The Kantian Idea of Mechanistic Nature

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Forthcoming in: "The Concept of Nature in Kant, Schelling, and Hegel", eds. Christian Martin and Florian Ganzinger, de Gruyter/Brill.

Abstract: I address a longstanding problem in Kant scholarship: how is Kant's use of the term 'mechanism' to be understood? It seems that Kant uses that term in a variety of ways, from a narrow sense ("motion communicated between matter") to a very wide sense ("any causation that is not noumenal"). I argue that Kant has a unified conception of mechanism, where the wider senses are to be understood in light of a conception of nature according to which all of nature is purely mechanistic in the narrow sense. In contrast to his mechanistic predecessors, Kant holds that this conception of nature is an idea, an imaginary end-point of science that we need for orientation but can only approach asymptotically.

Introduction

Kant uses the term 'mechanism' when discussing a variety of topics: the term plays a central role in his philosophy of science, it plays a prominent role in his account of organisms, and he also uses it at certain crucial points of his account of free will. However, this term is not well understood in the scholarship. The two main extant approaches consist in identifying 'mechanism' with 'natural causality' or in distinguishing up to six different senses of 'mechanism.' The first approach seems ad hoc and leads to enormous systematic and textual problems. The second approach leaves unanswered why Kant uses the term 'mechanism' in the variety of ways in which he does. Without an answer to that question, Kant can easily seem to have been undecided or even confused about the concept of mechanism. In this paper, I suggest a reading according to which Kant has a unified and principled account of mechanism. Furthermore, a proper understanding of this account involves a deeper insight into Kant's thinking. This deeper

insight is related to the way in which Kant does not identify 'mechanism' with 'natural causality,' yet shows the internal connection between the two concepts.

A core point of my interpretation consists in distinguishing 'mechanism' as denoting the communication of motion from matter to other matter on the one hand from the concept of nature as a mechanical system on the other hand. In the latter concept, we conceive of all of nature as if it contained nothing but mechanical relations in the first sense. However, and crucially, this concept is merely an 'idea,' in Kant's technical sense: it is the concept of an ideal end-point of science that tells us what to aim for in science, but one which we can never fully realize. Having in view the distinction between 'mechanism' as an explanatory form for the communication of motion from matter to matter on the one hand and the idea of mechanistic nature on the other hand allows for seeing the unity in Kant's usage of 'mechanism' without collapsing 'mechanism' into 'causality.' Reading Kant as collapsing this distinction means to read Kant as endorsing a conception[1] of nature in which all causation is mechanical and nothing but mechanical. This means to read Kant as endorsing a mechanistic conception of nature in the way that, arguably, prominent predecessors of his did, such as Hobbes, Descartes, and Locke. It is a central concern of mine in this essay to show that and how Kant does not simply endorse such a pre-Critical conception, but rather transforms it as part of his mature philosophy: a concept that his predecessors considered to straightforwardly tell us how things are, Kant thinks is an 'idea.' This transformation, together with its implications, is the deeper insight into Kant's mature thinking that is involved in the unified account of 'mechanism' presented in this essay.

I begin this essay by discussing the puzzle about Kant's variegated usage of the term 'mechanism.' This puzzle culminates in a dilemma regarding Kant's usage of 'mechanism' in his

[1] I use the terms 'concept' and 'conception' basically interchangeably.

account of organisms. Then, in the second section, I lay out my solution to this puzzle, namely, the way in which we can—and should—understand <mechanistic nature> as an 'idea.' I do so in three sub-sections. First, I distinguish between a 'general' and a 'spelled out' conception of nature. Then I discuss how and why there is a normative orientation of "improper sciences" towards mechanistic physics. In the last sub-section of section 2, I argue that the mechanistic conception of nature is merely an 'idea.' In the last section, section 3, I discuss objections to and advantages of the proposed reading.

1. The Puzzle about Mechanism

1.a Mechanism Is Used in Many Ways

Among early modern philosophers, the term 'mechanism' was used to refer to the communication of motion by one bit of matter to another bit of matter.[2] A paradigm case of mechanism in this sense is the oft-invoked case of a billiard ball imparting its motion onto another billiard ball. Another paradigm case is that of a key turning a lock. The 'Mechanics' chapter of Kant's *Metaphysical Foundations of Natural Science (Anfangsgründe)* is about mechanism in this sense. At the beginning of that chapter, Kant writes: "In mechanics … the force of a matter set in motion is considered as *communicating* this motion to another."[3] In the *Critique of the Power of Judgment (KU)*, Kant writes of "mechanism (according to mere laws of motion)."[4] Kant's

[2] Cf., e.g., Ayers 1991, Vol. II, 112; Gaukroger 2010, 58; Brandt Bolton 1998, 196-97.

[3] *Anfangsgründe*, Mechanics chapter, 4:536. I cite Kant's works via the volume of the "Akademie Ausgabe", followed by a colon and the page number. If apposite, line numbers are specified after a period after the page number. The only exception is, as it is the custom, the *Critique of Pure Reason (KrV)*, which I cite via the page numbers of the first (A) and second (B) edition.

[4] *KU*, §72, 5:390.

use of 'mechanism' thus seems to be in line with that of his predecessors. There are, however, uses of 'mechanism' in Kant's Critical writings, i.e., his writings from the first edition of the *Critique of Pure Reason (KrV)* onward, that seem to be radically different. Regarding free will and Kant's distinction between objects of experience (i.e., appearances) and things in themselves, Kant says the following in the preface to the second edition of the *KrV*:

> Now if we were to assume that the distinction between things as objects of experience and the very same things as things in themselves, which our critique has made necessary, were not made at all, then the principle of causality, and *hence the mechanism of nature* in determining causality, would be valid of all things in general as efficient causes. I would not be able to say of one and the same thing, e.g., the human soul, that its will is free and yet that it is simultaneously subject to natural necessity, i.e., that it is not free, without falling into an obvious contradiction…[5]

In this quote, and others,[6] Kant uses 'mechanism' in such a way that everything that is an appearance, and, thus, everything in nature, is subject to mechanistic causation. So Kant seems to be using 'mechanism' in a *narrow sense*, as pertaining only to matter in motion (henceforth "mechanism$_{\text{narrow}}$"), and in a *broad sense*, as pertaining to everything in nature. The latter sense also seems to be in play when Kant talks about *explanation*. Kant says that we *explain* natural phenomena by means of the "mechanism of nature"[7] and by seeking their causes "in the universal laws of the mechanism of matter."[8] If natural phenomena are explained mechanistically, the question arises as to what should be considered a natural phenomenon. Motion? – Certainly.

