

# Apriority, Metaphysics, and Empirical Content in Kant's Theory of Matter

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## Abstract

This paper addresses problems associated with the role of the empirical concept of matter in Kant's *Metaphysical Foundations of Natural Science*, offering an interpretation emphasizing two points consistently neglected in the secondary literature: the distinction between logical and real essence, and Kant's claim that motion must be represented in pure intuition by static geometrical figures. I conclude that special metaphysics cannot achieve its stated and systematically justified goal of discovering the real essence of matter, but that Kant requires this failure for his larger philosophical presentation of the dialectic that 'irremediably attaches to human reason' (A298/B354).

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## 1. Introduction

Taken in all at once, the sheer scope of Kant's philosophical project can be overwhelming. His stated ambition is to establish not only ethical principles valid for all rational agents, but also the basic principles of all discursive knowledge, and then to unify these two sets of principles within a single picture of human subjectivity.<sup>1</sup> Yet Kant himself often characterizes his project as a modest one,<sup>2</sup> and sympathetic readers have long found Kant's self-appraisal persuasive. The picture of a modest Kant is no doubt faithful to a deep current in his thought: his theoretical philosophy aims to limit the excesses of prior metaphysics, and his practical philosophy seems to advocate a return to the simplicity of the golden rule. Nonetheless, it is not obvious that Kant's modesty is wholly compatible with his ambition, and in an important sense, the reception of the Critical philosophy has been significantly affected by the dynamic at work in what we might call his ambitious modesty.<sup>3</sup>

One of the many ways this dynamic had, until recently, manifested itself in Kant scholarship was through a tendency to focus on the parts of his

system in which Kant's modesty is prominent—the *Critiques*—at the expense of those in which his high ambition is displayed in detail—his metaphysics of morals and nature. In his explicitly metaphysical works, Kant claims to reach philosophically rigorous conclusions on issues ranging from the proper content of marriage contracts to the structure of laws of specific density.<sup>4</sup> But the claim that philosophy establishes the one rational truth on such points looks like the pronouncement of an overreaching ambition, and so Kant's metaphysics of morals and nature were usually regarded as the symptoms of something gone amiss (with the critical philosopher, if not with the Critical philosophy).

Beyond such *prima-facie* difficulties lurk more serious problems in Kant's metaphysics. Readers of his metaphysics of nature, for instance, have often noted what appears to be an obvious and straightforward contradiction in his notion of what such a metaphysics is about.<sup>5</sup> The apparent contradiction first shows up in the Preface to the *Metaphysical Foundations*, where Kant asserts both that the metaphysics he develops there is an *a priori* science,<sup>6</sup> and that it 'takes the empirical concept of matter as its basis' (4: 470).<sup>7</sup> The interpretative demand this apparent contradiction presents seems clear. We should decide whether Kant's ambition—to secure *a priori* status, and thus objectivity and certainty, for natural science—or his modesty—the recognition that natural science depends on the experience of nature by finite beings—is more consonant with his overall project, and then reconstruct the 'properly' Kantian conception of the metaphysics of nature accordingly, thereby resolving the apparent contradiction.

The bulk of the secondary literature on the *Metaphysical Foundations* employs one or another version of this interpretative strategy. The motivation for doing so is strong. To begin with, Kant repeats his apparently contradictory claim many times over many years, making it unlikely that this characterization of his metaphysics is merely confused.<sup>8</sup> Furthermore, the metaphysics of nature he so characterizes serves as a bridge between the first *Critique* and empirical science; without such a bridge, Kant cannot vindicate his Critical project and succeed in reforming metaphysics.<sup>9</sup> Thus it seems a resolution of some kind is called for. Typically, interpretations aiming for resolution argue that Kant did not really claim *a priori* status for the main propositions of the *Metaphysical Foundations*, and instead claimed such status only for some of them or had a special, non-standard kind of apriority in mind.<sup>10</sup>

I indicate the specific problems facing a number of such interpretations as they arise in the course of my discussion below (frequently in the

endnotes).<sup>11</sup> But the main aim of that discussion is to argue more generally that the goal of getting Kant out of the apparent contradiction in his metaphysics of nature is a misguided one, no matter which interpretative strategy one adopts. Kant himself walks straight into this supposed problem, because it is one that is set up for him by the structure of the Critical philosophy and the picture of human reason animating that structure. We understand both Kant's basic position and his specific arguments in the *Metaphysical Foundations* better when we grasp what drove him to the apparent contradiction than when we look for a way out of it that he himself could not have endorsed.

My aim in this paper, then, is to show that Kant must make the contradictory claims he seems to make in his metaphysics of nature, as a result of his fundamental philosophical commitments. Rather than interpret the contradiction away, we can make sense of why Kant must attempt such a metaphysics, while also seeing why the metaphysics of nature he produces must fail on its own terms. My argument hinges on an interpretation of two basic Kantian distinctions. The first is Kant's metaphilosophical distinction between 'general metaphysics', or the transcendental philosophy of the *Critiques*, and 'special metaphysics', or what he does in the *Metaphysical Foundations*. I argue that the key issue here is one of determinacy, so that special metaphysics is concerned with more determinate conceptual contents than transcendental philosophy. The second is Kant's metaphysical distinction between logical essence and real essence. This distinction is often overlooked, perhaps because it appears in the *Metaphysical Foundations* under a different name. But whatever its name, it forms the basic methodological axis of Kantian special metaphysics of nature. I set the stage for my reconstruction (section 2) by explaining these two distinctions and placing them within a broader context, namely, that of Kant's idea of a *system* of laws of nature, an idea itself grounded in his conception of rational subjectivity. The stage set, I reconstruct (section 3) Kant's core argument regarding the essential properties of matter and show why, when this special metaphysics is constrained within the limits imposed by the Critical philosophy, it cannot achieve the systematic goals Kant assigns to it. I conclude (section 4) with some remarks on how reading Kant this way can help us understand his view of reason in general and its later influence.

## 2. The Context and Method of Kant's Metaphysics of Nature

### 2.1. Kant's Systematic Strategy

The *Metaphysical Foundations* can be understood properly only within the general Kantian conception of a philosophical system, a conception

fundamental to Kant's strategy for achieving his philosophical aims. While we today might be inclined to view systematicity as a welcome but ultimately dispensable feature of objective knowledge, Kant regards systematicity as a distinguishing mark of objectivity: objective knowledge is objective precisely to the extent that it is systematizable.<sup>12</sup>

Kant's commitment to systematicity flows from his answer to the basic question facing his theoretical philosophy: how are synthetic judgements *a priori* possible? His answer rests on his doctrine of the transcendental unity of apperception, according to which the unity of the judging subject is the fundamental condition of possibility for any experience that such a subject could judge about, and is therefore also the condition of possibility for objective knowledge in general.<sup>13</sup> This apperceptive unity of the subject is *active* in the sense that bringing about its unity is the thing the knowing subject most fundamentally does; the activity itself is *unifying* insofar as it is productive of the one experience had by that subject. The rules followed by this unified and unifying subject in its activity are the categories of the understanding.<sup>14</sup> There are, famously, twelve such categories, obliging Kant to explain how their variety is compatible with their being rules for just *one* unified activity of the subject and productive of just *one* experience. His explanation comes down to the claim that the many rules exhibit a basic unity in their variety—that is, they exhibit a *systematic* unity.<sup>15</sup> Thus for Kant the requirement that the *a priori* principles of our cognition be systematized stems from the transcendental unity of apperception, which provides the ultimate transcendental condition on synthetic *a priori* judgement, and thus on objective cognition generally.

