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ARTICLE

Relativizing the A Priori By Way of Reflective Judgement

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Abstract

An influential strand in philosophy of science claims that scientific paradigms can be understood as relativized a priori frameworks. Here, Kant's constitutive a priori principles are no longer held to establish conditions of possibility for knowledge which are unchanging and universally true, but are restricted only to a given scientific domain. Yet it is unclear how exactly a relativized a priori can be construed as both stable and dynamical, establishing foundations for current scientific claims while simultaneously making intelligible the transition to a subsequent framework. In this article, I show that important resources for this problem have been overlooked in Kant's theory of reflective judgement in the third *Critique*. I argue that Kant accorded the task of formulating new scientific laws to reflective judgement, which is charged with forming new 'universals' that guide the experience of nature. I show that this is the very task attributed to the relativized a priori: the constitution of a given *conceptual* framework, not of the conditions for object-reference as such. I conclude that Kant's considered conception of science encompasses the operations of both reflective and determining judgement. Relativizations of the a priori should follow Kant's lead.

Keywords: relativized a priori; constitutive principles; reflective judgement; scientific paradigms; scientific laws; Einstein; relativity theory; induction

1.

Recent developments in science, such as Einstein's theory of general relativity, have often been taken to refute the Kantian a priori. Where Kant imbued a priori status to Newtonian mechanics, seemingly enshrining it as eternally true, the supersession of classical mechanics by relativity theory demonstrated the dispensability of the Newtonian framework – and with it, the deficient nature of Kantian knowledge as structured by universal and fixed forms of human cognition. Yet one view in contemporary philosophy of science contends that a certain formulation of the Kantian a priori can be retained (Reichenbach 1920; Richardson 1998; Friedman 2001; Ryckman 2005; Massimi 2011; French and Massimi 2013; Heis 2013). Following the neo-Kantian tradition of the early twentieth century, adherents have claimed that remnants of the Kantian a priori can be salvaged by contextualizing, or *relativizing*, the

a priori to historically situated domains of knowledge or scientific paradigms. On this view, certain assumptions are indispensable for scientific inquiry, but these principles are not absolute or universal as Kant held them to be; instead, they hold only relative to a particular scientific context or framework. Relativizing the a priori, it has been claimed, can thus more fully account for the emergence of new scientific paradigms than rival theories.[1]

However, it has appeared less clear how precisely to understand the Kantian grounding of this relativized conception of the a priori. Commenting on the neo-Kantian movement in science, Einstein himself claimed that for Kant, 'a priori elements could not come into conflict with any future reasonable physical theory. . . . If one does not consider this goal to be attainable, then one should probably not call oneself a "Kantian"' (1924a: 500; see also Kitcher 2000: 89). Proponents derive resources from the constitutive synthetic a priori principles of understanding of the *Critique of Pure Reason*, which Kant takes to ground the Newtonian laws of motion: rejecting the meaning of the Kantian a priori as 'necessary and unrevisable, true for all time', they embrace a second sense, as 'constituting the concept of the object of knowledge', or establishing the conditions of possibility for a given scientific framework (Reichenbach 1920: 48; Richardson 1998: 112, 120; Friedman 2001: 72; French and Massimi 2013: 235; Heis 2014: 18–19).

Nevertheless, theorists of the relativized a priori call for a conception that is 'dynamical' or 'continuously evolving' as well as grounding current scientific claims, and thus aim to make sense of elements of the theory which *motivate* the possibility of change from one framework to the next. Yet it has proven difficult to cash this out adequately, since nothing within Kant's account of constitutive principles, given Kant's own view of them as unchanging and fixed, can accommodate such a conception.

In this article, I offer an alternate account of relativizing the a priori by looking to new Kantian resources in order to do so. Rather than appealing to the constitutive principles of understanding and regulative ideas of reason of the *Critique of Pure Reason* and *Metaphysical Foundations*, I suggest that the resources theorists need can be found in the *Critique of Judgement*. Where Kant characterizes the constitutive principles of understanding as necessary and unchangeable, while the regulative ideas of reason can play no direct role in generating knowledge, Kant advances the theory of reflective judgement from the outset as an account of how *new laws of nature are generated*.[2] Thus, Kant implicitly allows for the emergence of new possible scientific frameworks, while suggesting a procedure for accommodating more complex aspects of science for which the constitutive account of mechanical laws is deemed insufficient.[3]

As such, I claim that the right place to look for relativizing the a priori is to reflective judgement, not to constitutive principles of understanding or the regulative use of reason. Below, I lay out my own particular interpretation of reflective judgement, but I take myself to offer grounds for endorsing my programme even if some aspects of my interpretation might be challenged.[4] In particular, I show that it is reflective judgement which is responsible for forming *concepts* of objects, while the determinable principles of understanding constitute *objects* as given. It is the former sense, not the latter, which pertains to relativizing the a priori, insofar as theorists

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claim that each successive a priori frame constitutes a new conceptual framework for theorizing scientific objects rather than a new set of objects thereof.

I begin by examining weaknesses in predominant accounts of the relativized a priori. I claim that the emphasis on constitutive principles cannot make sense of the dynamic nature of the a priori once relativized. Yet privileging regulative over constitutive principles – or, as some have, bestowing a constitutive role on regulative principles – also faces major theoretical difficulties, given the way regulative reason is formulated by Kant as excluding any role in constituting knowledge.

I then argue that reflective judgement responds to the several desiderata that have been called for in relativizing the a priori: it is not strongly a priori, or eternally and necessarily true; it is constitutive – albeit not of objects, as Kant describes constitutive principles, but of *concepts* of objects; it accommodates the positing of new principles when current frameworks prove insufficient, and even where adequate conditions do not yet obtain for them to play a role in structuring an objectively valid theory. As such, it more elegantly accommodates the relativized a priori than either the derivation of scientific laws from constitutive principles of understanding or the regulative role accorded to merely ideal or aspirational elements of a scientific theory. I conclude by responding to objections that have so far precluded uptake of the resources in reflective judgement, and suggest some further ways of extending my account to outstanding issues in contemporary physics.

2.

