (STR) implies the falsity of another thesis in metaphysics (presentism).

I have already argued in the last section that a decision between presentism and eternalism depends on an arbitrary attachment of the predicate "real," which is associated with no empirical manifestation. The illusion now presented is that a non-empirical assertion, the failure of presentism, is somehow supported by the empirically well-founded results of another branch of metaphysics, the empirically well-founded results of special theory of relativity.

5 The Problem of Fatal Abstraction⁸

5.1 The Assumption

The problem of fatal abstraction arises from an assumption that is fundamental to traditional metaphysics. Each of the concepts investigated in this metaphysics will have many manifestations. The assumption is that we can abstract away all the specifics that distinguish the different manifestations and be left with something non-trivial of universal applicability. That commonality provides the substance of the metaphysics. We saw an example of this assumption in the characterizations of traditional metaphysics sketched in the last section. Le Poidevin

⁸ I failed for once to resist momentary cultural references in titles. "Fatal Attraction" is a 1987 psychological thriller movie starring Michael Douglas and Glenn Close. The problem was first sketched in Norton (2022, Section 12.4).

(2009, p.xx) remarked that metaphysics is “... pursued at a higher level of abstraction than typifies any of the special sciences...” Here is another formulation, given by Craig: (2005, p. 656)

Metaphysics is a broad area of philosophy marked out by two types of inquiry. The first aims to be the most general investigation possible into the nature of reality: are there principles applying to everything that is real, to all that is? – if we abstract from the particular nature of existing things that which distinguishes them from each other, what can we know about them merely in virtue of the fact that they exist?

Loux (2006, p.x) endorses a similar scope for metaphysics in a tradition that he traces back to Aristotle:

On this conception, metaphysics is the most general of all the disciplines; its aim is to identify the nature and structure of all that there is.

5.2 The Problem

The difficulty with this assumption is that it cannot be legislated in advance. Whether an abstraction produces something non-trivial has to be determined on a case-by-case basis. I will argue in the following sections that the assumption fails in two important cases, the metaphysics of possibility and the metaphysics of causation.

There are likely many other cases that cannot be recounted more fully here. The metaphysical fascination for laws is one. There are many regularities of great scope found empirically by the sciences. The goal of a metaphysics of laws is to abstract away the particulars of the regularities that locate them within specific sciences and thereby to recover a universally applicable account of laws. It was already noted in Chapter 12, Section 8.4, that such efforts have failed, for we have been unable to find exceptionless, well-supported regularities. Efforts to embellish an account of laws by introducing further metaphysics only deepen the difficulties. We might seek an account of laws in terms of natural kinds or universals. For Armstrong (1983, Ch.6), for example, laws are relations of necessitation between universals. We now have the added burden of defending these further metaphysical conceptions against the objections laid out in this chapter.

Another likely case of fatal abstraction is a newer topic in metaphysics, “grounding.” It offers a general characterization of how one thing can depend on another. Although I will not

pursue it further here, it does appear to depend on a fatal abstraction. Wilson (2014) has argued that the general conception is too weak to be illuminating, but that particular cases of grounding are better understood by looking at the particular way that the dependencies have arisen.⁹

These abstractions are fatal for the metaphysics, for once they are carried out, nothing of substance remains. The project of traditional metaphysics fails. There may be a deeper reason behind these failures. The assumption is that behind the intricate complications we find in many aspects of the world, there is a unifying simplicity of a type that can be captured by the generalizations of metaphysics. It would be a great kindness if the world was organized around the sorts of simplicities that we find comprehensible and form the substance of traditional metaphysics. The examples of the failures of the assumption are striking enough to preclude optimism for this kindness. To stretch the anthropomorphism, it appears that the world feels no obligation to organize itself such that it conforms with the simple generalities of metaphysics.

The problem of fatal abstraction arises for traditional metaphysics quite generally. It is, however, most troublesome for empirical metaphysics that seeks results of broad generality. For the problem challenges the methodology that such an empirical metaphysics would employ. That is, it would first find instances of the metaphysical conception and then seek to discern the generality common to all the instances. If the problem of fatal abstraction applies, there is no common generality to be discerned.