Because of its deep transcendental source, this demand for systematic unity extends beyond the conditions of possibility for synthetic *a priori* judgements to those judgements themselves, encompassing the entire transcendental philosophy. The *entire* content of transcendental philosophy must have the form of a system, and a central task of that philosophy is to show how such unity is in fact achieved. Within transcendental philosophy itself, this task is not difficult, at least in principle; the answer can always be that systematic unity is guaranteed by the transcendental unity of apperception. But the demand to demonstrate systematic unity extends beyond the limits of the transcendental philosophy as well.<sup>16</sup> After all, the point of showing that synthetic *a priori* judgements are possible is to show how objective *empirical* cognition and experience are possible, since empirical cognition and experience are dependent upon the possibility of such judgements. But this dependence implies that empirical cognition in turn is

rooted in the transcendental unity of apperception, and thus is subject to the demand for systematicity as well.

Now, if it is true that empirical cognition is subject to the demand for systematicity, then in order to demonstrate that his transcendental programme succeeds, Kant will need to demonstrate that our empirical cognition is necessarily systematizable. Within transcendental philosophy, this demand is satisfied, directly or indirectly, by referring the variety of transcendental principles, categories, and related elements back to the activity of apperception as their source. And it can seem that such a strategy will work for empirical cognition as well. If we grant Kant the claims of his transcendental philosophy, we grant that all our judgements about empirical objects share a set of transcendental conditions. This claim is equivalent to the claim that those judgements have at least the unity with each other such shared conditions imply. As a result, we know that any judgement about an object of experience has structure and even some content in common with, and therefore uniting it with, all other such judgements. Such commonalities might then reasonably be thought to provide an adequate basis for the systematization of our empirical cognition.

To see why these commonalities are unsatisfying from a Kantian perspective, we must focus on the fact that a system of objective empirical judgements coordinated by transcendental principles could still possibly include not only *true* judgements, but *false* judgements. This possibility arises because empirical judgements must include content delivered by sensibility, and thus must include a content not determined purely by the subject's own *a priori* cognitive forms. When it comes to judgements with empirical content, 'objective' for Kant thus does not imply 'true', and therefore objectivity conditions are not truth conditions.<sup>17</sup> It follows that a system of empirical judgements organized only by means of objectivity conditions would not necessarily exclude contingently false empirical claims meeting those conditions.

A systematizing principle that allows for false judgements, and at the limit allows for systems made up entirely of false judgements, falls short of Kant's systematic goal. As he makes clear in the first *Critique*, genuine systematicity ultimately provides not only a standard of objectivity, but also the criterion for distinguishing true from false empirical claims:

For the law of reason to seek unity is necessary, since without it we would have no reason, and without that, no coherent use

of the understanding, and, lacking that, no sufficient mark of empirical truth; thus in regard to the latter we simply have to presuppose the systematic unity of nature as objectively valid and necessary. (A651/B679)

The unity reason demands in our empirical cognition is thus not just the unity exhibited by all judgements about possible objects of experience, but a unity that can function as a ‘sufficient mark of empirical truth’—that is, a mark of the unity of actual, rather than merely possible, experience. Kant’s suggestion is that systematic unity of actual experience with the *a priori* necessary truths of transcendental philosophy can function as such a mark, provided we use the metaphysics of nature to develop the right kind of systematic principle for our cognition of the actual world. Clearly such a principle would have to be consistent with the transcendental philosophy. But, equally clearly, it must also be more determinate than the principles of transcendental philosophy, in order to rule out false objective judgements from the system of empirical cognitions. The *Metaphysical Foundations* is supposed to provide this principle.

As we will see in a moment, Kant’s strategy is to achieve this required determinacy by adopting a principle that has a more determinate content than anything allowed in the strictly transcendental part of the system. But as we will also see, it is just this demand for a more determinate systematic principle for empirical cognition that gives rise to the apparent contradiction in Kant’s conception of the metaphysics of nature. Such a principle, if it is to be more determinate than the principles discovered in transcendental philosophy, must be somehow basically empirical (on the assumption that the content of pure philosophical truths is either explicitly exhausted in transcendental philosophy, or implicitly exhausted therein under some form of deductive closure<sup>18</sup>). Yet if such a principle were a garden-variety *a posteriori* one, then it would be just another bit of empirical cognition requiring systematization, and could not serve as the systematizing principle itself. Hence it seems Kant must find some other kind of principle.

In order to understand Kant’s project in the *Metaphysical Foundations* and how it relates to the possibility or impossibility of finding such a more determinate, yet *a priori* principle, we will first need to understand the two distinctions mentioned above, namely, the distinction between general and special metaphysics, and the distinction between logical and real essence.

## 2.2. *General and Special Metaphysics*

Kant's distinction between 'general metaphysics' (the transcendental philosophy of the *Critiques*) and 'special metaphysics' (the metaphysics of nature of the *Metaphysical Foundations*) is designed to capture the difference in determinacy between their principles. While the general metaphysics of the first *Critique* deals with all possible objects of experience in general, special metaphysics deals with 'determinate object[s]' or 'the particular nature of this or that kind of thing' (4: 469–70).<sup>19</sup> Insofar as special metaphysics is orientated towards systematic unity, it seeks to establish a unity of determinate, actually existing objects under determinate laws, beyond the unity all possible objects exhibit merely in virtue of being objects.

Kant begins his discussion of the determinacy characterizing special metaphysics by noting that its objects are *natural* objects. The significance of their determination as natural depends, in turn, on our understanding of nature. 'Nature', Kant says, can be defined in two ways: its *material* definition tells us that nature is 'the sum total of things insofar as they can be *objects of our senses*'; its *formal* definition tells us that nature is 'the first inner principle of everything that belongs to the existence of a thing' (4: 467).<sup>20</sup> The material definition of nature allows us to divide the field of natural science according to the two Kantian types of sense: inner and outer. Thus, 'materially' speaking, rational cognition of nature consists of rational psychology (inner sense) and rational physics (outer sense). The formal definition of nature, by contrast, picks out the ultimate goal of such cognition: knowledge of the first inner principle of everything that belongs to the existence of its objects. For various reasons, Kant rules out the possibility of rational psychology;<sup>21</sup> as a result, the special metaphysics of nature is restricted to rational physics, or to the discovery of the first inner principle of everything that belongs to the existence of an object of outer sense.

Although the concept 'object of outer sense' looks more determinate than the concept 'object', it still belongs to transcendental philosophy or general metaphysics; the distinctions used to arrive at this concept, including that of nature *materialiter*, are themselves all transcendental. It is Kant's next move—his introduction of the *empirical* concept of matter—that adds determinate content to the concept *object of outer sense*, and thus moves us into special metaphysics. Bringing in such empirical conceptual content, however, seems obviously to render any principles drawn from it empirical in their turn, and thus ineligible to serve as principles for systematization. Yet Kant insists that this is not so.

He describes special metaphysics as dealing with the empirical concept of matter ‘in such a manner that, outside of what lies in this concept, no other empirical principle is used’, and goes on to describe this manner as one in which ‘transcendental principles are applied to the ... species of objects of our senses’ (4: 470). The clear implication is that Kant has a method in mind for special metaphysics that should allow *a priori* knowledge of the first inner principle of all objects of outer sense by means of the application of transcendental principles to the content of the empirical concept of matter. The method Kant in fact deploys has two key aspects: first, its use of his distinction between logical and real essence; second, its use of geometrical representation.

### 2.3. *Logical Essence, Real Essence, and Synthetic Judgement*

Most broadly, discovering the first inner principle of the existence of the objects of outer sense involves not only discovering, but also using, distinctively metaphysical principles, and Kant is clear that these principles are both *a priori* and synthetic.<sup>22</sup> Kant’s famous transcendental-logical distinction between the analytic and the synthetic differentiates between the two ways the subject and predicate of a judgement can be related. When they are related analytically, the predicate is logically ‘contained in’ the subject; when they are related synthetically, there is no such containment.<sup>23</sup> Rather, if a synthetic judgement is true, the predicate has some variety of non-logical connection to the subject, and metaphysics (general or special) is in the business of discovering and articulating the non-logical connections underwriting such *a priori* judgements.