I will start by examining why I take current relativizations of the a priori to merit reconsideration. Scholars have drawn from Kant's argument in the *Prolegomena* and *Metaphysical Foundations* that a privileged set of mathematical and geometrical a priori principles constitute the framework of possibility for Newtonian physics. Where Kant took *space, time,* or *causality* to constitute conditions of possibility for the Newtonian laws, contemporary accounts attribute a similarly privileged status to *spacetime* or to *probabilistic laws* as background conditions for general relativity.[5]

However, there is reason to suspect that this reliance on constitutive principles of understanding does not allow for a sufficiently rich account of relativization. For instance, Friedman describes the relativized a priori as 'dynamical', allowing for radical transformations from one a priori framework to the next (Friedman 2001: xii, 31, 41, 45–7, 63, 101, 118, 123; see also French and Massimi 2013: 232–3). Yet even though the universal and necessary status of Kant's a priori has here been nominally rejected, the fixed and unchanging status Kant confers on constitutive principles must be retained – at least *within* the perspective of the framework they make possible. After all, these principles can only fulfil the function accorded to them if they confer *stability* on, provide 'foundations' for, a set of empirical claims: 'The profound conceptual revolutions that have repeatedly shaken our knowledge of nature to its very foundations … is precisely [what] has revealed that our knowledge *has* foundations' in the first place (Friedman 2001: 46). A priori principles structure what is conceivable, such that changing them cannot even be construed as possible within the terms of the framework they establish. But transformations from one constitutive framework to the next *must* be possible in order for relativizing the a priori to even make sense. This is not a problem that faces Kant's own view of synthetic a priori

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principles as fixed and necessary, since Kant rejects the possibility that such principles can change. Yet in order to successfully relativize these structuring a priori principles, they must be construed as both fundamentally static – as conferring foundations for all other claims – and as 'radically transforming' (Friedman 2001: 21, 39) or 'continuously evolving' (p. 63).

As Friedman puts the point, 'What we end up with ... is thus a relativized and dynamical conception of a priori mathematical-physical principles, which change and develop along with the development of the mathematical and physical sciences themselves, but which nevertheless retain the characteristically Kantian constitutive function of making the empirical natural knowledge thereby structured and framed by such principles first possible' (Friedman 2001: 31). Yet it is not clear whether both conjuncts can consistently be held, at least on extant accounts – whether the constitutive function of enabling conditions of possibility can be retained in light of these principles 'developing along with' the sciences they make possible in the first place. As a response to this issue, Friedman (p. 101) argues that changes to a new framework are to be conceived as motivated internally within the existing one – as 'develop[ing] out of, and as a natural continuation of, the old concepts and principles', or 'developed against the backdrop of a common set of problems, conceptualizations, and concerns'. The shift from one framework to the next is thus not to be conceived as a radical rupture (as incommensurable or untranslatable, as on the Kuhnian view), but as a gradual process of 'continuous transformation' (p. 102).[6]

Unfortunately, however, there are few resources to be appealed to within the Kantian conception of constitutive principles alone in order to motivate this continual transformation. Friedman (2001: 102–3) insists on the continuity between frameworks, whereby, for instance, 'Einstein directly appealed to already accepted empirical facts and to already established conceptual resources and problems', thus stressing the retention of crucial features of pre-existing constitutive principles across frameworks. Yet of course it only makes sense to speak of a change in paradigm if there is some motive to move from one to the next, and thus some point of inadequacy *within* the constitutive function of the a priori principle undergoing the transformation.

In order to make sense of the dynamical nature of a priori principles as functioning across frameworks, Friedman supplements the constitutive account by taking recourse to Kant's theory of the regulative use of reason, on which 'the future evolution of science [is] not only framed by fixed and unrevisable constitutive principles', but is guided by 'regulative principles' that can only be asymptotically approached but never actually attained, and without which scientific progress would be halted 'dead in its tracks' (2001: 64). Under the direction of the regulative principles and ideas of reason, the constitutive principles must inevitably be viewed as inadequate or partial, undermining their stability in conferring the foundations of possibility for knowledge as such. The very function of the constitutive principles is thereby put into question – and indeed, it is this role accorded to regulative reason in informing the constitutive principles that has been singled out as what needs to be revisited and developed in future analysis (Friedman 2012: 50).

Indeed, building on Cassirer (1923), Ryckman (2005) has claimed that the constitutive principles of relativity theory should *themselves* be understood as regulative. Ryckman argues that Einstein accorded a constitutive role to spacetime as

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the background presupposition enabling the laws of general relativity, but only as a heuristic placeholder for a further regulative 'idea of reason', general covariance, which could not yet be realized within the governing terms of the theory. Thus, Einstein relied on spacetime as a constitutive framework conditioning the rest of the theory, while simultaneously viewing this framework *itself* as inadequate, partial and, ideally, dispensable. The principle of general covariance thus does not in fact obtain on Einstein's account, such that spacetime is still requisite as the absolute background against which the laws of relativity can be formulated – much like, Einstein 1924c noted, absolute space or the ether for Newtonian mechanics. Nevertheless, Ryckman argues that general covariance – not spacetime – is the ideal towards which Einstein aimed his development of general relativity. Thus, even after Einstein, further development of relativity has been directed towards banishing *any* conception of an invariant background framework or *any* role for 'absolute objects' which act but are not acted upon (including spacetime) – any role, that is, for wholly constitutive or 'a priori' grounding elements in structuring the theory – such that every element can instead be defined relationally (Rovelli 2001: 108).