6. Metaphysics of Possibility

6.1 The Empiricist Conception of Possibility

The problem of fatal abstraction is acute for the metaphysics of possibility if we seek an empirical foundation for it. In Norton (2022), I explored the prospects for an empirically based account of possibility. The scope of such an account is quite limited. It must base its judgments of possibility and necessity on the evidence of experience. Thus, all judgements of possibility and necessity are relational. A proposition can only be judged possible or necessary with respect to some specific body of evidence. The formulation developed in Norton (2022, p. 129) is given in the paper's abstract as:

⁹ See Bliss and Trogden (2021, Section 3.2) for discussion of this and further concerns about grounding.

What is possible, according to the empiricist conception, is what our evidence positively allows; and what is necessary is what it compels. These notions, along with logical possibility, are the only defensible notions of possibility and necessity. The paper teases out, at some length, the consequences of this empiricist analysis. They conflict, to a great extent, with familiar results in the literature on the metaphysics of possibility that purport to have universal applicability. Here are a few of these conflicts.

A repeated source of the conflicts is that strong inductive support, no matter how strong, is fallible. That means that no necessity, in this account, can be assured absolutely as a truth. A simple example is the law of the conservation of energy. It is one for which we have the most massive support in our science and is very strongly supported on all our evidence. Thus, if any proposition in science meets the empiricist criterion of a necessity, then it is the law of the conservation of energy. Precisely because even the strongest evidence leaves open the chance of failure, there have been, from time to time, cogent proposals for its failure. They do have some evidence in their support, even if very weak. But that is all that is needed for a judgment of possibility. A simple example arises in the steady state cosmology of Bondi and Gold from the mid twentieth century. They proposed that an expanding universe can maintain a constant average matter density as long as a small amount of mass-energy was popping randomly and repeatedly into existence throughout the cosmos.

It follows that the familiar possible world semantics fails. According to it, a necessity is a truth in all possible worlds. The necessity of the conservation of energy is not a truth in all possible worlds, for it fails in worlds conforming with Bondi and Gold's cosmology. Repairs to the semantics are possible, but they are not simple and the difficulties can only be hinted at here. The semantics must now incorporate the body of evidence used for judgments of possibility and necessity. If we translate the strong inductive support of a proposition into truth in most possible worlds, we need to develop an account of this "most."

6.2 Modal Logic Misapplied as a Metaphysics of Possibility

It seems to be fairly widely accepted that the modal logic S5 captures the metaphysical notions of possibility and necessity.¹⁰ For an empiricist, the idea is quite implausible. The notions of possibility and necessity are rich and complicated. The axioms of S5 are few and

¹⁰ See for example Williamson (2013, 2016).

simple, yet they are supposed to apply across all domains in which possibility and necessity arise. The axioms are readily seen to fail for the empiricist conception.

To begin, consider the axiom “ $\Box A \rightarrow A$ ”, that is, informally, for a proposition A , if A is necessary, then it is true. Under the empiricist conception, A is necessary if it has strong inductive support, but, since such support is fallible, its truth is not guaranteed.

The duality of the operators of possibility $\Diamond$ and necessity $\Box$ are expressed as “ $\Box A \rightarrow \sim \Diamond \sim A$ ”, if A is necessary then it is not possible that A is false. This duality is violated by the example of the conservation of energy. If, $\Box A$, energy is necessarily conserved, then it is possible that energy conservation is false, $\Diamond \sim A$.

Finally, we have “ $\Box A \rightarrow \Box \Box A$ ” that if a proposition is necessary, then it is necessary that it is necessary. Iterating, we have that, if the proposition is necessary, then it is necessary that it is necessary ...and so on finitely often, “ $\Box A \rightarrow \Box \Box \Box \dots \Box A$ ”. If necessity is strong inductive support, then this iteration fails. That is easiest to see if we represent strong inductive support by high probability, such as 0.99. Repeated iterations correspond to repeated multiplications $0.99 \times 0.99 \times 0.99 \times \dots \times 0.99$, which will eventually yield an arbitrarily small probability.