Kant’s distinction between logical essence and real essence is a metaphysical distinction meant to differentiate properties of *objects* in a way that tracks the transcendental-logical distinction between analytic and synthetic *predication*. Understood this way, the logical essence of an object is the property or set of properties of that object picked out by the content of its concept, while the real essence of an object is the property or set of properties of that object picked out by those concepts truly predicated of it in synthetic *a priori* propositions.<sup>24</sup> Thus Kant’s claim that special metaphysics takes the empirical concept of matter as its basis indicates two features of his special metaphysics: first, the logical essence of matter will be the starting-point for the discovery of the real essence of matter; second, synthetic *a priori* judgements expressing that real essence will have the concept of matter in the subject position and the concepts of its really essential properties in the predicate position.



Yet as we have already noted, it seems the synthetic judgements expressing the real essence of matter cannot be *a priori* judgements, given that their subject term, *matter*, is an empirical concept.<sup>25</sup> We can bring the difficulty here out clearly by recalling a few more features of the Kantian doctrine of concepts. An empirical concept, like any concept, has what Kant calls synthetic unity, by which he means that it unifies diverse concepts into a single content. But Kant distinguishes empirical concepts by means of the source of the synthetic content-unity they contain: while the unity found in pure concepts 'arise[s] merely from the understanding', the unity found in empirical concepts is 'drawn [or] abstracted from experience' (9: 92).<sup>26</sup> Kant claims that conceptual analysis reveals the synthetic unity of the empirical concept of matter to contain three concepts—extension, lifelessness, and impenetrability. It follows that the logical essence of matter consists of the unity of the properties designated by these concepts.<sup>27</sup> Of the three, says Kant, impenetrability 'is the fundamental property (*Grundeigenschaft*) of matter, whereby it first manifests itself to our senses' (4: 508), and it is clearly this element in the content of the concept of matter that renders it empirical.<sup>28</sup> We can therefore predict that synthetic *a priori* judgements with impenetrability as (or logically contained in) the subject term will play a prominent role in Kant's attempt to discover the real essence of matter.

Now consider these judgements and the metaphysical connections they assert. Kant's theory of synthetic judgement requires a non-logical connection between subject and predicate, but the only non-logical *a priori* ground for such a connection, outside the principles of the first *Critique*, is pure intuition. Since the principles of the first *Critique* cannot themselves generate the required determinacy, we know that the non-logical connection underwriting the relevant synthetic *a priori* judgements must be a pure intuitive one.<sup>29</sup> But, as we saw already, the unity obtaining between the components of an empirical concept is a unity necessarily borrowed from experience, and is therefore a connection grounded in empirical, not pure, intuition.<sup>30</sup> Hence it seems impossible that judgements in which the concept of matter (or, equivalently, the concept of impenetrability) occupies the subject position—that is, the very judgements required by special metaphysics—could be synthetic *a priori* judgements, as is also required.

Thus Kant's demand for systematicity has resulted in a demand for a systematic principle underlying natural science. This principle must have empirical content in order to have the required determinacy, but it also must be *a priori* in order to have the right systematizing scope and

warrant. In order to generate an *a priori* principle from the empirical content of the concept of matter, Kant must find a pure *a priori* intuitive ground for synthesis. But it is just that ground that is missing from the concept of matter, in virtue of its empirical character. What Kant requires, then, is a way to preserve the apriority of special metaphysics by somehow getting around, but still admitting, the empirical character of the concept of matter.

### 3. Kant's Metaphysics of Matter

#### 3.1. Motion and Pure Intuition

Kant adopts a substitution strategy to deal with the difficulty posed by an apparent lack of a pure intuitive basis for synthetic *a priori* judgements about matter. Specifically, he looks for a pure intuition that can be substituted for the empirical intuition actually underlying the concept of matter, and he then uses that substitute intuition as the means to validate the relevant synthetic *a priori* judgements. His substitution strategy has two steps. The first is to point out that there is a close connection between matter and motion in empirical intuition, a connection so close that 'the understanding traces all other predicates of matter belonging to its nature' to motion (4: 476–7). In general, Kant seems to think, we are justified in regarding matter as the movable. While there are various questions about Kant's warrant for this claim about matter and movability we might raise, we can bracket these questions and focus instead on the fact that a connection between matter and movability alone is not enough to get Kant the substitute pure intuition he needs.<sup>31</sup> The reason such a connection will not suffice is that, as Kant himself insists, 'the *movability* of an object in space cannot be cognized *a priori*' (4: 482). In other words, movability is no more directly available *a priori* than is the empirical intuition underlying the unity of the concept of matter. And indeed, even an intuitive, not yet fully cognitive access to movability is impossible, since 'in space considered in itself there is nothing movable' (A41/B58).<sup>32</sup>

This point about motion and *a priori* intuition is worth emphasizing, because it dictates the second step in Kant's substitution strategy. We might be tempted to think that Kant's descriptions of the method for determining space *a priori* in intuition—namely, geometrical construction—allows for some kind of abstract or pure intuition of motion. Construction, on Kant's view, is the exhibition or presentation (*Darstellung*) in pure intuition of a geometrical figure corresponding to a given concept.<sup>33</sup> In the context of his theory of construction, the static quality of geometrical figures is obscured

by the fact that the *process* of construction was regarded, both by Kant and by the larger tradition, as the mental activity of producing geometrical figures through a kind of imaginative drawing.<sup>34</sup> Thought of in this way, geometrical figures are produced by what is naturally conceived of as a constructive drawing motion of some sort. In the larger transcendental context of Kant's philosophy, the static quality of the object of pure intuition is further obscured by Kant's explanation of how the forms of intuition themselves are produced by the transcendental imagination. This explanation involves appeal to what we might call a transcendental motion, originally productive of the form of space itself.<sup>35</sup> Clearly, Kant's appeals to these other, non-empirical kinds of motion may persuade us to adopt the idea that some *a priori* direct presentation of motion is possible. To be so persuaded, however, would be a mistake. Even granting transcendental and constructive motion as necessary to the process of *generating* a geometrical figure, it in no way follows that the figure so generated contains or involves any motion *per se*, or that the generative motions in questions are themselves objects of intuition. And given Kant's insistence on the impossibility of an *a priori* exhibition or presentation of motion, we have positive reasons to resist drawing any such conclusion.<sup>36</sup>

Knowing that matter is the movable, therefore, does not by itself get Kant the pure intuition he needs. He is therefore forced to use indirect means for obtaining his substitute intuition. This indirect option requires that Kant devise a method for interpreting what *is* available in pure *a priori* intuition—namely, static geometrical figures—not as directly presenting, but as representing, actual and possible motions.<sup>37</sup> Arriving at such an interpretative method is the second step of Kant's substitution strategy. If such a method can be found, then we can use the static figures as pure intuitive substitutes for the empirical intuitions actually underlying the concept of matter, by means of the connection between matter and motion. Possessed of such substitutes, we will be in a position to make the synthetic *a priori* judgements connecting the logical essence of matter with its real essence.

### 3.2. *Static Geometrical Figures and the Representation of Motion*

Explaining how a static geometrical figure can be interpreted as representing motion, and understanding which such figures can be so interpreted, is the task of the first chapter of the *Metaphysical Foundations*: the Phoronomy. The challenge, according to Kant, arises from the fact that geometrical figures are merely spatial, while motion involves time as well. Thus we must somehow grasp static geometrical figures as capturing 'not solely, as in geometry, the space described, but

also the time in which, and thus the speed with which, a point describes the space' (4: 489).<sup>38</sup> But if it is true that pure intuited figures themselves cannot directly present any motion, then the key task is to show how the temporal aspects of a motion can be seen in a static figure.<sup>39</sup> Only then will a purely *a priori* ground for the synthetic judgements linking logical and real essence be possible, and thus only by generating such an interpretative method can we achieve the systematic unity demanded by reason.