[5] Bxxvii; my italics.

[6] E.g., *Grundlegung*, III, 4:458; *Critique of Practical Reason (KpV)*, Preface, 5:6 fn.

[7] *KU*, §78, 5:410.

[8] A691/B719.

Heat? Light? Magnetism? Organisms? Human actions? Passages like the one just quoted from the B-preface seem to state clearly that even human actions are to be considered as natural phenomena.[9] However, light, magnetism, organisms, and human actions are, at least prima facie, very different phenomena than the phenomenon of mere matter that communicates motion to other matter. To explain the motion of a falling rock or of planets by means of mechanism in the narrow sense is clearly adequate. Yet, it is far less clear whether an explanation by means of mechanism in the narrow sense is adequate to light, magnetism, organisms, and human actions. Thus one might think that Kant uses 'mechanism' in disparate ways without marking the differences.

Because of such puzzles about Kant's usage of 'mechanism,' prominent Kant scholars, such as Henry Allison, Hannah Ginsborg, Peter McLaughlin, and Rachel Zuckert, distinguish different senses of 'mechanism' in Kant's Critical writings.[10] Hannah Ginsborg distinguishes five senses of 'mechanism,' generated by the choices whether to include dynamical and chemical laws in <mechanism>; whether to include teleology; and, finally, whether to include artifacts. The sense that Ginsborg considers to be the most inclusive, which is used in the quote above from the B-preface of the *KrV*, is one where 'mechanism' pertains to everything that is an appearance, i.e., not noumenal.

Distinguishing (seemingly) different senses of 'mechanism' is helpful. But *merely* distinguishing different senses does not answer why Kant uses the same term in these different ways. To be sure, we must not rule out from the outset that Kant was just sloppy in the usage of his terms. Yet we must equally not rule out from the outset that Kant was not sloppy, and that

[9] Further such passages are *KpV*, 5:48, 49, 65, 94-95, 114; *Geschichte*, 8:17; *Einige Bemerkungen*, 8:154. Of course, this is not to say that human actions are *nothing but* natural phenomena.

[10] Allison 1992, 26-27; Ginsborg 2001, 238-40; McLaughlin 2014, 150-54; Zuckert 2007, 102.

it may need some interpretative as well as philosophical work to bring Kant's unified use of 'mechanism' into view. As stated in the introduction, I believe that the latter is the case, and that understanding the unity of 'mechanism' in Kant means to understand a central lesson of Kant's 'Critical turn.'

1.b McLaughlin's Dilemma

There is also systematic pressure internal to Kant's philosophy towards a unified account of 'mechanism.' For Kant uses the term 'mechanism' to formulate the antinomy to which, he thinks, the existence of organisms gives rise. The antinomy consists in our wondering how organisms are possible, and then wavering back and forth between taking organisms to be possible by means of "merely mechanical laws" and our taking this to be impossible.[11] Leaving the details of that antinomy aside, what is relevant for the issue at hand is that Kant characterizes this antinomy as "a natural dialectic and an unavoidable illusion."[12] That is, the dialectical back and forth of the antinomy comes about naturally, and even unavoidably. Insofar as the antinomy is unavoidable, it is necessary. Yet if the antinomy is unavoidable, and if <mechanism> figures in the antinomy, then <mechanism> must be, in some sense, necessary. That is, <mechanism>, as used in the antinomy, cannot be an arbitrarily adopted concept. For if it were, the antinomy could be avoided by simply not using that concept.

Therefore, <mechanism> must be in some sense necessary. This should be spelled out, I submit, in the following way: There must be some *a priori grounding* of the concept of mechanism, at least in the sense used in the antinomy about organisms. To be sure, if such an a priori

[11] Cf. *KU*, §70, 5:387.

[12] *KU*, §70, 5:386. Kant says the same about the antinomies in the *first Critique* at A442/B449 and A462/B490.

grounding is found, then this a priori grounding may only pertain to one and not all senses of 'mechanism.' Yet mechanism's figuring in the antinomy about organisms excludes that we merely distinguish different senses of mechanism and leave it at that. Sense must be made of mechanism's necessity, at least insofar as <mechanism> figures in the antinomy. The way in which I suggest showing mechanism's necessity will, conveniently, also show how Kant can be taken to employ 'mechanism' in a unified way. That is, on the suggested reading, answering the narrow question about mechanism's necessity brings with it the answer to the question about the unity of Kant's usage of 'mechanism.'

How can the necessity of <mechanism>—as it is in play in the antinomy about organisms—be shown? That is, what is the a priori grounding of that concept within the philosophical system of the mature Kant? The easiest answer would be that mechanism's necessity is shown in the *Metaphysical Foundations of Natural Science*, through the way in which Kant develops the road to the 'Mechanics' chapter and that chapter itself. The laws of mechanics stated in the *Anfangsgründe* are not transcendental principles, because they concern matter in motion and <matter> contains some empiricality. Yet they are "metaphysical principles." They hence come with necessity, on the assumption that something is given to the senses, which is an assumption that no finite cognizer can deny.[13] It thus seems to be an attractive option to take mechanism's necessity to lie in the *Anfangsgründe*. However, this option would only amount to an a priori grounding of mechanism in the narrow sense, i.e., of matter's moving other matter. It would not show the necessity of mechanism in the other senses. And it would not show the necessity of mechanism in the sense at issue in the antinomy about organisms. For Kant's usage

[13] Cf. *KU*, Introduction, 5:181. "Once" something is given to the senses, the determinations from the Phoronomy chapter of the *Anfangsgründe* follow, then those of the Dynamics chapter, and then those of the Mechanics chapter. Cf. fn 42.

of mechanism in the antinomy about organisms—and in the *third Critique* in general—seems to be one that pertains to *organisms*, and to all appearances. Taking <mechanism> to be necessary because the Mechanics chapter of the *Anfangsgründe* is, in some sense, necessary, thus does not seem to be a viable route.