It may be helpful to consider an instantiation of this iteration. A signal is to be sent from a source location along a noisy telegraph wire. The signal is to be picked up at a sequence of repeater stations. Each reports to the next station that a signal was received; and each report is correct with probability 0.99 and incorrect with probability 0.01, due to its mistaking of noise for a signal. A positive report from the first repeater station amounts to a probability of 0.99 that the signal was sent. A positive report from the second repeater station amount to a probability of 0.99×0.99 that the signal was sent; and so on.

The general conclusion from this empiricist analysis is that possibility and necessity are intrinsically inductive notions. One might harbor a hope that something in inductive logic itself might allow us to see how the notions are governed by simple regularities. They may not be the axioms of S5 but they may be something of comparable simplicity. The material theory of induction dashes such hopes. Its core assertion is that there are no universally applicable rules of inductive inference. Thus, there can be no simple rules governing strong inductive support that can be sustained universally, that is, across all the manifestations of judgements of necessity.

In short, under this empiricist analysis, the material theory of induction entails that the metaphysics of possibility will suffer the problem of fatal abstraction.

7. The Metaphysics of Causation

7.1 The Expanding Variety of Causes

The metaphysics of causation also fails because of the problem of fatal abstraction. It is an established empirical fact that things in the world connect together in all sorts of interesting ways. Forces accelerated bodies. Voltages drive currents. Chemical potentials advance chemical reactions. Selective pressures lead to the evolution of biological species. Aspirin reduces fever and inhibits blood clotting. And so on, in innumerable more cases across all sciences. The goal of a metaphysics of causation is to abstract away all the particulars from this expanding collection of varied connections to recover a simple, unifying narrative. It is to encompass this great variety and thereby capture the fundamentally causal nature of reality. In a series of papers (Norton, 2003, 2007, 2009, 2016) and most recently Norton (2024a) I have argued that causal metaphysics has failed to find a unifying narrative that has any definite factual content.

To preclude confusion, this conclusion derives from my empiricism, but it is *not* a Humean skepticism about causation. For Hume's skepticism is based on Hume's inductive skepticism. Where Hume was an inductive pessimist, small-e empiricism is based on an inductive optimism.

Small-e empiricism allows that we can learn contingent truths inductively from experience that extend well beyond experience. In so doing, we find a great variety of factual dependencies in the world. Their range is ever growing. Opening each new domain of inquiry brings dependencies of a new character. At any stage of our learning, we may fit a simple, overarching narrative to those dependencies such as is sought by causal metaphysics. No such narrative survives when new dependencies are learned. This failure is no basis for epistemic pessimism. We do possess an ever-growing and rich repertoire of dependencies in the world. As we shall see in the brief survey that follows in the next subsection, what remains elusive is a unifying, simple narrative. If the long history of failed efforts to find one teaches us something, it is that the variety of dependencies in the world is inexhaustible and not subsumable under such a simple narrative. That is, attempts to abstract away the particulars of the many cases in this variety is fatal. It leaves nothing non-trivial behind.

This failure is most troubling for a non-empirical metaphysics of causation. Each failed attempt at a unifying metaphysics of causation is a failure of the non-empirical mode used to arrive at it. We saw in Chapter 12 that these modes are unable to explain their failure. All we learn from the repeated failures is that these modes are unproductive. Matters are only slightly better for an empirical metaphysics which tries to discern its content from experience. We do learn that things in the world connect in repeatable and reliable ways. These are the regularities that form the content of science. What an empirically informed metaphysics should learn from the endless variety of the connections found through experience, is that they do not conform with a simple, overarching metaphysics of causation.

7.2 No Factual Principle of Causation

The goal of a metaphysics of causation is to identify how causation governs processes in the world at a foundational level. If that identification is factual, it will be expressed in a principle of causality that circumscribes universally the sorts of processes that can occur in the world. As my papers cited above recount in more detail, efforts to find such a factual principle have failed repeatedly.