Therefore, although the focus in most accounts of relativization has been on the significance of spacetime as constitutive of general relativity, Ryckman argues that the regulative role of general covariance was actually far more central in Einstein's own view than has been acknowledged (2005: 24). Indeed, while Ryckman does not note this, it may have played a role in Einstein's own rejection of neo-Kantian philosophy of science. In a critical review of the book *Kant and Einstein*, Einstein writes: '"Ideality" pertains to all concepts, those relating to space and time no more and no less than all the others. ... In my opinion, Kant had an unfavorable influence on [scientific] development by giving spatio-temporal concepts and their relations a special position in relation to other concepts' (1924a: 502).[7] Because Einstein downplayed the constitutive significance of spacetime as the fixed foundation for general relativity, and instead sought a more dynamical account on which any conception of 'space', 'time' or 'spacetime' would ultimately prove dispensable, he rejected any role for the a priori in his own philosophy of science.[8]

Ryckman thus attributes a *constitutive*, in addition to a regulative, role to the principle of general covariance, insofar as it 'constrain[s] the concept of possible object in field theory to objects that are "background independent"' and 'transform[s] the concept of "objectivity" in physics' (2005: 15). In other words, general covariance, while a merely heuristic placeholder for future revision of the theory, helps to specify the *content* of the theory, and thus contributes more substantively to it than the wholly general regulative maxims of systematicity or continuity do on Kant's account. Since for Kant regulative principles by definition cannot be constitutive, having no legitimate application to sensibility and thus no direct role in generating knowledge (*CPR*, A509–10/B537–8),[9] Ryckman claims that 'principles of invariance have both a "constitutive" and an ideal "regulative" a priori significance' (2005: 15), but acknowledges that this status can no longer be construed as 'constitutively a priori in Kant's sense' (p. 46). As such, Ryckman leaves it unclear how exactly a regulative element can be understood as also constitutive, since it can no longer be construed as constitutive in the Kantian sense. Conceptually speaking, how can an ideal which does not actually obtain within the terms of the theory play any role in *structuring*, establishing *foundations* for, the theory itself?

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Thus, Ryckman ends up at a point of difficulty that mirrors Friedman's: where Friedman seeks to explain how constitutive principles can be conceived as also regulative, Ryckman must account for how regulative principles can be construed as simultaneously constitutive. Moreover, such an impasse does not merely face relativizations of aprioricity in contemporary physics; the problem of accounting for simultaneously regulative and constitutive principles is also a fundamental one for other sciences, for instance in contemporary philosophy of biology (Zammito 2006: 766).

3.

We can take the suggestion of simultaneously constitutive and regulative principles to motivate *weakening* the constitutive force of general covariance. While covariance does not in fact obtain *within* the framework, Einstein claims that it nevertheless has 'significant heuristic force, which has already brilliantly proven itself in the gravitational problem that has been based on it' (1918a: 39); Ryckman (2005: 17) derives the constitutive status of the principle from this assertion of 'heuristic force'.

Interestingly, we can take Reichenbach to call for a similar weakening of the constitutive status of aprioricity – even though Reichenbach's reinterpretation of Kantian constitutive principles was one of the primary influences for contemporary accounts of the relativized a priori. Reichenbach famously claims, 'One of [the] meanings [of the a priori], namely, that the a priori statement is to be eternally true, independently of experience, can no longer be maintained. The more important does its second meaning become: that the a priori principles constitute the world of experience' (1920: 77). As discussed above, this claim has been interpreted as rejecting the first meaning of the a priori as universal, necessary and unrevisable in favor of affirming the second meaning of the a priori as constitutive (Richardson 1998: 131–2; Friedman 2001: 30; Ryckman 2005: 6; Heis 2014: 18–19). Yet Reichenbach parses the second meaning not in terms of the immediate constitution *of an object* as given, as Kant generally refers to it (e.g. 'constitutive ... for determining something in regard to its direct object', *CPR*, A680/B708), but as instead 'constitutive of the *concept* of [the] object' of cognition (1920: 48). Commentators have followed Reichenbach's formulation of constitutive principles, such that the constitutive status of the relativization has been similarly, if perhaps unwittingly, weakened: thus, Friedman claims that constitutive principles are 'constitutive of the concept of the object of scientific knowledge' (2001: 30, 72), constitutive of a given 'framework' (p. 62), or 'constitutive of the notion of "correctness" or "validity" relative to this framework' (pp. 31, 41–2), while Massimi (2011: 5) follows Cassirer in defending a view of science as mediated in its relation to objects by the 'concept of "function"'.[10]

While this point is not explicitly acknowledged, this meaning already importantly weakens Kant's own construal of constitutive a priori principles – where, for instance, the category of causality constitutes a condition of possibility for affirming a causal order in time, or the intuition of space for cognition of objects of outer sense – but is also somewhat stronger than mere regulative principles, which are interpreted as playing no role in establishing knowledge. Thus, for Reichenbach, a constitutive a priori principle serves as 'presupposition of scientific knowledge and not merely a subjective property of our sensations', where 'the object of knowledge is not

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immediately given but constructed, and … contains conceptual elements not contained in pure perception. Such a construction is not a mere fiction' (1920: 2, 49). Unlike Kant's construal of constitutive principles, Reichenbach's constitutive a priori principles are defeasible, and thus do not directly construct *objects* as given. Like Kant's regulative ideas, they are heuristics, albeit ones which do not run the risk of appearing as illusory 'empty thought-entities' (*CPR*, A670/B698).[11]

Thus, rather than rejecting the first meaning of Kant's a priori as universal and necessary while embracing its status as constitutive, I see relativizations of the a priori as weakening *both* meanings, while retaining aspects of each. In other work, I explain how I understand the weakened conception of necessity which is at play in these conceptions, which I relate to Kant's account of merely subjective necessity in reflective judgement (Vaccarino Bremner n.d.); in this article, my focus is on the weakening of the constitutive status of the a priori.

4.

Insofar as relativizing the a priori presupposes this weakened constitutive status, I submit that what theorists are ultimately interested in is not the constitutive role of understanding, but what Kant came to refer to as reflective judgement.[12]

The relevance of Kant's theory of reflective judgement for the relativized a priori has been rejected, insofar as it is 'merely regulative' (Friedman 1992: 255) and can thus play no role in constituting objects of cognition (Friedman 2001: 126).[13] On this interpretation, reflective judgement 'merely aims at and searches for … the asymptotic ideal of a maximally unified science', which 'remains entirely indeterminate' (Friedman 1992: 255-6). Reflective judgement is thereby reduced wholly to Kant's account of induction: it proceeds entirely 'bottom up' where the constitutive role of understanding proceeds 'top down' (p. 49), inheriting the hypothetical use of reason from the first *Critique* unchanged (p. 253). As such, reflective judgement cannot 'specify the content' of science in its own right (p. 256).