The interpretative method Kant derives is a relatively simple one. He begins by adopting the straightforward rule that we should regard every line segment, no matter what its length, as representing a motion occurring in one unit of time.<sup>40</sup> Thus the temporal component of motion is not presented directly in the figure by means of an independent geometrical element, but is represented in the figure by the fact of the delimitation of each segment occurring in it. While such an approach is unproblematic for simple lines representing simple motions, it is not immediately clear how we might use this method to represent composite motions (or, equivalently, how we might interpret figures containing multiple line segments as representing motions). To see the difficulty here, we can use one of Kant's own examples.

Kant defines composition of motion as 'the representation of a single motion as one that contains two or more motions at the same time ... insofar as they constitute one motion *combined*' (4: 489). Now, consider an object (regarded in phoronomy as a point) whose motion is to be represented as the composition of two motions in the same direction.<sup>41</sup> Let us designate one of these two motions **AB** and the other **ab**, and suppose that **AB** is represented geometrically by a line segment *AB* and **ab** by *ab*. We might be inclined to represent the composite motion of the point in question by means of a figure *ABC*, formed by placing line segment *BC*, of the same length as *ab*, end-to-end with *AB*. Yet given Kant's rule according to which each line segment must be understood as representing the distance traversed by a motion in one unit of time, if *ABC* represents the motion of the point, then we must regard *ABC* as representing a distance traversed in *two* units of time, since it is a figure containing two line segments. Interpreted in this way, *ABC* represents a motion in which **AB** is simply continued, spatially and temporally, after its end (represented by point *B*) by **ab** (represented here by *BC*). Under such an interpretation, the motion represented by *ABC* is a 'composite' motion only in the weak sense that it is a spatial and temporal *continuation* of **AB** by **ab**. But this weak sense of composition does not

fit Kant's requirement for true composition, since when interpreted this way,  $ABC$  does not represent  $ab$  as occurring at the same time as  $AB$ , but rather after it. We get, in some sense, an addition of motion, when what we wanted was a composition. In the simple case where  $AB$  and  $ab$  are equal, and thus  $AB$  and  $BC$  are equal,  $ABC$  represents a motion in which a distance twice that traversed in  $AB$  is traversed in twice the time taken by  $AB$ . But a proper composition, again in the simple case, would be a motion traversing twice the distance traversed in  $AB$ , but in the same time—that is, one in which  $AB$  was combined with  $ab$  into a motion with twice the speed.

The challenge for Kant here is to represent strong or proper composition with the same static geometrical tools already used to represent mere addition of motion. More specifically, the challenge is to interpret  $ABC$  itself as representing such a composition, but in a way that obeys the rule requiring each segment to represent a distance traversed in one unit of time.<sup>42</sup> Kant's claim is that we can understand  $ABC$  as representing a proper composition of  $AB$  and  $ab$  by reinterpreting the meaning of  $BC$ . This reinterpretation relies on Kant's version of the relativity of motion, according to which motion 'can be viewed arbitrarily as motion of the body in a space at rest, or else as rest of the body, and ... motion of the space in the opposite direction with the same speed' (4: 487). Availing himself of this principle, Kant proposes that if we take  $AB$  to represent the motion  $AB$  of the point in absolute space, we can ascribe the motion  $ab$  to a relative space within which  $AB$  is included. We can then interpret  $BC$  as representing the motion, in the direction from  $C$  to  $B$ , of that relative space. In this way, we can interpret  $ABC$  as representing—precisely by means of the figure's containing two distinct segments—the two motions as motions of the one point in one time (one a motion of the point proper, the other a motion of it along with its space). The result is an interpretation of  $ABC$  such that it represents composite motion properly so called.

Kant's rule of interpretation, according to which composition of motion must be represented by attributing one of the motions composed to a point in absolute space and the other to the corresponding relative space in the opposite direction, is given as the sole Proposition (*Lehrsatz*) of Phronomy (4: 490). With this interpretative rule in place, Kant has taken the second step in his substitution strategy, and a major step towards his ultimate metaphysical goal. For if we accept that matter is the movable, and if we can understand each of the properties in the logical essence of matter in terms of this movability, then by the construction of figures suited to phronomical interpretation we can relate each of these properties to a

pure intuition that can be used to ground synthetic *a priori* judgements about matter. These judgements, presumably, will ultimately lead us to the real essence of matter, and thus to our systematizing principle.

### 3.3. From Impenetrability to Essential Forces

In the Dynamics, Kant considers matter's logically essential property of impenetrability, and shows how impenetrability can be understood in terms of motion. Kant's considerations here can be reconstructed fairly plainly. We know from its logical analysis that matter is impenetrable. The relation of impenetrability to movability is apparent when we consider that penetration into a space is a kind of motion. Impenetrability, then, is just resistance to that penetrating motion. Accordingly, the Dynamics begins with the claim that matter is 'the *movable* insofar as it *fills* a *space*', where '[t]o fill a space is to resist every movable that strives through its motion to penetrate a certain space'. But to resist a motion is to cause it to be diminished, and so when we say matter is impenetrable, we predicate of it 'a property relating as cause to effect' (4: 496). As we know from the Proposition of Phoronomy, 'nothing can be combined with a motion, which diminishes or destroys it, except another motion of precisely the same movable in the opposite direction' (4: 490). Thus the cause of the resistance through which matter diminishes penetrative motion into its space is a cause of motion.<sup>43</sup> Kant's term for a cause of motion is *force*, and specifically *moving force*, and thus matter as impenetrable contains a moving force. On this basis, Kant formulates Proposition 1 of the Dynamics, according to which 'matter fills a space ... through a particular moving force' (4: 497), a force explicitly identified in Proposition 2 as a repulsive force.<sup>44</sup> The property of filling space through repulsive moving force, however, is not among the properties making up the logical essence of matter; we know this from Kant's appeal to pure intuition via his invocation of the Proposition of Phoronomy in the course of his argument. Yet in Proposition 6, Kant claims that this property is essential to matter.<sup>45</sup> If this force is essential, and not part of the logical essence of matter, then it must be part of the real essence of matter.

We can see Kant's metaphysical method, and the role played by the phoronomical interpretation of geometrical figures in that method, if we examine this argument a little more closely. The judgement attributing an essential repulsive force to matter can only count as a metaphysical one expressing (a component of) the real essence of matter if it is *a priori*. Its apriority, in turn, clearly depends on the validity of the phoronomical procedure (as well as on various synthetic *a priori* principles from the first *Critique*). According to that procedure, we can

interpret a geometrical figure as representing a change in the motion of some body *L* as it approaches some other body *K* by regarding that figure as representing a composition of motions. More precisely, the figure would represent, by appropriate line segments, both the original motion of *L* towards *K*, and a second motion of the corresponding relative space in the direction from *K* towards *L*. By the principles of the first *Critique* (specifically here, the Second Analogy), this second motion must have some cause; in calling *K* impenetrable, we claim that *K* is the cause of this second motion. But in saying that *K* is the cause of a motion, we say it is possessed of a repulsive moving force.

The key point here is that in regarding the impenetrability of matter as bringing about a change in motion, we are required to represent impenetrability through a composition of motion. If we want to represent such a composition through an *a priori* pure intuition, we can do so, but we must arrive at the relevant geometrical figure by considering the phoronomical rules for its interpretation. Were those rules different, we might be committed to ascribing some other property to matter's real essence. But the Phoronomy has demonstrated the necessity of these rules. We thus know, through appeal to an *a priori* intuitive representation, that matter as the impenetrable movable has such a repulsive force in its essence, even though that force does not appear in its logical essence. In other words, assuming that our entitlement to our interpretative procedure is itself *a priori*, we know the synthetic *a priori* truth that there is a repulsive force belonging to the real essence of matter.