We may start a brief review in the seventeenth century of the continuing vacillations over how causation factually restricts processes in the world. A unifying theme in the new thinking of the seventeenth century was a repudiation of Aristotle's four component conception of causation: efficient, material, final and formal causes. Three of Aristotle's causes were to be discarded and only one, efficient cause, was viable. Even the great Isaac Newton insisted upon a severe restriction on which causal processes were admissible. He dismissed the idea of action at a distance as a novice scientist's mistake: (Newton, 1761, pp. 25-26.)

[T]hat one body may act upon another at a distance through a vacuum, without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity, that I believe no man, who has in philosophical matters a competent faculty of thinking, can ever fall into it.

The irony was that by the nineteenth century, the gravitational forces of Newton's physics came to be begrudgingly accepted as just this action at a distance. An authoritative Teubner Encyclopedia article summarized the best empirical results on gravitation at the end of the nineteenth century. They favored gravitation as action at a distance. Empirical investigations,

Zenneck (1901) reported, had failed to find any empirical manifestation of an intervening medium that could carry gravitational action (§17, pp. 42-43) and had also failed to place a finite limit on the speed of propagation of gravitation (§20, pp. 44-46). A priori speculation on the possibility of action at a distance was overridden and eclipsed by empirical investigations.

In the nineteenth century a new, purified conception of causation prevailed. It was purged of all elements except one. The principle of causality asserted only the determinism of all processes. The present state of the world fixes its future state. When quantum mechanics was discovered in the early twentieth century, this nineteenth century dogma of determinism was found empirically to fail. This failure was characterized in apocalyptic terms as the failure of causality.

Bridgman, writing later in 1959, recalled his resistance to the chanciness in newly emerged quantum theory, when he wrote his 1927 *Logic of Modern Physics*. It derived from a prior commitment to causality as requiring determinism that controlled his thinking as well as that of others like Einstein. Bridgman wrote: (1959, p. 519)

This I said on page 117: “We cannot permanently be satisfied with a picture of radioactive phenomena which represents radioactive disintegration as a matter of chance.” I suppose I said this because I thought that the requirement for determinism and causality, perhaps in the guise of a principle of sufficient reason, was an inescapable requirement of any thought that could be called rational. In this I was in good company, for I suspect that such an opinion is back of the intransigent refusal of Einstein and others to accept “chance” as in any sense an ultimate component of the world. The reason I have changed is that I have seen it demonstrated that it is not an inescapable requirement of our thought; I have seen others learn, and I have myself learned, how to think without this requirement.

Causal metaphysics soon recovered from this loss of determinism. The nineteenth century dogma of determinism was replaced by the new twentieth century dogma of probabilism. In the new conception, causes do not determine their effects. Rather, they raise the chances of the effect. Here chances are identified with probabilities. Mellor has asserted his complete confidence in the dogma: (1995, p. 21, his emphasis)

The first point I must make about chances is that they are *probabilities*. My other claims about chance may be contentious, but not this one: everyone measures chances by numbers which satisfy the standard calculus of probabilities.

This new dogma fares no better than the nineteenth century dogma of determinism. Of course, there are many cases of processes that are governed by probabilities and that do conform with the conception of causes as probability raisers. The problem is that this conception does not apply universally to all processes. Chances and indefinitenesses in general are not always well represented by probabilities. For an entry into the literature that recounts this failure of probabilism, see Norton (2021, Ch. 10-16; 2024a).

Efforts to find a factual principle of causality persist, but without success. There is continuing interest in “Curie’s principle.” It derives from Pierre Curie’s nineteenth century investigations in crystallography and asserts that a symmetry of a cause must be replicated as a symmetry of its effect. Norton (2016) argued that the principle has no independent factual content. In applying it, we can render it as true or false according to how we choose to map its terms onto the cases at hand. In another context, Norton (2009) argues that this same vagueness about exactly what counts as a cause and an effect compromises a recent attempt to formulate a principle of causality as the requirement that an effect cannot precede its cause in time. A recent literature has proposed various ways that causation places factual restrictions on the prospects for downward causation between different levels in scientific theories. Norton (2024a, Section 8-9) recounts their failure.

7.3 The Pragmatic Value of Causal Labeling

We may have hoped that identifying a process as causal would assure us that it conforms with some foundational, factual restriction on things in the world. The above discussion shows that such a factual restriction has proved elusive. We can still find a pragmatic value in causal labelling, without the labels imposing factual restrictions on processes.