Against this interpretation, reflective judgement is not wholly regulative or indeterminate, it is not solely inductive, and it does specify particular content for a given theory. Thus, as I show below, it is constitutive in precisely the weakened sense presupposed in contemporary theories. Indeed, Kant charges it with generating new scientific laws, supplying a dynamic component to Kantian science. Kant claims that 'the power of judgement … with regard to things under *possible (still to be discovered) empirical laws* is merely reflective', since only reflective judgement can 'subsume under a *law that is not yet given*' (*CJ*, 5: 184, 5: 385, my emphases). It is by means of reflective judgement that 'we have been able to discover many laws of nature which, given the limitation of our insights into the inner mechanisms of nature, would otherwise remain hidden from us' (*CJ*, 5: 399). Kant thus explicitly tasks reflective judgement, not understanding, with scientific discovery. Consequently, it is reflective judgement that enables us to 'acquire a guideline for considering things in nature … and for *extending natural science* in accordance with another principle' (*CJ*, 5: 379).[14] For instance, Kant refers to the 'indispensability' of teleology (posited by reflective judgement) for empirical investigation, and the crucial role of 'testing appearances' by means of the principles reflective judgement posits (*CJ*, 5: 376, 379, 410). In this connection, Kant refers to the laws happened upon so far as merely '*incidentally*

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discovered (*gelegentlich entdeckten*) *particular laws*' (FI, 20: 209), rather than laws true for all time.

Indeed, Kant *defines* reflective judgement in terms of its role in generating laws – or forming new 'universals': 'If the universal (the rule, the principle, the *law*) is given, then the power of judgement, which subsumes the particular under it ... is *determining*. If, however, only the particular is given, for which the universal is to be found, then the power of judgement is merely *reflective*' (*CJ*, 5: 179, my emphasis). It is thus reflective judgement, not determining judgement, which is employed in order to 'find laws'. As such, Kant claims that reflective judgement is called for when the 'particular, as such, contains something contingent with regard to the universal' and when 'the a priori derivation of the particular laws from the universal ... is impossible' (*CJ*, 5: 404): cases in which given concepts and extant principles fall short, cases left 'undetermined by' (*CJ*, 5: 180) or which 'outstrip' the understanding and its synthetic a priori principles (*CJ*, 5: 403). Kant acknowledges, in other words, that there are cases in science in which the synthetic principles of the first *Critique* are insufficient to fully determine the content of a given judgement and to wholly constitute experience.

Yet Kant does not attribute the task of accommodating these limitations to understanding, but *to reflective judgement*. The dynamical task of scientific change – the accommodation of particulars that 'outstrip' the understanding's given principles and extant scientific laws – is thus accorded to the latter. In such cases, the power of judgement *projects* or *stipulates* a principle in order to serve in place of a determinate law. Since 'the reflective power of judgement is supposed to subsume under a law that is not yet given and is only a principle for reflection on objects for which we are objectively entirely lacking a law', it *gives itself* a principle that can stand in for the law that is lacking (*CJ*, 5: 385). Since it is only reflective judgement which 'gives itself' laws, only reflective judgement is accorded 'autonomy', while determining judgement, governed by understanding, has the 'law sketched out for it ... and it is therefore unnecessary for it to think of a law for itself' (FI, 20: 225; *CJ*, 5: 179). It is thus determining, not reflective, judgement, that 'confirm[s]' the latter's principles 'by means of observation' of nature (*CJ*, 5: 186), 'deriving' its laws only from understanding as an external source (*CJ*, 5: 180). In fact, the distinction between deriving laws from elsewhere as opposed to creating new laws is the criterion distinguishing determining judgement from reflective judgement: the latter 'cannot derive [its laws] from anywhere else (for then it would be the determining power of judgement)' (*CJ*, 5: 180). As I return to in §6, the understanding, as expressed in determining judgement, thus provides post-facto justification for the reflective power of judgement, corroborating or demonstrating what it has already formulated; it plays no direct role in discovery.

Consequently, there can *be* no dynamic function in determining judgement as governed strictly by synthetic principles of understanding, since determining judgement by definition 'merely subsumes' (*CJ*, 5: 179) or 'derives' laws given to it from elsewhere. Yet this does not mean that Kant has no such dynamic conception of science; merely that it must be sought in a different place.

Indeed, while Kant's account in the *Critique of Judgement* is often taken to be restricted to the empirical sciences, Kant expressly acknowledges the role of discovery in physics as well (the paradigm of pure or proper a priori science, *MFNS*, 4:

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468-70). New laws of physics, he repeatedly insists, are discovered, including 'through experience' (*P*, 4: 352; *CPR*, A206–7/B252, A290/B346). In one fascinating passage (penned prior to introducing reflective judgement), Kant even characterizes the discovery of the law of universal gravitation as the product of the regulative employment of reason: 'If, e.g., the course of the planets is given to us as circular through a (still not fully corrected) experience, and we find variations ... under the guidance of [regulative] principles we come to a unity of genera in the forms of these paths, but thereby also further to *unity in the cause of all the laws of this motion (gravitation)*' (*CPR*, A663/B691, my emphasis). The treatment of gravity was one of the most controversial aspects of Newtonian theory; it is thus striking that Kant acknowledges that it must be treated as a dynamical heuristic formed through a process of discovery. As such, Kant is permissive about the future scope of a priori science. Rather than taking the domain of such sciences to be fixed, Kant's definition expressly allows for the effects of future discovery, since the a priori sciences extend even to those whose a priori grounding in understanding can at present only be 'assumed': 'Even the rules of uniform appearances are called laws of nature (e.g., mechanical laws) only when they are either cognized really a priori or (as in the case of chemical laws) *when it is assumed that they would be cognized a priori from objective grounds if our insight went deeper*' (*CPrR*, 5: 26, my emphasis).

Thus, Kant stresses the importance of discovery for all science, including a priori science or potentially a priori science, as well as what we would now call the empirical sciences. This suggests a more general contribution of reflective judgement to all scientific inquiry. Indeed, as we have seen, Kant characterizes reflective judgement as forming new *laws,* which are, by definition, objective and necessary (*G,* 4: 401, 4: 468), and not merely *principles*, which can be subjective (*G,* 4: 421n). While reflective judgement is thus guided in the first instance by merely subjective and self-given principles (or maxims, *CJ,* 5: 386), it follows that, in certain cases, these principles can ultimately be vindicated post-facto as objective laws by understanding.