Kant attributes a further force to the real essence of matter as well: a fundamental force of attraction. He reasons that if matter had only an essential force of repulsion, it would dissipate itself infinitely in space, to the point where the repulsive force it exerted in any given region would be, even if nonzero, nevertheless of 'no specified quantity'. But an infinitely small repulsive moving force in any region of space would lack any capacity to diminish motion, and consequently there would be no impenetrability anywhere. Yet we know from an analysis of its concept that matter is impenetrable. Thus Kant concludes that 'matter requires for its existence forces that are opposed to the expansive forces' (4: 508). Opposed to the essential repulsive force, then, is an 'attractive force' that 'belongs to the possibility of a matter as matter in general', a force that is 'a fundamental force belonging to its essence' (4: 509).

Here again the phoronomical constraints on interpreting geometrical figures are central to Kant's argument. He argues that we cannot conceive

of the material universe as a totality of *merely* mutually repelling bodies possessed *only* of repulsive force, since then the repulsive force essential to each would be infinitely dissipated. Thus we know that, in order to check the dissipation of repulsive force, matter must have a second force acting in it. The phoronomical rules for the composition of motions, however, require that this second force act in a direction precisely opposite to that of the repulsive force. Hence the second force acting in matter must be directed towards the centre of each part of matter. Again, if composed motion could be represented in pure intuition in some other fashion, matter might have some other real essence. But the phoronomical method is the only possible one.<sup>46</sup> In this way, Kant argues that special metaphysics allows us to discover repulsive and attractive forces as principles of the impenetrability belonging to the existence of any object of outer sense.

### 3.4. *The Real Essence of Matter and Systematic Unity*

Kant goes on in the Dynamics to discuss further properties of matter, but these discussions assume the essentiality of the fundamental forces. The first obvious bit of systematization of natural science in the *Metaphysical Foundations*, namely the derivation of Newton's first and third laws of motion in the Mechanics (the third chapter), also clearly depends on the previous demonstration of such essential forces. And once the Phenomenology (fourth chapter) takes up the way to distinguish true from apparent motion, the plan for the full systematization of our empirical cognitions is clear: insofar as these cognitions can be fully translated into descriptions of the true motions of material objects, they can be systematized under the laws for such motions.<sup>47</sup>

Kant's procedure in the later chapters, and their relation both to the earlier chapters and to the transcendental philosophy, are of considerable interest in their own right. But our question about the coherence of Kant's special metaphysics and its role in achieving Kant's systematic philosophical aims can be pursued by focusing on what we have seen already in the Dynamics, and by noting that whatever else he accomplishes in the *Metaphysical Foundations*, he never achieves his own explicitly stated and systematically justified goal of reducing the two essential forces of attraction and repulsion to one essential force, or to one common metaphysical ground. That is, despite all the efforts he makes, Kant does not in fact find 'the first inner principle of all that belongs to the existence' of matter (4: 467).

My argument is that this failure is a real one. To see why it is and what it means, we should recall exactly why Kant is looking for such a first



inner principle at all. Reason 'prescribes and seeks to bring about ... the *systematic* in cognition, i.e., its interconnection based on one principle' (A645/B673), and the establishment of such systematicity counts as 'reason's own empirical use' (A643/B671). In this empirical use, reason 'presupposes an idea, namely that of the form of a whole of cognition' and through this idea 'postulates the complete unity of the understanding's cognition, through which this cognition comes to be ... a system interconnected in accordance with necessary laws' (A645/B673). The function of the essential forces of matter in such a system is to coordinate a series of empirical relations and laws under higher principles; the concept of essential force is used to 'reduce the apparent variety' of empirically detected forces in nature to as few forces as possible, until even the 'comparatively fundamental forces' of attraction and repulsion are thought under a higher idea, 'so as to discover their unanimity and thereby bring them to a single radical, i.e., absolutely fundamental, force' (A649/B679).

The discovery of a first inner principle of matter, a single and unique real essence, is thus not quite an ultimate aim of reason as such, but one of its intermediate aims, insofar as such a discovery would make realizable reason's deeper goal of systematicity. This intermediate aim is one set by the basic condition of cognition in general: the unity of apperception. The systematic unity demanded by reason is therefore not to be regarded as an imposition on the understanding from without, as though the understanding might just as well function correctly and coherently in the absence of such unity; it is rather the condition of possibility of the understanding itself, and is thus one of those aspects of our cognition 'grounded in the nature of our powers' and their 'correct use' (A642/B670).

Yet in the *Metaphysical Foundations* Kant never gets more fundamental than the repulsive and attractive forces—he arrives at no absolutely fundamental force. The natural conclusion, then, would be that special metaphysics has failed to achieve its systematic goal. Yet the directness and clarity with which Kant recognizes the incompleteness of his matter theory suggests something other than total disappointment and failure on his part. 'The concept of matter is reduced to nothing but moving forces', Kant writes, 'But who pretends to comprehend the possibility of the fundamental forces' (4: 524)? Knowledge of 'the first grounds of things', including knowledge of an unconditioned absolutely fundamental force, is an 'inconceivable' goal of reason (4: 564), and when reason grasps the impossibility of finding an object for such an idea,

says Kant, it turns away from the consideration of it and back towards a study of ‘the ultimate limits of its own unaided powers’ (4: 565).

We should of course be inclined to take this general and abstract admission of the unrealizability of his explanatory and systematic goal for what it is: an exemplary case of Kantian modesty. Indeed, what we have here is just the claim that the attempt to ground the real essence of matter in an absolutely fundamental force should be taken as an instance of Kant’s famous doctrine of the regulative use of the transcendental ideas. Since Kant himself restricts these ideas to such a regulative use, he can hardly be said to be unaware of the results of doing so.

Yet we should not imagine that invoking the regulative use of the concepts of reason converts the failure here into a victory; all the regulative restriction amounts to is an admission of the necessity of this failure. What we should be more interested in is the cause of the failure, or in this case, the moment in Kant’s method when the impossibility of arriving at the single real essence of matter is set in systematic stone. Kant himself does not specify a single such moment, but we have seen a few candidates in the course of the reconstruction above. There is the beginning empirical conditionedness of our possession of the concept of matter, and there is the apparent empirical conditionedness of the claim that all properties of matter are to be referred to motion. Finally, there is the fact that the ground of our purported synthetic *a priori* claims is itself a substitute ground generated by an interpretative procedure. Any one of these, or perhaps all together, show us ‘the ultimate limits of [reason’s] own unaided powers’ in the incompleteness of the *Metaphysical Foundations*, and thus how this text fits in as part of Kant’s Critical project overall.

Again, we should resist the inclination to regard the regulative use of reason here as one in which the idea of a fundamental force appears as a mere hypothesis or a heuristic for the efficient practice of empirical natural science—as though Kant were giving a bit of helpful laboratory advice to a junior colleague. On such a reading, Kant’s strenuous efforts in his substitution strategy would make no sense, since a mere heuristic cannot demand that such a stringent interpretative principle be developed. Were a fundamental force a mere hypothesis, any particular use of geometrical figures to model it would have only experimental or *a posteriori* warrant through its pragmatic success, rather than being subject to strict *a priori* constraints on its proper use. And in any case, Kant himself explicitly rejects this understanding of the regulative use of reason, claiming instead that the idea of an absolutely fundamental

force 'pretends to objective reality', with the result that 'an apodictic principle of reason is erected' (A650/B678); in fact it is this principle that Kant regards as securing the 'coherent use of the understanding' required for 'the sufficient mark of empirical truth' (A651/B679). The pretence here is, as it were, in deadly earnest—reason really pretends, and really erects the principle. Of course, it is entirely correct to point out that the demand here is only that: a demand for, and not a proof of, the objective reality of such a force. Yet to do so is not to get Kant out of the problem, but to describe it. If P is demanded for Q, then, lacking P, we lack Q; if an objectively real ultimate fundamental force is demanded for the coherent use of the understanding, then, lacking such a force, we lack such a use. To classify the idea of such a force as regulative is simply to assert that we lack it necessarily; otherwise put, if the understanding is always in search of the condition of its coherence, then it always lacks coherence.