An oft-taken route to (seemingly) making sense of Kant's usage of mechanism in the *third Critique* consists in identifying mechanism with the principle of causality, for which Kant has argued in the second Analogy of Experience in the *first Critique*.[14] This also promises to be an easy route to make sense of Kant's usage of 'mechanism' in passages related to the problem of free will, such as the one from the B-preface quoted above. In that quote, Kant says that only transcendental idealism avoids the view that "the principle of causality, and hence the mechanism of nature in determining causality, would be valid of all things in general as efficient causes."[15] If we take the route of identifying mechanism with the principle of causality, then we

[14] For example, Paul Guyer (2001, 264), Robert Butts (1990, 4), and Lara Ostaric (2023, 207, 213) take this route. Even though she first differentiates three senses of mechanism, Rachel Zuckert also identifies mechanism with causality when trying to make *mechanical inexplicability* understandable by focusing on the temporal relations involved (2007, 138-39). For Kant's argument in the second Analogy of Experience is that exact time relations can only be cognized by means of causation. This, according to Zuckert, excludes teleology. I would respond that there is a way to understand Kant's connecting causation with time relations that is compatible with his claims about the existence of teleological (including agential) causation (cf. p.10 below and, e.g., *KU*, Introduction, 5:172.04-17): *Exact* time relations can only be accounted for by means of $\text{mechanistic}_{\text{narrow}}$ causation, while the causal principle established in the second Analogy also allows for causal relations by means of which less exact time relations can be established. This interpretation makes sense of Kant's writing at *KpV*, 5:97.28-32 that a "psychological and not mechanical causation" is still "the causality of a being insofar as its existence is determinable in time and therefore under the necessitating conditions of past time".

[15] Quoted above on p.4.

take Kant, in this quote, to paraphrase "the principle of causality" with "mechanism". That is, avoiding the view that mechanism "would be valid of all things in general as efficient causes" is tantamount to avoiding the view that the principle of causality "would be valid of all things in general." Taking the route of identifying mechanism with the principle of causality provides an easy answer to the question about the necessity of mechanism. Mechanism, as it figures in the antinomy about organisms, is necessary, because mechanism means nothing but the principle of causality; and of the principle of causality Kant has shown in the second Analogy of Experience that it is constitutive of experience.

Taking this route, of identifying mechanism with the principle of causality, has two severe problems, however. The first problem, which is discussed in the secondary literature,[16] is that Kant's discussion—if not resolution—of the antinomy about organisms involves the claim that mechanism, in its relation to organisms, is *regulative* and not constitutive. That is, mechanism has, in some sense, only a *guiding function* in our experience of organisms. It is not the case that whatever we experience, we experience it necessarily and only as mechanical. This either directly contradicts the identification of mechanism with the principle of causality, which is clearly constitutive of all experience; or it means that Kant's discussion of the antinomy about organisms overturns a pillar of Kant's Critical philosophy, namely, that the principle of causality is constitutive of experience. There is also a second severe problem, which is, to my knowledge, so far not addressed in the secondary literature. This problem is that identifying mechanism with the principle of causality would render experience of organisms, as exhibiting purposiveness, impossible. If mechanism is constitutive of experience then whatever we experience, we experience it necessarily and only as mechanical. Yet the peculiarity of organisms consists just

[16] E.g., Watkins 2009, 204; McLaughlin 2014, 164.

in this, that they exhibit a form that goes beyond mechanism.[17] But if mechanism is constitutive of experience, then we could never experience anything that exhibits a form that goes beyond mechanism. That is, nobody could experience organisms as going beyond mechanism. So no problem, let alone an antinomy, about organisms could arise. Besides this systematic problem, there is also ample textual evidence that Kant holds that we can and do experience organisms as exhibiting purposiveness. For example, Kant says that organisms "first provide objective reality for the concept of an **end** that is not a practical end but an end of **nature.**"[18] He says that there are "empirical laws of natural ends in organized beings"[19] and that organisms are created according to *known laws of experience*.[20] He says that the teleological principle of organisms is as "for what occasions it … of course to be derived from experience"[21] and that the "concept of a thing as a natural end … is certainly an empirically conditioned concept, i.e., one that is possible only under certain conditions given in experience."[22] Kant could not make these claims if he did not believe that we have experience of organisms as at least seemingly involving purposiveness. Yet if mechanism were constitutive of experience, then no purposiveness, not even a seeming one, could be experienced. These two severe problems should suffice for holding that it is not tenable to identify mechanism with the principle of causality.

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[17] Cf. *KU*, §65, 5:372-74, §66, 5:376-77.

[18] *KU*, §65, 5:376.1-4.

[19] *KU*, §68, 5:382.31.

[20] Cf. *KU*, §68, 5:382.7-11. Cf. Kreines 2005 for why these claims should not be watered down so as to refer to laws of nature that are, after all, mechanical. Contra Kreines, however, I think that the passages cited here show that, according to Kant, we do in fact know organisms as purposive. Lack of insight is not the same as lack of knowledge—at least not for the critical Kant.

[21] *KU*, §66, 5:376.15-16.

[22] *KU*, §74, 5:396.07-11.