Causal labels can assist our psychological understanding in the sense of allowing us to form more serviceable mental images. The voltage difference and amperage of an electric conductor are linearly related. We understand the relationship better if we are told that the voltage difference *causes* the current flow that is measured by the amperage. We can picture it as similar to how water pressure pushes water to flow in a pipe and even just how our muscular action sets ordinary objects into motion. Norton (2024a, Section 4) recounts a more substantial

example in Einstein's "*A and B coefficients paper*" of 1917 in which the foundations of LASER technology are laid down. One of the processes is described causally as "stimulated emission," even though it is fully specified as a relationship between the ambient electromagnetic field and the probability of an electric charge state transition.

Causal labels can also enhance communication. Woodward's (2003) interventionist account of causation identifies a process as causal if an intervention on one variable is associated with changes in another variable. There is no factual principle of causality presumed in this definition. It is an empirical matter as to whether there are any processes that conform with the many clauses of Woodward's full definition. However, being told that a process is identified as causal in the interventionist sense, tells us a lot in a few words. For then we know that we can use the process to manipulate what is identified as the effect by intervening on the cause.

8. Causal Metaphysics as Failed a priori Science

This last use of causal language is benign as long as it is restricted to the introduction of pragmatically useful definitions, without any prior requirement that the world must instantiate them. A neighboring conception is not benign. According to it, causal metaphysics provides us causal concepts that are to be instantiated by subsequent empirical investigations. If that prior causal metaphysics is used to restrict factually what can happen prior to empirical investigations, then it is a form of ill-fated, a priori science.

Such a priori science arises in Mellor's metaphysics of causation. He remarked: (1995, p. 5, his emphasis)

So while I will accommodate the relevant results of modern physics, I will not for example leave it to quantum physics to tell me whether causation can act immediately across spacelike intervals. On the contrary: only when our metaphysics as told us what causation is can we see if physics *could* reveal unmediated action at a distance (it couldn't).

Mellor continued, in an adventurous spirit, to insist on how spacetime *must* be on the strength of his causal metaphysics. He concluded (pp. 234-35) that there can be no causal loops and thus there must be a single linear dimension in spacetime whose direction is given by the direction of causation. He concluded: (his emphasis)

So if that dimension *is* time, this fact shows why any possible spacetime, however many spatial dimensions it has, can have only one time dimension. More: it shows that any possible world with laws, and hence chances and causability, must have at least one dimension, that of time, even if it has no space.

It then follows that: (p. 235, his emphasis)

... causes *must* precede their effects.

A further restriction on physics is derived from his strict causal metaphysics in Mellor's (1998) later monograph on time. He concluded in (1998, Ch.12) the impossibility of time travel, backward in time, such as would require a closed causal loop. This contradicts a modern literature that finds such time travel to be possible in an array of spacetimes arising in Einstein's general theory of relativity.¹¹ Mellor dismissed one of the first, Kurt Gödel's 1949 spacetime, and, presumably, the huge literature that followed with: (1998, p. 127)

... all it shows is that general relativity does not rule them [timelike loops] out, not that nothing does. (Gödel's argument illustrates the common and pernicious fallacy that nothing can show what physics cannot show, so that anything which is physically possible, i.e. consistent with physics, must be possible in fact.)

I do not see a pernicious fallacy at work. Rather, I see physics telling us how such loops would fit with present physics and giving us prescriptions for what we would need to do to detect them empirically. In the Gödel case, we would need to find the bodies of the universe in rotation *en masse* about us, which is not the case. If there is a tendentious idea present, it is Mellor's folly in believing that a priori reflections on what causation must be can pre-empt what empirical investigations can yield.

Lowe (2002, p. 332) has a similar view on the possibility of backward causation and time travel.