Thus it is my claim that the insistence of reason on the objective reality of a fundamental force captures the tension operating within the *Metaphysical Foundations* and shows the mistake we would commit by trying to resolve this tension, either by saying that reason knows all along that it cannot have access to the real essence of matter, or by saying that reason in fact can have such access. Reason insists on the apodictic principle that there is such a single fundamental force, and on its objective reality (that is, its discoverability, not merely its abstract desirability)—whence the demand for an *a priori* special metaphysics of nature and all the methodological twists and turns used to get one. Without a rigorous attempt at such a metaphysics, reason cannot regard the understanding as pursuing its (both reason's and the understanding's own) goals. But reason also insists on the conditionedness of our experience, and so on the distinction between the *a priori* and the *a posteriori*. The conditionedness of our experience of determinate objects means that no matter what technical devices we might be able to generate for the geometrical representation of motion, the empirical character of the concept of matter will render the synthetic judgements based on that concept non-*a priori*, and thus will render such a metaphysics incomplete.

What is perhaps surprising here is that the failure of the *Metaphysical Foundations* to generate an *a priori* real essence of matter must be, on Kant's view, a good and indeed necessary result, despite the fact that the pursuit of such an essence is also necessary. A successful demonstration that the content of the *Metaphysical Foundations* is *a priori* would violate the Critical limits of the understanding, while a successful demonstration that such content could only ever be *a posteriori* would

deny reason's apodictic principle of the objective reality of a single absolutely fundamental force. Any reading of Kant's system, then, that proceeds on the assumption that Kantian reason cannot issue genuinely contradictory demands is a reading that runs counter to Kant's own method for carrying out a critique of metaphysics and producing a subsequent reformed metaphysics.

In terms of the actually generated content of the special metaphysics of nature, we can see how this dialectical result shows up 'on the ground'. The determinacy of the essential forces of attraction and repulsion is the very thing that lends them their superior systematizing power with regard to empirical laws when compared to the categories and principles of the first *Critique*. This determinacy is, and can only be, grounded in their non-transcendental, i.e. their empirical, status. But precisely insofar as this empirical character distinguishes the principles of special metaphysics from those of general metaphysics, it is both the key to the possibility of special metaphysics, and the insurmountable obstacle to its successful completion.

#### 4. Conclusion

Kant's special metaphysics of nature should be understood as expressing, through its failure to achieve its own stated and justified goal, Kant's position on the dialectical nature of human reason. Interpretations of the *Metaphysical Foundations* that either attempt to resolve the tension between apriority and empirical character, or ascribe to Kant the claim that reason's demand for systematicity is merely heuristic, are therefore unsatisfactory in two ways: they fail to understand the argumentative structure of the *Metaphysical Foundations*, and they fail to recognize the depth of Kant's commitment to the idea of reason's 'peculiar fate' (Aviii). This fate consists in the fact that 'human reason ... is already dialectical on account of the tendency of its nature' (A849/B877). While Kant of course understands the project of the Critical philosophy as aimed at avoiding the pernicious consequences of reason's dialectical nature, he does not think that this nature can be overcome, avoided, or otherwise made to go away. Indeed, he makes the opposite claim: while the Transcendental Dialectic can 'uncover' the dialectic of reason, and even 'protect us from being deceived by it', it 'can never' make it 'disappear'. Dialectical form is 'natural and unavoidable' and 'irremediably attaches to human reason' (A298/B354).

We are inclined, perhaps, to think that such a dialectical fate is always being worked out somewhere else, in some other argument, on some

other page. But if I am right about the *Metaphysical Foundations*, Kant is not only interested in displaying the illusions that dialectical reason generates in general metaphysics, but also in special metaphysics, where the dialectical nature of reason must also appear. There is of course a serious question to be asked about the status of the reason responsible for the assertions of the *Critiques* themselves; the problem of the double genitive in the titles of the *Critiques* is not merely literary, merely philological, or otherwise to be excluded from philosophical reflection. But even bracketing those issues, we can see that the reason operating in special metaphysics can only be the very reason found to be naturally, and irremediably, dialectical in the first *Critique*. If this is true, then the only consistent option for Kant is to have the *Metaphysical Foundations* set up an unachievable, but still wholly necessary, goal for reason and the understanding, and then to leave this goal unmet. In that sense, this work can be thought of as Kant's pragmatic demonstration of a kind of cognitive-normative 'ought but cannot'.

Finally: it may seem that if Kant's project is designed to come up short here, it must also be immune to attack. After all, what objections could possibly be raised against it that would show it to have done worse than it was designed to do? Yet Kant's idealist successors neither tried to resolve the contradiction here (in the way contemporary Kant scholarship tends to do), nor tried to dismiss Kant's project for setting itself a task it could not complete. If anything, Fichte, Schelling, and Hegel embraced the project of the *Metaphysical Foundations* and attempted to deepen and extend it. In the case of Hegel, for instance, his complaints about Kantian matter theory are almost all best understood as complaining that Kant does not sufficiently make explicit the fundamentally dialectical character of all of reason's efforts. As he puts it in the *Science of Logic*, 'deeper insight into the antinomial, or more truly into the dialectical, nature of reason' shows that the content of 'any concept whatsoever' can be expressed in 'the form of an antinomial assertion'.<sup>48</sup>

Not everyone takes agreement with Hegel's understanding to be the sign of a good Kant interpretation, and I do not want to suggest that the interpretation I advance here is either dependent upon, or directly implies, any particular post-Kantian thesis or claim. Its hermeneutical merits reside, first, in maximally preserving Kant's own claims about his special metaphysics of nature, including his claims about motion and geometrical representation and, second, in attributing the minimum number of implicit commitments to his argument. Finally, to return to the theme with which I opened this paper, the interpretation I propose

also allows us to get a perspective on Kant's ambition and modesty that fits well with his view of reason itself. To attempt to determine the nature of reason as such is indeed ambitious. But to conclude that reason is knowably and unavoidably dialectical, at odds with itself, and therefore by nature necessarily finite, and to conclude this without tipping over into the radicalism of the sceptic or the asceticism of the quietist, is all the modesty one could hope for.