Thus the most promising options to vouchsafe the necessity of mechanism fail. In an article entitled "Can Mechanism be Necessary and Still be Merely Regulative?", Peter McLaughlin thus concludes that <mechanism> confronts us with a dilemma. After discussing the options he takes to be available, his verdict is that *either* Kant's usage of mechanism stems from his *uncritically adopting* 18th century orthodoxy regarding the meaning of that term, *or* we consider 'mechanism' to be necessary by identifying it with the principle of causality.[23] On the first horn of the dilemma, Kant's using <mechanism> to formulate the antinomy would not be necessary. As I put it above, then the antinomy could be avoided by simply avoiding the use of <mechanism>. On the second horn, McLaughlin holds, we face the first of the two severe problems just discussed, namely, that Kant's discussion of organisms would render the principle of causality regulative. I would add that we are then also faced with the just discussed second severe problem that, if we identify mechanism with the principle of causality, experience of organisms as (at least seemingly) exhibiting purposiveness would be impossible. I take this dilemma to reflect the state of the art in the secondary literature regarding Kant's usage of 'mechanism' and will henceforth refer to it as 'McLaughlin's dilemma.'

Having developed these problems surrounding Kant's usage of 'mechanism,' I now move to my account of how these problems can be solved.

2. The Idea of Mechanistic Nature

I first sketch my solution to the presented problems about Kant's usage of 'mechanism,' before arguing for this solution in three sub-sections.

[23] McLaughlin 2014, 158, 162-3, 164.

Sense can be made of Kant's different usages of 'mechanism,' I hold, if we take the necessity of <mechanism> to stem from the construction of <matter> as Kant carries it out in the *Metaphysical Foundations of Natural Science*. <Mechanism>, as constructed in the *Anfangsgründe*, is necessary, because if *anything* is given to us through the senses, then there is sensibly given matter, and then—at least by Kant's lights—the entirety of the *Anfangsgründe* can be constructed.[24] Thus, <mechanism> in the narrow sense has the necessity that <mechanism> needs in order to figure in the antinomy about organisms.

This, of course, does not address the problem of the *unity* of Kant's usage of 'mechanism,' and it also does not explain why <mechanism> in the narrow sense figures in the antinomy about organisms. Both issues can be addressed in the following way. Recall that the laws of mechanics laid out in the *Anfangsgründe* hold for mechanical phenomena, i.e., phenomena such as planetary motion, the trajectory of a thrown ball, etc. Now, and this is a central point of this essay, we can *also* use these laws to form a concept of *nature* as thoroughly mechanistic. That is, a conception of nature can be formed on the basis of the necessary principles of mechanics, as laid out in the *Anfangsgründe*. This concept of nature, however, is an idea in Kant's technical sense, i.e., a concept that does not denote an actual object but merely guides us in our cognition. This guidance consists in the following. We should strive to reduce all empirical, theoretical cognition—i.e., all contentful[25] cognition about nature—to cognition of mechanistic$_{\text{narrow}}$ relations.

[24] The phoronomy chapter of the *Anfangsgründe*, for example, argues that sensibly given matter must be movable, on the basis of the fact that sensibly given matter occupies space in one way or the other. Cf. fn 42.

[25] There is a straightforward way in which Kant holds that content must be given through the senses (cf. A50-51/B74-75). This is not to exclude that in an attenuated sense also mathematical cognition or metaphysical cognition might be said to have content.

This point leads to a further central claim of this essay: when used in relation to organisms or human beings, 'mechanism' is to be understood in light of *the idea of mechanistic nature*. One could say that mechanism in the narrow sense is the focal sense of 'mechanism,' on the basis of which the idea of mechanistic nature is formed, and on the basis of which, at times via the idea of mechanistic nature, all other usages of 'mechanism' are to be understood. So much for the sketch of my solution.

I argue for this claim, and my solution to the presented problems about "mechanism" in Kant as a whole, in the following three sub-sections. In the first sub-section, I suggest that we distinguish *two conceptions of nature*. Kant's account of how experience is possible in general gives rise to a conception of nature that I call "general," whereas Kant's elaborations on the empirical concept of *matter* in the *Metaphysical Foundations of Natural Science* give rise to a concept of nature as *materially unified* on the basis of *mechanistic principles*. I call this latter concept of physical nature a "spelled out" conception of nature. In the second sub-section, I discuss how Kant argues that there is a normative orientation for "improper sciences" towards mechanistic physics, and thus towards a mechanical conception of nature. And in the third and final sub-section, I lay out why the spelled out concept of nature as a mechanical system is a *mere idea*. This means that this concept has no "objective reality," but merely guides us in our inquiries into nature.[26]

[26] In the *KrV*, Kant says up until A663-66/B691-94 that ideas have no objective reality. At A663-66/B691-94, he qualifies this claim by saying that ideas have objective reality only "indeterminately" and "indirectly." In this essay, I ignore this qualification in order to allow for a more concise read.

2.a General vs. Spelled Out Conception of Nature

Before distinguishing different conceptions of nature, I want to clarify what sense of 'nature' in Kant I mean to refer to. (For example, I do not discuss what Kant calls a "formal" conception of nature.[27]) The following quote allows us to get Kant's general concept of nature into view:

> By nature (in the empirical sense) we understand the combination of appearances as regards their existence, in accordance with necessary rules, i.e., in accordance with laws. There are therefore certain laws, and indeed a priori, which first make a nature possible; the empirical laws can only obtain and be found by means of experience, and indeed in accord with its original laws, in accordance with which experience itself first becomes possible.[28]

In this quote, Kant argues that there can only be empirical laws of nature if there are also a priori laws of nature. The relevant parts of this quote for our topic are the following three. First, Kant defines nature (in the empirical sense) as the combination of appearances regarding their existence, i.e., as the combination of objects of experience regarding their existence. That is, for Kant there is an intrinsic connection between <nature> and <experience>. The phrase "regarding their existence" indicates that the concept of causation is central to the concept of nature. For the principle of causation is argued for in the second Analogy of Experience, and of the Analogies of Experience Kant says that they concern appearances insofar as they exist.[29] Second, and in line with the just stated point about causation, Kant states that appearances are combined or unified by means of *laws of nature*. Third, note that the *a priori* laws of nature—which are the a priori laws of experience—are not enough in order to *actually* unify appearances, i.e., to unify

[27] Cf. A418-19/B446; *Anfangsgründe*, Preface, 4:467.