Moreover, Kant takes pains to establish that reflective judgement amounts to more than mere induction. Reflective judgement is autonomous insofar as it contributes actively to experience by *injecting principles into it*. Even where a determinate principle or concept is lacking to guide our experience of the unknown, it must provide *itself* one: 'When we *reflect* ... we need a principle just as much as we do when we determine, where the underlying concept of the object prescribes the rule to judgement and so takes the place of the principle' (FI, 20: 211). Reflective judgement does not passively compile empirical data as brute affections of sensibility, as the rejections of its role as entirely indeterminate or merely bottom-up might suggest. Rather than mere induction, on which a principle can only be stipulated after the fact, reflective judgement's principles *guide* experience.

As such, reflective judgement supplies the conditions in which new *concepts* can be formed, rather than, as the synthetic principles of understanding do, the conditions for presenting the *objects* those concepts are about.[15] Thus, reflective judgement presupposes the subjective deliverances of sensibility as given (Kant raises the example of space: *CJ,* 5: 188-9), but brackets the role of understanding.[16] Ordinarily, 'in the cognition of an object of the senses both relations', the subjective conditions in reflective judgement for concept formation *and* the objective conditions of

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understanding which serve to determine the object as logically valid, 'are present together' (*CJ,* 5: 188). Reflective judgement abstracts away from these objective conditions, revealing the 'subjective ground … *prior* to any concept' (*CJ,* 5: 192). Hence, the *Critique of Judgement* is also deemed 'the critique of the judging subject and its cognitive faculties' (*CJ,* 5: 194), supplying additional subjective conditions, as *conceptual* conditions, of possibility for cognition along with the objective conditions established in the first *Critique*.

In short, reflective judgement does not abstract entirely from the object as *already* given (the object is *there*, is given, but 'outstrips the understanding', *CJ,* 5: 403), but concerns the discursive conditions by which it can be rendered intelligible – by which meaning is ascribed to it. Kant acknowledges that there can be varying conceptual conditions, which are thus not merely universal and fixed, under which the object can be considered, where these include the possibility of new scientific laws. But these need not be merely *empirical* conceptual conditions or merely empirical laws. We have seen that Kant recognizes the possibility of formulating new laws even for the a priori sciences. Moreover, Kant recognizes that classical mechanics can prove inadequate for a scientific understanding of sufficiently complex cognitive objects; here, Kant has in mind biological organisms (where 'we must conceive of a causality different from mechanism' to make sense of the concept of a final cause, *CJ* 5: 389), but, as I return to below, the point can be extrapolated to more complex understandings of physics as well, including general relativity. Here, it is reflective judgement that accommodates limitations in the predominant scientific framework. In other words, the theory of reflective judgement already presents an implicit relativization of the Kantian a priori – resources invaluable, therefore, to the philosophy of science literature.

As such, where theories of the relativized a priori have focused on Kant's conception of constitutive principles as restricted to the synthetic principles of understanding, reflective judgement is constitutive as well – and constitutive precisely in the weakened sense formulated in contemporary relativizations of the a priori. Hence, it provides a more helpful textual source in Kant to support the idea of relativizing constitutive principles. Reichenbach claims that 'it is not necessary to cite quotations for the second meaning of "a priori"' as constitutive, 'which will not be disputed. I refer in particular to the Transcendental Deduction in the *Critique of Pure Reason*' (1920: 114). Yet neither deduction includes mention of the 'constitutive'. The lack of available textual references relates to the problem discussed in §3: Kant never employs the term in these sections of the first *Critique* in the weakened sense, since his focus there is on the constitution of objects as given to us in experience, not on the constitution of new concepts for objects.

In particular, reflective judgement can be considered constitutive of concepts. Thus, in aesthetic judgement, another of reflective judgement's possible modes or expressions, reflective judgement is 'constitutive' of the 'feeling of pleasure and displeasure' (*CJ,* 5: 196). The concept of purposiveness in teleology, while 'regulative', is 'occasioned' by this feeling, and thus by 'aesthetic judgement [as] a constitutive principle' (*CJ,* 5: 197).[17] Indeed, Kant holds that the feeling constituted by reflective judgement is what accompanies concept formation in general (FI, 20: 249; see also Geiger 2022). Thus, reflective judgement's maxims are not *merely* regulative, but are constitutive of the conditions for concept formation, extending to the formation of new scientific laws: 'The reflective power of judgement therefore has its maxims …

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in order to arrive by their means at concepts, even if these are concepts of reason, if it needs these merely in order to come to know nature *as far as its empirical laws are concerned*' (*CJ,* 5: 386, my emphases).

For Kant, the principles of reflective judgement are thus rooted in the subjective limitations of fallible human cognition, rather than in the conditions for determining objects as given. They are claims about the conditions of the subject – about 'the peculiar constitution of my cognitive faculties' – rather than assertions about the objects being judged (*G,* 4: 397). Although Kant speaks of 'cognitive faculties' here in a way that may strike some as psychologistic, 'faculty' (*Vermögen*) is better translated as 'capacity' or 'ability' (Longuenesse 2001: 7-8), and Kant explicitly denies that his general project is one of psychologizing cognition (*CPR*, A54–5/B79–80). Thus, by the 'subjective conditions' or 'peculiar constitution' of our 'cognitive faculties', we can understand Kant to be referring to the limitations of human capacities to conceive this or that object. As Kant puts it, 'where the cognition of [objects] outstrips the understanding, we should conceive all objects in accordance with the subjective conditions for the exercise of our faculties necessarily pertaining to our (i.e., human) nature' (*CJ,* 5: 403), since in such cases the object 'is, to be sure, given in experience, but . . . cannot even be determinately (let alone completely appropriately) judged in accordance with the idea' (*CJ,* 5: 405). In other words, such cases pertain to how to render already given objects more fully intelligible under determinate conceptual frames.

5.

For the purposes of contemporary philosophy of science, we can specify the referent to the subjective limitations here in terms of the *current* limitations of finite human cognition, or *current* conceptual resources.[18] So construed, reflective judgement can finally account for a sufficiently dynamic conception of relativization. After all, current laws of relativity are not considered to be unchanging and eternally true (the view commonly ascribed to Kant on mechanism), but constitute the foundations for scientific practice *given our current cognitive resources.* Einstein himself held them to be necessarily limited and subject to future alterations – integration of the principle of general covariance, for one – in order to better accommodate the complexity of nature beyond the current limitations of human cognition.