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### Notes

- 1 The Cambridge University Press translations of Kant's works are used throughout when available, sometimes slightly modified. Other translations are the author's own. On the scope and aim of Kant's practical and theoretical philosophy, see 4: 389 and Bxxii–xxiv respectively.
- 2 See Axiii–xiv.
- 3 Langton (1998) takes this dynamic to be central to Kant's project.
- 4 On marriage contracts, see the *Doctrine of Right*, 6: 277–80; on specific density, see the *Metaphysical Foundations of Natural Science*, 4: 525–35. As Ripstein (2009: 370, n. 36) makes clear, these issues are not entirely separate, since Kant's theory of matter plays a role in validating the apriority of his political philosophy.
- 5 The recent interpretations most relevant to my concerns here are Buchdahl 1969; Cramer 1985; Friedman 1992, 2005; Plaaß 1994; Pollok 2001, 2002; Warren 2001.
- 6 See 4: 469–70 and A847–8/B875–6.
- 7 See also A848/B876.
- 8 The claim is in all three editions of the *Metaphysical Foundations* (1786<sub>1</sub>, 1787<sub>2</sub>, and 1800<sub>3</sub>) and in both edns of the first *Critique*; see nn. 6 and 7 above.
- 9 See the Preface to the *Metaphysical Foundations* (4: 467–97), the Appendix to the Transcendental Dialectic (A642–68/B670–96), and the Doctrine of Method (A712–38/B740–66).
- 10 So, for instance, Plaaß (1994: 285) and Pollok (2002: 84) claim that the *content* of the concept of matter is available *a priori*, while we depend upon sensation, empirical intuition, and/or experience for proof of its objective reality. Friedman (1992: 158) claims that universal and immediate gravitational attraction is 'in an important sense *a priori*', though he does not specify how it might differ from the apriority Kant ascribes to other claims.
- 11 Thus given the view of empirical concepts I argue for in section 2.3, I cannot agree with the view of Plaaß (1994: 282–90) on the empirical status of the concept of matter (see n. 10 above and nn. 26 and 30 below); given the view of geometrical representation of motion I argue for in §§3.1–3.2, I cannot agree with Friedman (1992: 201) that motion is available as an object of pure intuition in virtue of the transcendental description of space (see also n. 32 below).
- 12 See A648/B676 and §3.4 below.
- 13 See Kant's famous claim that 'the *transcendental unity* of apperception is that unity through which all of the manifold given in an intuition is united in a concept of the object' (B139). For the purposes of this essay, I take it as granted that this unity is the basic condition not only for representation, but for the objecthood of objects as well; see nn. 15 and 17 below. For a helpful recent survey of the issues here, see Guyer (2006: 72–95).

- 14 The categories 'are only rules for an understanding whose entire capacity consists in thinking, i.e., in the action of bringing the synthesis of the manifold that is given to it in intuition from elsewhere to the unity of apperception' (B145).
- 15 The table of categories 'completely contains all the elementary concepts of the understanding, indeed even the form of a system of them in the human understanding' (B109–10) and 'is systematically generated from a common principle, namely the faculty for judging (which is the same as the faculty for thinking)' (A80–1/B106); this 'common principle' is the transcendental unity of apperception.
- 16 Hence the Architectonic of Pure Reason (A832–51/B860–79).
- 17 In calling an empirical judgement objective, says Kant, 'I do not mean to say that these representations *necessarily* belong to one another in the empirical intuition, but rather that they belong to one another *in virtue of the necessary unity* of the apperception in the synthesis of intuitions' (B142).
- 18 On the content of transcendental philosophy and deductive closure, see Kant's discussion of derivative pure concepts (A81–3/B107–9).
- 19 The first *Critique* provides 'the laws that make possible the concept of a nature in general' (4: 469), namely, the laws of the possibility of things as such.
- 20 Related to the material definition of nature is Kant's characterization of nature as 'the sum total of all appearances'; see e.g. (4: 318) and (A418–419n/B446n). The shift from subject-focused transcendental philosophy to object-focused metaphysics is already present in the shift between these formulations from 'appearances' (transcendental philosophy) to 'things insofar as they can be objects' (metaphysics).
- 21 See 4: 471.
- 22 In the *Prolegomena*, Kant asserts that metaphysics requires 'fundamental propositions' (4: 266) that must be *a priori* ('Metaphysical cognition must contain nothing but judgements *a priori*': *ibid.*) and synthetic ('*Properly metaphysical* judgements are one and all synthetic': 4: 273–4).
- 23 See e.g. the *Prolegomena* (4: 266) for a clear statement of the distinction; for an in-depth treatment, see Anderson 2005.
- 24 Kant discusses the logical essence/real essence distinction in a number of lectures; see e.g. the *Vienna Logic*: 'We speak of the essence of things according to the concept that we have of things, according to the logical concept. But we can also ask about the essence of the thing in and of itself. This is what constitutes the essence and belongs to it necessarily, even if it is not contained in our concept, in short, the basis of a body. This is the real essence. The other is the logical essence.' In the *Metaphysical Foundations* Kant distinguishes 'essence' (logical essence) and 'nature' (real essence). In the lectures he is clear about the strict parallel between these vocabularies; the *Vienna Logic* continues: 'The real essence is also called the nature. If I distinguish essence and nature, then I distinguish the logical from the real essence. When we abstract the marks of our concept, we have the logical essence. But if we investigate the innermost ground of a body, then I will cognize its nature, i.e., its essence' (24: 839–40).
- 25 The judgements in question cannot be simple instantiations of more general synthetic *a priori* propositions. Consider that if it is a synthetic *a priori* truth that all events in space and time have a cause, then it is arguably also a synthetic *a priori* truth that the breaking of my window last night had a cause. But no such instantiation could count as providing the more determinate principle Kant is seeking for the systematization of empirical cognition.
- 26 Kant writes in the Postulates that a concept is empty whenever the synthesis it contains 'does not belong to experience, either as borrowed from it, in which case it is an *empirical concept*, or as one on which, as a *priori* condition, experience in general

- (its form) rests, and then it is a *pure concept*' (A220/B267). The synthesis is 'borrowed' from experience when the concept relates to objects by means of empirical intuitions, which are themselves related to the object through sensation (A19–20/B33–4). In the *Logic*, Kant explicitly states that the content of empirical concepts is always drawn from experience: 'An empirical concept arises from the senses through comparison of objects of experience ... [It is] actual experience from which, as to their content, they are drawn' (9: 92). This taxonomy of concepts clearly rules out the argument (central to Plass 1994 and echoed in Pollok 2001 and Cramer 1985) that Kant allows for a variety of empirical concepts whose content is derived not from experience but from *a priori* sources, whose objective validity is thus demonstrable *a priori*, whose objective reality must be demonstrated in experience, and whose name is shared with ordinary empirical concepts (Plass 1994: 282–90).
- 27 See A618/B646; A848/B876; 4: 295; and 24: 116.
- 28 Kant calls the concept of impenetrability empirical at B5 and A173/B215, among other places. Extension is clearly an *a priori* concept. The status of lifelessness is less clear, but since Kant (a) often omits it from the analysis of the concept of matter (e.g. A618/B646) and (b) derives the law of inertia as Proposition 3 of the *Mechanics* (4: 543–4), I do not consider it here.
- 29 In 'On a Discovery' Kant claims that the possibility of synthetic *a priori* judgements is grounded in 'the pure intuition underlying the concept of the subject [of the judgement], whereby it is possible, indeed alone possible, to link a synthetic predicate *a priori* with a concept' (8: 242); see earlier in the same essay at 8: 239–40, and also A9/B23.
- 30 Of course, any empirical intuition has pure *a priori* conditions of its own; but if special metaphysics is to provide a determinacy general metaphysics cannot provide, then it has to get that determinacy from something not itself available within general metaphysics. Thus the pure *a priori* conditions of empirical intuition cannot themselves deliver this determinacy.
- 31 Kant does not, or does not explicitly, claim that the connection between matter and movability is an *a priori* one. Although we might expect him to do so, he never lists movability as part of the logical essence of matter, and he seems to establish the connection between matter and movability in a more or less empirical or immediate way, simply asserting that 'the basic determination of something that is to be an object of the outer senses had to be motion, because only thereby can these senses be affected' (4: 476).
- 32 Friedman (1992) has proposed that there is a kind of motion—the geometrical-constructive description of space by the motion of a point—that is available in pure intuition, and he bases his resolution of the apparent tension in the *Metaphysical Foundations* on the idea that Kant uses this kind of motion to ground synthetic *a priori* judgements in special metaphysics (see n. 11 above and n. 34 below). But in Remark 1 to Explication 1 of the *Phoronomy*, Kant states that 'no other property is here ascribed to the *subject* of motion, namely, matter, aside from *movability*' (4: 480). Thus even though he talks there about the motion of a point, he ascribes to this point the very movability he has just said cannot be cognized *a priori*. See Pollok 2006 for an extensive discussion of the different kinds of motion in Kant. See also §3.4 below.
- 33 '[T]o *construct* a concept means to exhibit (*darstellen*) *a priori* the intuition corresponding to it' (A713/B741). Kant, of course, regards any intuited object as a representation, and speaks primarily of constructions of the concept of motion, not of constructions of geometrical objects (e.g. at 4: 486). My alternative way of talking about presentation, representation, and construction is meant more clearly to track Kant's method for the purposes of this paper. It is not meant to imply that e.g. intuitions used in pure geometry are not representations.