[28] A216/B263. For further passages in which Kant articulates this conception of nature, cf. fn 30.

[29] Cf. A177/B219, A178/B220.

appearances regarding their existence. For that, contentful laws of nature are needed; and these are normally empirical.

On the basis of this quote, we can distinguish two conceptions of nature. The first conception of nature I call *general conception of nature*. This conception of nature is the primary topic of the just stated quote: nature as the combination, whole, or "sum-total" (Inbegriff) of appearances.[30] This is a common sense of 'nature,' as when 'nature' is used to signify everything that exists or when we speak of "things in nature".[31] Note, however, that this conception of nature refers to the things we currently take to exist, according to our best knowledge.[32] Given our current state of knowledge, we know of certain objects and of the laws that unify these objects. Regarding these things we can make justified existence claims. Of what goes beyond our current state of knowledge, we cannot. Of what goes beyond our current state of knowledge, we can at best *assume* existence. Yet experience and hence empirical knowledge is a continually ongoing project. The existence of something that was assumed to exist can be empirically confirmed, as in the case of Neptune or the Higgs particle. More generally, the continually ongoing project of empirical knowledge centrally involves the "combination", as Kant calls it in the quote above, or *unification* of the objects there are, by finding the laws of nature that unify

[30] In addition to the just quoted passage from A216/B263, cf. B163; A126-27; *Prolegomena*, §16, 4:295; *Anfangsgründe*, Preface, 4:467; *KU*, §61, 5:359; *Gebrauch teleologischer Prinzipien*, 8:159. Note that 'sum-total' may be a misleading translation of 'Inbegriff.' For 'Inbegriff' has no connotation of the unity at issue's being one of summation.

[31] The latter is Kant's phrase at A418-19/B446 fn.

[32] *Determinate* existence can only be claimed on the basis of experience. Cf. A178/B211; A226/B279; A561/B589; *KpV*, 5:95. Cf. also the just stated point that the Analogies of Experience concern existence and the fact that existence or actuality is, for Kant, a category. Furthermore, as is well known, Kant rejects non-empirical claims to existence, as they are made in proofs of God's existence.

them. For example, Newton unified celestial and terrestrial mechanics, yet the unification of quantum mechanics with general relativity has not yet occurred. The point I want to emphasize here is that, qua empirical cognizers, we strive for (further) such unification and seek ways to bring it about, even though we do not yet know how exactly to bring such unification about.

The decisive distinction for the topic of this essay is between the general concept of nature and a second concept of nature. This second concept of nature could be called "nature as materially unified."[33] Nature in this sense has more content than the general concept of nature, for it contains *determinate principles for the unification of the objects of nature in the general sense*. In what follows I argue that these principles are those laid out by Kant in the *Anfangsgründe* and that thus <nature as materially unified>, but *not* the general concept of nature, is a *mechanistic* conception of nature. I call this second sense of nature a *spelled out conception of nature*. The general concept of nature is oriented by and towards nature in the spelled out sense, because the latter is an *idea of nature*. (I say more about exactly why that is below.) Qua idea, a spelled out concept of nature has *no corresponding object* in intuition and thus nature.[34] This lack of a corresponding object in nature Kant also expresses by saying that ideas have no 'objective reality.'[35] Yet, equally qua idea, we continually and perennially strive to approach it asymptotically. The general conception of nature presents us with the task of unifying the objects of experience, while the spelled out conception of nature as a mechanical system tells us *how* we can move towards that goal. Thus,

[33] This is not exactly the material concept of nature as Kant defines it at *Anfangsgründe*, Preface, 4:467; *Prolegomena*, §16, 4:295; A418-19/B446-7 fn. In the terminology of Kant's in these passages, both this conception as well as the general conception of nature are material concepts of nature.

[34] Cf. A327/B383; A320/B377; *KU*, §22, 5:243.03-06.

[35] Cf. A339/B397; B412-13; A489/B517; A509/B537; *Grundlegung*, III, 4:455. But note fn 26 above. For 'objective reality,' cf. A155/B194-95; A109; B148-49; *Über eine Entdeckung,* 8:188-89; *Fortschritte*, 20:266.

I submit, we should distinguish the following two conceptions of nature in Kant: a general concept of nature in which the unity of (the objects of) experience is declared but *not* spelled out, and a concept of nature in which this unity is spelled out.

How exactly does the spelled out conception of nature orient us in bringing about more and more unity among (the objects of) experience? The following quote from Kant's pre-Critical writing *The Only Possible Argument in Support of a Demonstration of the Existence of God* gives us a first intimation:

> It is with good reason presumed that the expansion of bodies through heat, light, electric force, thunder, perhaps even magnetic force are many kinds of appearance of one and the same effective [wirksam] matter which is spread out in all spaces…[36]

I interpret this quote in the following way. Kant lists several natural phenomena and says that it is "with good reason presumed" that these phenomena can be traced back to—they are "many kinds of appearance of"—"effective [wirksam] matter", i.e., matter that brings about effects of motion. The way in which matter brings effects of motion about is described by the principles of mechanics. We can thus take Kant to say in the quote that very different natural phenomena, such as "the expansion of bodies through heat, light, electric force, thunder, perhaps even magnetic force", are to be seen as ultimately explainable in terms of $\text{mechanistic}_{\text{narrow}}$ laws. If such a diversity of natural phenomena can ultimately be explained mechanistically, then we have brought unity to this variety of phenomena—by means of the laws of $\text{mechanics}_{\text{narrow}}$. We can thus say that Kant envisions something like a 'mechanistic reductionism.'