In this respect, contemporary developments in relativity theory follow more naturally from the subjective principles of reflective judgement than from constitutive principles of understanding or regulative ideas of reason. Indeed, Kant's construal of constitutive principles of understanding proves too strong for the purposes of relativization here. Kant articulates the distinction between a constitutive and a reflective principle of purposiveness by claiming that the former would 'derive . . . its products from their causes' and 'would introduce a new causality into natural science', where the latter establishes the conditions 'for the mere judging of appearances' (*CJ*, 5: 361). The formulation of general relativity, however, does not amount to the introduction of a new form of *experienced causality*: it does not establish new conditions of possibility for *experience as such*. Instead, it establishes new conditions of possibility merely for a given framework in natural science for *conceiving* of causality.

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However, as Ryckman points out, future alterations to relativity theory cannot be conceived as merely regulative, either: the prospect of these changes would not merely render the theory more systematic, more specific or more continuous, although these are still important regulative maxims (arguably motivating, for instance, the push towards a grand unified theory of physical explanation). Instead, future shifts in the theory aligning with Einstein's aims would make relativity theory better conform to a principle which does specify the theory's specific content, namely its ideal or aspirational content: the dispensability of absolute objects as an invariant background framework.

These changes to the theory are better understood as exercises of reflective judgement, as what specifies heuristic content for science in the making. If a relativized a priori framework sets defeasible presuppositions conditioning the possibility for a given theory, the account of transcendental a priori (mere) presuppositions to be found in Kant's critical project is in his account of reflective judgement. Kant speaks of reflective judgement 'presupposing a priori' the concept of purposiveness (FI, 20: 248), insofar as it is 'necessarily ... a priori' but only in the sense of a 'necessary presupposition' (FI, 20: 215), or of the need to 'assume a priori' the systematic connection of appearances (FI, 20: 204).[19] The principle of purposiveness provides one example of a 'heuristic principle' for reflective judgement (FI, 20: 205; *CJ*, 5: 411), a principle that can only be assumed or presupposed rather than proven or derived (*CJ*, 5: 181, 185; FI, 20: 203–4, 209–10, 213–16) – and one of greater specificity than the wholly general regulative maxims of systematicity and homogeneity.[20] Reflective judgement can thus better accommodate Ryckman's contention that general covariance does not yet obtain in mathematical calculation, but nevertheless has significant 'heuristic force', than the regulative-constitutive distinction can. Similarly, it can account for Reichenbach's claim that the meaning of Kantian aprioricity to be retained is that of 'a *presupposition* of scientific knowledge' rather than a presupposition for experience as such (1920: 2).

The stipulation of purposiveness by reflective judgement thus offers a helpful model for a transcendental heuristic which gives rise to defeasible principles. Purposiveness, as Kant conceives it, is a necessary condition of possibility for cognition, but one merely *subjectively* necessary, ascribed to the limitations of cognitive resources rather than to the very possibility for experiencing the object at all. This is precisely the sense of the a priori that relativizations call for: purposiveness is a priori in that it 'could not be drawn from experience' (FI, 20: 240). Yet, even though it is a priori, Kant does not straightforwardly refer to the 'necessity and universality' of purposiveness as such; unlike other a priori principles, purposiveness only *lays claim* to necessity and universality (FI, 20: 225, 239, 243). Although it is presupposed prior to experience, this language suggests (though Kant never directly endorses this implication himself) that the possibility of future revisions to the principle cannot be foreclosed.

Indeed, I submit that the conception of *transcendental presuppositions* Kant advances here can do all the work the appeal to Kant's principles of understanding was to do. What the relativized a priori calls for is not the construction of objects in pure intuition *per se*, but a *localized* domain of knowledge structured by propositions establishing the conditions of possibility not for all of human knowledge or experience as such, but only for a restricted and defeasible conceptual framework.

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Moreover, the contemporary shift in meaning away from the constitution of objects and towards the constitution of *concepts* of objects actually comes closer to the heuristic principles of reflective judgement than to the constitution of objects by the understanding: it is the former which arise from the conceptual conditions by which an object can be presented, as the subjective conditions for forming new concepts at all. The resources for a truly *dynamic* conception of the relativized a priori are therefore to be found in reflective judgement.

6.

One of the main impediments to recognizing reflective judgement as having a valid role in Kant's conception of science has been the objection that teleology (the domain to which this role has typically been restricted) can play no role in generating knowledge. This objection marshals support from claims such as that 'we would want to make no use of [teleology] for explaining nature itself, since ... we do not seek the ground of its possibility beyond nature' (*CJ*, 5: 411), that invoking teleology does not constitute 'explanation' but only 'elucidation' (*CJ*, 5: 412), and that it does not 'seem to belong to natural science' but only to the 'description of nature' (*CJ*, 5: 417) (see Friedman 1992; Richards 2000; Nassar 2016; Kosch 2021).

To clarify my view, I take reflective judgement to provide only the starting point of scientific inquiry. To yield genuine science or knowledge, Kant claims that reflective judgement must be *combined* with determining judgement. Thus, reflection and determination are not mutually exclusive forms of the power of judgement; instead, Kant claims that reflection is the condition of judgements in general.[21] In the case of ordinary cognitive judgements, reflective judgement is combined with determining judgement; in the case of 'merely' reflective judgements (FI, 20: 220–1, 223–4; *CJ*, 5: 179, 184, 194), including aesthetic and, to a lesser degree, teleological judgement, reflection is *not* accompanied by determination. But for an objectively valid scientific judgement, both are required.