... empirical science alone cannot definitively determine the answer to a question concerning metaphysical possibility, such as the one with which we are now concerned, although I do not wish to deny that scientific theorizing and empirical

¹¹ As an entertaining exercise, Norton (2025) describes a spacetime that is everywhere locally like that of special relativity excepting for a singularity. In it, a freely moving spaceship can end up encountering its past self and also find itself aging in the opposite time sense.

data can throw useful light on a question like this. The key point is that empirical data can only be taken to be good evidence for the truth of a scientific theory if its hypotheses are already entitled to be viewed as expressing metaphysical possibilities: that they can be so viewed is not, thus, something that can be determined on merely empirical grounds.

Once again, non-empirical, a priori reflections are to pre-empt what can be found empirically.¹²

9. Empiricism as Metaphysics: the *tu quoque* objection

I expect that, at some point, someone will object that my critique is itself a part of metaphysics and thus it is self-refuting. This *tu quoque* (“you too”) defense of metaphysics is common. For example, Lowe (2002, p. 2) considered the view that metaphysics extends beyond the reach of the physical sciences and responded:

Of course, physicalist philosophers may want to challenge this view: but then they are engaging precisely in a metaphysical debate, not one which belongs to the province of physics itself.

A *tu quoque* defense is generally weak and, in this case, clearly fails. Whether the present critique is labeled as a part of metaphysics or not does not undo any of the specifics of the criticism. The field designated by metaphysics is so diffuse that the label of metaphysics carries little discerning power. My principal objection is specifically to results claimed in metaphysics that concern the nature of reality that are not sustained empirically. My analysis is based on the proposal of small-e empiricism, which is a doctrine itself derived empirically. That empirical derivation includes the account of inductive inferences recommended for its implementation, the material theory of induction.

Someone pursuing this response might still want to press me on my allegiance to experience as the means of learning about nature. Is not that allegiance nothing more than a private metaphysics? Again, that the allegiance is labeled as metaphysics does not compromise its use against non-empirical metaphysics. The basis for my allegiance is not in some abstract, covert attachment to metaphysics. It has been laid out Chapter 12 above. There the argument is

¹² Lowe (2002, p. 334) “... as metaphysicians we are not absolutely committed to the truth of Einstein's theory.”

that relying on experience has been fertile, where other modes have not. If other modes are tried and come into conflict with experience, they will abandon any of their results that conflict with experience.

We may choose to doubt or abandon experience as a means of learning about the world. The prospects for such a choice are poor. To implement it, we may decide just to abandon the entire project of learning about the world. That is to choose needlessly a total ignorance. Or we may be more modest and adopt other methods in the place of experience. That policy is epistemically self-destructive. We choose to ignore the mode that has a proven history of correcting all other modes. It commits us willfully to another form of ignorance.

10. Conclusion: Metaphysics, Empiricists and Its Critics

A recent summary of unfavorable attitudes towards metaphysics was given by Manley (2009, p. 4). He distinguished “strong deflationists” (who find the disputes entirely misguided), “mild deflationists” (who believe the disputes can be resolved) and “reformers” (who find the disputes substantive but in need of novel approaches). My view aligns best with the strong deflationists. In the same volume on “metametaphysics,” the view that comes closest to the one developed here is Bennett’s (2009). It is restricted to debates over composition and material constitution. She concludes: (p.71, her emphasis)

There do not appear to be any real grounds for choosing between the competing positions about either composition or constitution. We are not justified in believing either side. These are basically cases of *underdetermination of theory by evidence*.
To metaphysicians who struggle with what they judge to be the deepest and most profound problems concerning the nature of things, my empiricist critique may well appear hasty, superficial and even lazy, for not engaging more deeply into the details of the metaphysical analysis. I am a “physicalist philosopher” whose critique of metaphysics appears to Lowe as misguided.

In response, may I report how elaborations of non-empirical metaphysics appear to me as a small-e empiricist? I do appreciate the intellectual creativity of work in non-empirical metaphysics. It seeks to illuminate the deepest foundational problems without the guidance of experience; and it must do it in a way that comports with the existing, elaborate canon of writing in non-empirical metaphysics. With these constraints, it is a significant intellectual achievement

to add to this canon. However, the achievement is just that of conforming with an existing canon. It is not a work of discovery of contingent facts because it lacks the essential element. The analysis proceeds without empirical foundation.

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