Note, however, that such a reduction of different phenomena to mechanistic laws is not already reality or a certainty. Rather, said mechanistic reductionism is only "with good reason

[36] 2:113. I took over Ginsborg's amendments of the translation at Ginsborg 2001, 242.

presumed." We do not yet know how a mechanistic reduction could be carried out for these phenomena. It is only with good reason presumed that it will be possible and hence we should *seek* such a reduction.

This raises a question: Why is such a mechanistic reduction "with good reason presumed"? The answer to this question is the topic of the next section.

2.b Normative Orientation of Improper Sciences towards Mechanistic Physics

We just saw that Kant takes the unification of (objects of) experience to be central to the concept of nature. Now, a body of theoretical, empirical knowledge is properly unified, Kant holds, when it is *systematic*;[37] and a thoroughly systematic body of theoretical, empirical knowledge Kant calls a *science*. Given that we want to unify what we experience when doing science, the question arises sooner or later *whether different sciences can be unified*. For this issue it is relevant that Kant holds—in the preface to the *Metaphysical Foundations of Natural Science*—that there is only *one proper natural science*: mechanical physics. Natural sciences such as chemistry, psychology, and, arguably, biology are only "improper sciences." They are improper because they cannot fully realize the demand for unity, i.e., they can in principle not realize the demand that the body of all our knowledge be thoroughly systematic. The reason for this is that the highest laws or principles of improper natural sciences will always be merely empirically justified, and that means that these principles are only *contingently* true. Contingency, however, is exactly the *absence* of systematicity and hence unity. For an illustration of this point, think of the diverse natural phenomena in the quote on the previous page: the expansion of bodies

[37] Cf. A832-33/B860-61; *Anfangsgründe*, Preface, 4:467-68. Mathematics and logic are for Kant also sciences, although no natural sciences. (Cf., e.g., *Logic*, 9:13.)

through heat, light, electric force, thunder, … Do these phenomena have anything to do with each other? Is there any unity among them? As long as we are presented with a mere list of these phenomena, where it is a contingent fact that specifically these phenomena exist and not others, no unity among the phenomena is to be made out. Yet if we managed to show that these phenomena are special cases of the laws of mechanics, then we could make out unity among the phenomena: they would be unified insofar as they would all be mechanistic phenomena. Regarding the principles of a natural science we can thus say: as long as they are only contingently true, they are not unified with the rest of our theoretical, empirical knowledge.[38]

Despite their status as improper natural sciences, there is still the *demand* for improper natural sciences to be unified with all of our experience.[39] This demand is present, I would argue, because all of the experiences that we try to unify in and across improper natural sciences are things we can experience; and that all of these experiences can be enjoyed by one mind means that they must belong to *one* nature. Put differently, all natural phenomena must be unified because they are all *natural* phenomena and hence are part of *one* nature.[40] It follows from all of this that the only way for our conception of nature—*generally* characterized as the whole of the

[38] Cf. *Anfangsgründe*, Preface, 4:467-69.

[39] I am indebted to Angela Breitenbach's reading of the relation between proper and improper sciences in Kant in Breitenbach 2021. In this text, she claims that 1) systematicity, 2) being structured by ground-consequence relations, and 3) necessity of the laws of a body of knowledge are "increasingly restrictive characterizations of science" (62). I do not think, however, that these are increasingly restrictive criteria, but rather that true fulfillment of one of these dimensions is only possible by true fulfillment of the other two. (A law can follow with necessity from a higher law, and hence be necessary relative to that higher law, even though the higher law is not itself necessary.)

[40] This argumentation dovetails with Kant's focus on the *unity* of representations in the Transcendental Deduction of the Categories, esp. §15 and §16, and in the Principles of the Understanding in the *KrV*.

objects of experience—to be unified in a *material* or *spelled out* sense is by means of the one science that can realize thorough systematicity by having non-empirical, i.e. a priori principles: mechanical physics, or as Kant calls it: the general doctrine of body.[41] This is the main point of this sub-section.

Physics, as Kant lays out in the *Anfangsgründe*, is centrally *mechanical*. How Kant understands 'mechanical' here can be understood by considering the principles of 'mechanics' laid out in the *Anfangsgründe*. These principles govern matter, i.e., whatever fills space,[42] with this matter's being movable in space,[43] and where such movement is to be explained by some kind of repulsive force as well as some kind of attractive force.[44] Of this matter, the mechanical principles say that changes are changes in motion, that they occur due to an external cause, that action equals reaction in interactions, and that the quantity of matter remains the same in such interactions.[45] Note the progressive character of the *Anfangsgründe*: <matter> is initially determined as whatever fills space, *then* Kant argues that matter must be movable in space, *then* Kant explains this movability by means of forces, *and then* Kant states the laws by means of which matter moves, i.e., communicates motion onto other matter. The concept of matter is progressively determined,

[41] Cf. *Anfangsgründe*, Preface, 4:467, 471, 472.

[42] Matter is the minimal determination of something that fills space. That is, whatever is given to us through our senses – and that can be significantly richer than mere matter – will obey the laws governing mere matter. These laws thus have a priori validity and are not merely contingently true – despite being based on the empirical concept of matter: once "the empirical concept of a body (as a movable thing in space) [is] made the ground of th[ese] proposition[s]" they "can then be understood fully *a priori*." (*KU*, Introduction, 5:181.)

[43] Cf. *Anfangsgründe*, Phoronomy chapter, 4:480-81.

[44] Cf. *Anfangsgründe*, Dynamics chapter, 4:496-99.

[45] Cf. *Anfangsgründe*, Mechanics chapter, 4:541-47.

each step building on the previous one.[46] In Kant's words: "The concept of matter had … to be carried through all four of the … functions of the concepts of the understanding (in four chapters), where in each a new determination of this concept was added."[47] Hence, what Kant says in the *Mechanics* chapter builds on the previous chapters.[48] The principles of mechanics laid out in that chapter are thus not about an altogether different topic than what Kant treats of in the *Phoronomy* and *Dynamics* chapter. Rather, the *Mechanics* chapter treats of a fuller concept of matter than the previous chapters, while taking the lessons from the previous chapters on board and building on them. The mechanical principles detailed in the *Mechanics* chapter are thus not opposed to the principles laid out in the *Dynamics* chapter, but rather incorporate the latter. What I call the narrow sense of 'mechanics' thus includes Kant's dynamical account of matter.