This possibility is one not expressly considered by interpretations rejecting the role of reflective judgement in science, which tend to assume that cognition must be *either* reflective *or* determining (exclusive 'or'), and thus that reflective judgement must be restricted in this context to the teleology of biological organisms. However, it allows us to reinterpret the passages that scholars take to support this view. In all such passages, Kant suggests only that reflective judgement must be combined with determining judgement in order to yield genuine science, and thus cannot furnish knowledge all on its own: 'Natural science ... requires determining *and not merely reflective* principles in order to provide objective grounds for natural effects' (*CJ*, 5: 417).[22] Indeed, Kant resolves the Antinomy of Teleological Judgement between the teleological and mechanical maxims by claiming that teleology and mechanism, reflective and determining judgement, *must always be combined,* such that reflective judgement is operative *even in the case of seemingly merely mechanistic principles* (*CJ*, 5: 411).[23]

Thus, teleology is merely one possible expression of the operation of reflective judgement in general – one which evidences a key example of Kant's own strategy for grappling with objects of nature that he felt could not be fully accommodated by the most successful scientific paradigm of the day. While Kantian teleology is thus

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illuminating in its own right for contemporary problems in the philosophy of science, the role of reflective judgement in science should not be restricted to teleology alone:[24] ultimately, Kant insists throughout the third *Critique* that mathematics, geometry and physics combine reflective along with determining aspects (FI, 20: 196, 198; *CJ*, 5: 172–3, 283, 362, 366n., 382).[25]

7.

At the outset, I considered Einstein's dissatisfaction with the idea that space, time or causality would have a necessarily privileged status in establishing any possible scientific framework. The account I have sketched here offers the beginnings of a response to the demonstration over the course of the intervening centuries that developments such as 'spacetime' or non-Euclidean geometries are at least conceivable, and arguably even intuitable (Helmholtz 1876; Einstein 1924a, 1924b; Richardson 1998: 122), or that the categories of 'substance' or 'causality' are dispensable in the wake of new physical theories of mass, relation and probabilistic events (Reichenbach 1920: 78). In accounting for such shifts, Kant's characterization of reflective judgement, as what is called for when the 'particular, as such, contains something contingent with regard to the universal' and when 'the a priori derivation of the particular laws from the universal ... is impossible', suggests important resources for the relativized a priori theorist (*CJ*, 5: 404). Further elaboration of the remarks advanced here should thus consider whether Kantian transcendental idealism, once taken to accommodate reflective judgement in the way I have sketched in this article, can accommodate the idea of science progressing beyond the conceptions of space, time, substance or causality nominally constructed by the mind.

Although Kant does not explicitly license this possibility, it is arguably consistent with the procedure of reflective judgement in integrating recalcitrant particulars into the formation of new scientific laws and concepts. Kant claims that reflective judgement finds 'so many modifications of the universal transcendental concepts of nature that are left undetermined by those laws that the pure understanding gives a priori' (*CJ*, 5: 180). On one way of reading this passage, it is the role of reflective judgement to find *new* ways of schematizing space, time, substance, causality or the other categories, since there are *many* possible ways in which formal laws can be fit with empirical sensible forms rather than one privileged set of schemata for science in particular (de Boer 2011). Extending this line of thought beyond Kant, we may then take the exercise of reflective judgement to allow for the conceptual formulation of spacetime or probabilistic causal laws.

However, even in general relativity's ideal of general covariance, what guides the future evolution of the relativistic framework is the ultimate dispensability *of space and time* as absolute objects constituting the background of relativistic laws. Thus, this ideal continues to presuppose *some* conception of space or time, such that it can be argued that at least for now, space, time and (probabilistic) causality retain their primacy in reflectively guiding the progress of the theory, even simply as the elements to ideally be dispensed with.[26]

Irrespective of the ultimate fate of 'spacetime', if we want to marshal resources from Kant to make sense of these developments, the considerations advanced above suggest that we should adapt them from the theory Kant himself elaborated

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in attempting to apply the governing science of his day to new domains of nature, such as biology, that it could not fully accommodate. Relativizing the a priori, I have shown, concerns reflective judgement; as such, Kant's account of it bears re-evaluation.

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Notes

1 See also Kuhn's claim of being a 'Kantian with moveable categories' (2000: 264), and Cassirer's retention of a 'strictly limited meaning of the "a priori"', on which 'a cognition is called "a priori" not in any sense as if it were *prior* to experience, but because and insofar as it is contained as a necessary premise in every valid judgment concerning facts' (1923: 269). Friedman (2001) takes the main alternative to the relativized a priori to be Quine's epistemological holism, but rejects it by claiming that degrees of entrenchment within a web of belief cannot account for how some propositions establish conditions of possibility for others within a given scientific theory – such as laws of calculus vis-à-vis Newtonian laws of motion.

2 The third *Critique* has thus been associated – incompletely, on my view – primarily with *empirical* science, such that its resources for relativizing the a priori have so far been missed, or even rejected altogether (Friedman 2001: 126). My reading instead presupposes that the third *Critique* offers a *transcendental* account of conditions of possibility of experience – specifically, of the *conceptualization* of experience. I thus reject the prevailing, decidedly empiricist, interpretation of this text (e.g. Buchdahl 1992; Kitcher 1994).

3 Moreover, in key respects reflective judgement crucially expands, as commentators have long acknowledged, the regulative account of ideas of reason advanced in the first *Critique* (e.g. Buchdahl 1992: 347; Guyer 1990: 17). I will not go into these developments here, but I do think that they help to motivate shifting away from regulative reason to reflective judgement.

4 Other aspects of my interpretation are explored in Vaccarino Bremner (2021, 2022a, 2022b).

5 The most extensive and influential recent account of the relativized constitutive a priori is found in Friedman 2001, and this is the one I focus on primarily in what follows; I next turn to a relativized regulative account (in Ryckman 2005).

6 Another conception of the relativized a priori can be found in C. I. Lewis (1923, 1929), one relativized pragmatically to human interests and allowing for radical ruptures rather than rational or continuous change; see Franco (2020) for discussion. My concern here is not so much with the *rationality* of the shift from one a priori to the next as with the dynamism implied in doing so, a problem which I take to apply to both sets of views. I am indebted to an anonymous reviewer for suggesting Lewis' view.

7 In a letter to Cassirer, Einstein sceptically reiterates this point: 'Aren't the notions of cow and donkey also a priori?' (1924b: 201).

8 Indeed, Einstein writes that Hume 'had considerably healthier instincts' than Kant (1918b: 818).

9 References to Kant's works use the standard Academy references, except for references to the first *Critique*, which use the standard A/B notation. English translations are drawn from the Cambridge edition of Kant's works, with some modifications by the author. Abbreviations are as follows: *CPR* = *Critique of Pure Reason*, *P* = *Prolegomena to any Future Metaphysics*, *G* = *Groundwork to the Metaphysics of Morals*, *CPrR* = *Critique of Practical Reason*, *CJ* = *Critique of the Power of Judgement*, FI = First introduction to *Critique of the Power of Judgement*, *MFNS* = *Metaphysical Foundations of Natural Science*, *OP* = *Opus Postumum*.