- 34 See the first *Critique*: 'We cannot think of a line without *drawing* it in thought, we cannot think of a circle without *describing* it, we cannot represent the three dimensions of space at all without *placing* three lines perpendicular to each other at the same point' (B1 54). Friedman (1992: 122–35) emphasizes the motion that occurs in the drawing of pure intuited figures, as does Pollok (2006).
- 35 Thus there are three kinds of motion in Kant's theoretical philosophy: empirical motion of an object in space, constructive motion required for the presentation of static geometrical objects in pure intuition, and transcendental motion productive of the forms of intuition themselves. On transcendental motion, see B1 55n; see also Pollok 2006.
- 36 Thus, on my view, Friedman is mistaken to infer from the necessity of transcendental and/or constructive 'motions' to the availability of motion as an object of pure intuition.
- 37 Kant has eliminated the possibility of appeal to pure temporal intuitions already, as part of his rejection of the possibility of a science of the soul; see 4: 471.
- 38 Since 'speed' is Kant's term for the quantitative determination of motion by which space (distance traversed) is related to time (units elapsed), he states his position here by noting that '[i]n phoronomy we use the word "speed" purely in a spatial meaning' (4: 485). For a full account of the metaphysics involved in this claim, see Warren 2001: 12–19, 22–30.
- 39 In Kant's own terms, the issue is about what I 'attend to' (*Acht haben auf ...*) (4: 489) in the pure intuitive figure; more specifically, it is about how I can attend to the static figure as representing both space and time.
- 40 '[T]he lines ... designating the speeds are, properly speaking, the spaces they traverse in equal times' (4: 490); thus 'the ratio of speed results immediately from the ratio of the lines' (4: 489).
- 41 Here I reconstruct the first case from the proof of the Proposition of Phoronomy (4: 490–1) using Kant's terms; the associated figure is Figure 1 in Kant's text.
- 42 It is clearly not acceptable simply to eliminate point *B* and regard *AC* as capturing such a composite motion, since *AC* would be only one segment, and thus would not represent two motions as combined, but would only represent one motion. The trick is to keep the multiple motions in the figure without having their multiplicity compromise the unity of the composed motion.
- 43 Technically, according to Proposition 1 of the Phoronomy (what Kant calls 'the Phoronomical Proposition', because it is the only proposition of that section), I must represent material body *K*, into whose space material body *L* is attempting to penetrate, as the cause of the motion away from *K* of the relative space in which *L* is moving, where the motion caused by *K* is opposite in direction to the motion of *L*.
- 44 See Dynamics, Explication 2: '*Repulsive force* is that by which a matter can be the cause of others removing themselves from it (or, what is the same, by which it resists the approach of others to it)' (4: 498), and Proposition 2: 'Matter fills space through a repulsive force of all its parts' (4: 499).
- 45 'A property on which the inner possibility of a thing rests, as a condition, is an essential element thereof' (4: 511).
- 46 Kant uses the ascription of attractive force to matter (or body) as an example of the discovery of a real essence in his lectures; see e.g. the *Metaphysik L*2: 'We posit a logical essence through the analysis of the concept. The first ground of all predicates thus lies in a concept, but that is not yet a real essence. E.g., that bodies attract belongs to the essence of things, although it does not lie in the concept of the body' (28: 553); see also the *Metaphysik Mrongovius* (29: 807) and the *Blomberg Logic* (24: 116).
- 47 I take my position here to accord with Friedman's rejection (2005: 262) of Buchdahl's insistence on 'a fundamental distinction between Kant's transcendental theory of human

experience in the first *Critique* and his more specific views about the foundations of the mathematical exact sciences as expressed in such works as the *Metaphysical Foundations*'. But Friedman is mistaken when he distinguishes the first *Critique* from the *Metaphysical Foundations* solely on the basis of 'the manner in which the categories and principles of the understanding are considered' (Friedman 2005: 271). He is right that, in the first *Critique*, these are considered as 'derived from the spontaneity of the subject', and that in the *Metaphysical Foundations* 'they are taken simply as given, as premises for further derivations of principles of pure nature science from them' (ibid., p. 270). Yet this distinction only indicates that special metaphysics presupposes general metaphysics, and such a presupposition relation cannot account for the additional determinacy of content found in the *Metaphysical Foundations*. Thus in addition to the premises provided by the first *Critique*, Kant helps himself in the *Metaphysical Foundations* to the content of the empirical concept of matter. Understood this way, special metaphysics has a genuinely distinct domain, without implying the kind of manifest image/scientific image distinction Buchdahl makes and Friedman rightly rejects.

48 Hegel 1986: 216–17.

## References

- Anderson, R. Lanier (2005) 'The Wolffian Paradigm and its Discontents: Kant's Containment Definition of Analyticity in Historical Context'. *Archiv für Geschichte der Philosophie*, 87, 22–74.
- Buchdahl, Gerd (1969) *Metaphysics and the Philosophy of Science*. Oxford: Oxford University Press.
- Cramer, Konrad (1985) *Nicht-reine synthetische Urteile a priori: Ein Problem der Transzendentalphilosophie Immanuel Kants*. Heidelberg: Carl Winter Universitätsverlag.
- Friedman, Michael (1992) *Kant and the Exact Sciences*. Cambridge, MA: Harvard University Press.
- (2005) 'Kant on Science and Experience'. In E. O'Neill (ed.), *Early Modern Philosophy: Mind, Mater, and Metaphysics* (Oxford: Oxford University Press), 262–75.
- Guyer, Paul (2006) *Kant*. London: Routledge.
- Hegel, G. W. F. (1986) *Wissenschaft der Logik I*. In E. Moldenhauer and K. M. Michel (eds), *Werke* (Frankfurt a. M.: Suhrkamp), vol. 5.
- Kant, Immanuel (1902ff.) *Kants Gesammelte Schriften*. Ed. Königlich Preussische Akademie der Wissenschaften. Berlin: de Gruyter. (Cited by volume and page number, except for the first *Critique*, cited in the standard A/B pagination.)
- Langton, Rae (1998) *Kantian Humility*. Oxford: Oxford University Press.
- Plaaß, Peter (1994) *Kant's Theory of Natural Science*. Trans. A. E. Miller and M. G. Miller. Boston: Kluwer Academic Publishers.
- Pollok, Konstantin (2001) *Kants Metaphysische Anfangsgründe der Naturwissenschaft: Ein Kritischer Kommentar*. Hamburg: Meiner.
- (2002) "'Fabricating a World in Accordance with Mere Fantasy ...'? The Origins of Kant's Critical Theory of Matter'. *Review of Metaphysics*, 56, 61–97.
- (2006) 'Kant's Critical Concept of Motion'. *Journal of the History of Philosophy*, 44(4), 559–75.
- Ripstein, Arthur (2009) *Force and Freedom: Kant's Legal and Political Philosophy*. Cambridge, MA: Harvard University Press.
- Warren, Daniel (2001) *Reality and Impenetrability in Kant's Philosophy of Nature*. New York: Routledge.