Besides yielding this clarification of the meaning of 'mechanics' in the narrow sense, attention to the progressive structure of the *Anfangsgründe* also allows us to make sense of a passage in which Kant uses the term 'mechanism' that is otherwise hard to understand. In the section of the *Anfangsgründe* entitled 'General Remark to Dynamics,' Kant uses 'mechanical' to refer to Descartes' philosophy of nature and to atomistic philosophies.[49] To this *old* understanding of 'mechanism' Kant opposes his *dynamical* account, which makes recourse to

[46] Cf. *Anfangsgründe*, Preface, 4:476.07-09, Mechanics chapter, 4:536.09-537.04; Friedman 2013, xiii.

[47] *Anfangsgründe*, Preface, 4:476.07-09.

[48] The fourth chapter of the *Anfangsgründe*, the *Phenomenology* chapter, concerns the "relation [of movement or rest of matter] to the mode of representation or *modality*" (*Anfangsgründe*, Preface, 4:477). That chapter does thus not concern principles of nature as such and is hence not relevant for the present discussion.

[49] Cf. *Anfangsgründe*, Dynamics chapter, 4:532-33.

forces.[50] Given the progressive character of the *Anfangsgründe*, this means that Kant's *own* understanding of 'mechanism,' as detailed in the *Mechanics* chapter and which incorporates Kant's points from the Dynamics chapter, is equally opposed to this old understanding of 'mechanism.' We can hence say that Kant seeks to *replace* the old, defective understanding of mechanism with his own, better one, which includes his dynamical account.

That, according to Kant, physics on the basis of mechanical principles is the only body of substantial knowledge about nature that has a priori principles means that our only hope for a materially unified conception of nature lies in a conception of nature that is unified by means of mechanical principles, i.e., a conception of nature without room or necessity for non-mechanical explanations. This conception is the previously discussed spelled out concept of nature. It guides the unification of the improper sciences and of theoretical knowledge more generally and is hence an idea.

In sum, thorough unification of our body of knowledge of nature is only possible by means of mechanical physics. Hence the demand for improper sciences to be incorporated into mechanical physics, by having their principles derived from the principles of mechanics. In this way, it is at least conceivable for different improper sciences to be ultimately unified. Furthermore, it is because of this guiding role of mechanical physics, with its a priori principles, that it is "with good reason presumed" that as diverse natural phenomena as the expansion of bodies by heat, light, electric force, thunder, … are reducible to mechanistic$_{\text{narrow}}$ laws.

[50] Cf. Warren 2001 for an excellent account of the way in which Kant criticizes this old conception of mechanics and goes beyond it.

Why the concept of nature as a mechanical system is an idea, how it allows for solving McLaughlin's dilemma, and how, thus, a unified account of Kant's usage of 'mechanism' is possible are the topics of the next sub-section.

2.c Reduction of All Empirical, Theoretical Cognition to Mechanical Physics Is Merely an Idea

The concept of nature concerns the unity of (objects of) experience. Kant's discussion of the relation of improper sciences to the one proper science tells us why a complete unity of (objects of) experience is only conceivable by means of mechanistic physics. In the following quote, Kant articulates the demand for unity—and thus systematicity—and relates it to his conception of ideas:

> If we survey the cognitions of our understanding in their entire range, then we find that what reason quite uniquely prescribes and seeks to bring about concerning it is the **systematic** in cognition, i.e., its interconnection based on one principle. This unity of reason always presupposes an idea, namely that of the form of a whole of cognition, which precedes the determinate cognition of the parts and contains the conditions for determining *a priori* the place of each part and its relation to the others. Accordingly, this idea postulates complete unity of the understanding's cognition, through which this cognition comes to be not merely a contingent aggregate but a system interconnected in accordance with necessary laws.[51]

In cognizing nature, we seek unity of what we cognize. The part of our cognitive faculty that seeks that unity among cognitions, Kant calls 'reason.' In order to bring that unity about, an *idea* is needed, which "postulates complete unity of the understanding's cognition". Harking back to our discussion of the contingency of the principles of improper sciences, Kant says that through

[51] A645/B673.

an idea our cognition of nature "comes to be not merely a contingent aggregate but a system interconnected in accordance with necessary laws." According to this quote from the *first Critique*, <mechanistic nature> should be considered an idea. This is in line with the discussion of the preface of the *Anfangsgründe* in the previous sub-section.

Also in the body of the *Anfangsgründe* we find a rather striking passage to that effect. In the following passage, Kant emphasizes that the concept of nature as structured by the principles laid out in the *Anfangsgründe* has, for one, indeed merely a guiding role, and then, that this concept is guiding all other natural scientific investigations.

> [A]ll natural philosophy consists ... in the reduction [Zurückführung] of given, apparently different forces to a smaller number of forces and powers that explain the actions of the former, although this reduction proceeds only up to fundamental forces, beyond which our reason cannot go. And so metaphysical investigation [as carried out in the *Metaphysical Foundations of Natural Science*] *is useful only for the purpose of guiding natural philosophy*, so far as this is ever possible, to explore dynamical grounds of explanation. For these alone permit the hope of determinate laws, and thus a true rational coherence of explanations.[52]

This quote can be interpreted in light of the quote from *Only Possible Argument* above on p.17. Different natural phenomena, such as the expansion of bodies through heat, light, electric force, thunder, etc., are to be seen as expressions of forces: each of these phenomena is the act of a different force. These different forces ought to be reduced to basic forces, in order to bring about unity among the forces and thus phenomena. These basic forces are, as Kant argues in the Dynamics chapter of the *Anfangsgründe*, the forces of attraction and repulsion. Given the

[52] *Anfangsgründe*, Dynamics chapter, 4:534; my italics. Cf. also: *Metaphysics Mrongovius* 29:772; A648-51/B676-79.

progressive character of the *Anfangsgründe*, the motions brought about through these forces and the bodies which exercise these forces are described by the principles detailed in the Mechanics chapter. Hence the quote can be taken to express the mechanistic reductionism discussed in section 2.a. Now, Kant goes on to say that this result of metaphysical investigation—namely, mechanistic reductionism—"is useful only for the purpose of guiding natural philosophy, so far as this is ever possible". That is, not only in the preface but also in the body of the *Anfangsgründe* does Kant write of the regulative character of mechanical physics for the rest of natural science.