10 Though see one exception in Richardson (e.g. 1998: 113), who characterizes a priori principles as constitutive *of objects*.

11 Kant holds that regulative ideas are perpetually prone to speculative illusion, and they have thus often been interpreted as 'mere fictions' (e.g. Vaihinger 1922: 318, Kemp Smith 1918: 544). Yet

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Reichenbach's constitutive principles do not run the risk of incurring illusion, and reflective judgement does not, either.

12 I do not deny the importance of the constitutive role of understanding, but I take Kant's considered view to emphasize the interplay between understanding and reflective judgement, where the formulation of new scientific laws is the purview of the latter; see §6.

13 Ferrari (2012: 24) defends the contribution of reflective judgement, but similarly reduces it to the 'regulative principle' of teleology.

14 As these passages show, Kant often treats 'laws of nature' and 'empirical laws' interchangeably throughout the third *Critique,* even if the scholarship has associated the argument as restricted solely to particular empirical scientific laws, principally biological laws (Kitcher 1986, 1994; Friedman 1992; Breitenbach 2006; Ginsborg 2015).

15 Their necessity does not rest 'on concepts of the object a priori', but 'on subjective conditions for concepts, which ground them a priori' (FI, 20: 238). I do not limit my claim for reflective judgement to *empirical* concepts because I take reflective judgement to be involved in stipulating weak a priori concepts as well.

16 Kant's claims here thus might be taken to support a non-conceptualist reading of the critical project. I leave this debate aside, but it could be related to another point of contention between various theories of relativizing the a priori, namely whether to retain an independent role for the faculty of sensibility; see Pap 1944; Ferrari 2012; Friedman 2012.

17 The analysis of reflective judgement in concept formation is thus clearest in the case of aesthetic judgement, which for Kant is the only pure instance of reflective judgement, since teleological judgements do involve the extant concept of an end or purpose (*CJ*, 5: 193–4, compare 5: 286). But this does not make teleological judgements solely regulative, playing no role in specifying new concepts or laws. Teleological judgements are simply *impure* cases of reflective judgement and still manifest its constitutive function.

18 While this goes beyond Kant's own claims in the third *Critique*, Kant does attempt to accommodate Lavoisier's revolution in chemistry into his transcendental idealism (Friedman 1992; Förster 2000; *OP,* 21: 566, *OP,* 22: 509), an example of Kant not treating limitations in understanding some aspect of scientific experience to be fixed and given aspects of human constitution.

19 The principle of purposiveness is thus a transcendental principle; unlike views which situate the *Metaphysical Foundations* as presenting Kant's account of pure science and the third *Critique* of empirical science (e.g. Breitenbach 2006: 707; Nassar 2016: 59, 66), as I read it, the principle of purposiveness of the third *Critique* is transcendental for *science in general*, such that the *Metaphysical Foundations* advances *metaphysical* principles for which the third *Critique* supplies a *transcendental* grounding (FI, 20: 241), albeit one of a weaker a priori validity than the categories and synthetic principles of understanding (Vaccarino Bremner n.d.). Thus, I also do not construe the principle of purposiveness as transcendental only for empirical concept formation (see e.g. Geiger 2022); instead, I see it as transcendental for weaker conditions of validity (subjective as opposed to objective necessity, corresponding to weak rather than strong aprioricity).

20 Kant does use the term 'transcendental presupposition' (*transzendentale Voraussetzung*) to describe transcendental apperception (*CPR*, A107), but only provisionally in the course of establishing its objective validity. The principle of purposiveness does not share the same status: unlike the transcendental unity of apperception, it remains a *mere* presupposition; while necessary, it is merely subjectively necessary (FI, 20: 209); it is not an objective law, but a merely subjective principle, or maxim (*CJ*, 5: 385, 389, 184).

21 Kant is careful to characterize the aesthetic and teleological judgements that comprise the focus of the third *Critique* as '*merely* (*bloß, nur*) reflective judgments'; see FI, 20: 220–1, 408–9, 223–4; *CJ*, 5: 179, 184, 194; and discussion in Longuenesse 2001: 163–4. See also Kant's claim that reflective judgement is *always* at work in theoretical cognition, whereas some ('merely reflective') judgements do not admit of determination: 'The teleological power of judgment is … only the reflective power of judgment in general, insofar as it proceeds in accordance with concepts, *as is always the case in theoretical cognitions,* but, with regard to certain objects in nature … [it] is *merely* reflective and is not determining objects' (*CJ*, 5: 194, my emphasis).

22 This is also the sense given to 'explanation' at *CJ*, 5: 412, defined as 'a distinct and determinate derivation [*Ableitung*] of the possibility of a natural product that is possible in accordance with those two heterogeneous principles', whereas, as we have seen, reflective judgement furnishes conditions of

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possibility for concepts, not for objects, and does not derive its concepts from elsewhere. This claim thus does not entail that reflective judgement plays no role in scientific explanation once combined with determining judgement.

23 See here also Cooper 2023: ch. 7.

24 However, most interpretations have restricted reflective judgement's role in science to teleology, and have thus considered its implications primarily for functionalism in philosophy of biology (for one comprehensive analysis, see Zammito 2006), or for contemporary theories of natural selection, such that much work remains to be done if my analysis bears out.

25 Indeed, Kant's dynamical conception of matter in the *Foundations* (*MFNS*, 4: 532–4), as a mere 'a priori conjecture' or 'assumption' (*MFNS*, 4: 534), can provide a helpful example of a scientific principle which is both reflective and determining, on my account. As a mere conjecture – but an a priori one – the dynamical conception of matter is a subjectively necessary principle, one purposive for experimental aims in physics (*MFNS*, 4: 533), and thus one advanced through reflective judgement on Kant's later view. But it is also one that can be justified post-facto as objective by determining judgement through mathematical demonstration or experimental corroboration.

26 Indeed, Kantians have argued that *some* notion of space, time, causality or substance cannot ever be wholly dispensable (Reichenbach 1920: 16; Chignell 2008; de Boer 2011; Matherne 2021: ch. 8).

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