Further textual evidence for this regulative character consists in Kant's statements in the *KrV* that chemical explanation is based on "the idea of a mechanism",[53] that "matter ... is also the highest empirical principle of the *unity of appearances*, and has, insofar as it is empirically unconditioned, in itself the properties of a *regulative principle*",[54] and in his statement in the *KpV* that "in appearances ... the mechanism of nature must always ... constitute the *guiding thread*".[55] So much for my textual case that <mechanistic nature> is an idea of reason, which guides us in the unification of our cognitions of natural phenomena, and that hence all such cognition is to be understood in light of the idea of mechanistic nature.

If we accept that Kant thought that <mechanistic nature> is an idea, the question arises *why* he thought so. Very generally put, the reason is that we are finite cognizers, i.e., that we cognize through a cooperation of receptivity and spontaneity. These are the characteristics of our faculties of sensibility and the understanding, respectively. One consequence of this is that we

[53] A646/B674. Going into the special way in which the idea of a mechanism bases chemical explanation would go beyond the scope of this essay. Carrier 2001 gives a helpful account of Kant's views on chemistry. In relation to this quote, cf. esp. p.222.

[54] A618/B646; my italics.

[55] *KpV*, 5:30; my italics, translation amended.

take in the matter of our cognition through sensibility. Yet sensibility brings with it that we can never be done taking in what there is. There is always more to perceive and hence to experience. It follows that the number of empirical laws can in principle not be limited. But if the number of empirical laws can in principle not be limited, then there is no limit to our taking in the variety of laws of nature there is. Hence we can never be done with the task of reducing known laws of nature to the mechanistic laws laid out in the *Anfangsgründe*. There is always the possibility of more laws that are to be found and then reduced. Furthermore, there is no guarantee that the demanded unification of our cognition will succeed. Newton succeeded in unifying celestial and terrestrial mechanics, yet there was no guarantee of that. And there is no guarantee that the unification of general relativity and quantum mechanics will succeed—even though we must strive to bring it about. Hence there is no guarantee that reduction to the mechanistic laws will succeed—even if we assume a finite set of laws of nature that are to be reduced.

These points are expressed by Kant in the introduction to the *third Critique*:

> … we must think of there being in nature, with regard to its merely empirical laws, a possibility of infinitely manifold empirical laws, which as far as our insight goes are nevertheless contingent (cannot be cognized *a priori*); and with regard to them we judge the unity of nature in accordance with empirical laws and the possibility of the unity of experience (as a system in accordance with empirical laws) as contingent. … such a unity must still necessarily be presupposed and assumed, for otherwise no thoroughgoing interconnection of empirical cognitions into a whole of experience would take place…[56]

This passage is nicely glossed by Michael Friedman in the following way:

[56] *KU*, Introduction, 5:183.

> ... since the manifoldness of empirical laws is potentially infinite, we can imagine ... a grounding for the totality of empirical laws only as the regulative ideal of a complete science we can only continually approach but never fully attain.[57]

Thus, the concept of all of nature as a mechanistic system does not refer to something actual, but is an idea.

3. The Unity of 'Mechanism'

Having in view the distinction between a general and a spelled out concept of nature, the normative orientation of improper sciences towards mechanical physics, and the claim that <mechanistic nature> is an idea, we can now turn to McLaughlin's dilemma. The question that formulated this dilemma was: "Can Mechanism be Necessary and Still be Merely Regulative?" My answer is that <mechanism> can be necessary yet regulative insofar as it figures centrally in the concept which articulates the only way in which we can hope to thoroughly unify all of our experience: the concept of nature as a mechanistic system. <Mechanism> figures in that concept, because the principles that unify that concept[58] of nature are mechanical. The necessity of these principles lies in their a priori justification in the *Anfangsgründe*. Yet the concept of all of nature as unified by means of these principles is merely an idea and thus regulative. In this way, mechanism can be necessary without being constitutive of experience.[59]

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[57] Friedman 1992, 190; my underlining.

[58] What unifies that concept is what unifies nature—at least ideally. Cf. pp.14-15 for Kant's claim that laws articulate unity.

[59] This account can also address the puzzle why <mechanism> figures in the antinomy about organisms and why it does so as a maxim of the reflecting power of judgment.

This solution to McLaughlin's dilemma contains the central parts of the suggested account of the unity of Kant's usage of the term 'mechanism:' Mechanism$_{narrow}$ refers to the mechanistic principles laid out in the *Anfangsgründe*. These principles describe directly, i.e., not merely regulatively, the way in which matter communicates motion to other matter. This is the central, or focal, sense of 'mechanism.'[60] Kant's other usages of 'mechanism' are to be understood in relation to it. Because we can only conceive of our experience, and thus of nature, as thoroughly unified if this unification is brought about through the laws which are the principles of mechanics, Kant at times uses 'mechanism' in such a way that it pertains to all objects in nature, i.e., appearances. Here, the deeper point regarding Kantian ideas comes into play: because <mechanistic nature> is merely an idea, it is not excluded that there are sciences such as chemistry and biology, which explain the phenomena they are about, but have principles that are not mechanical$_{narrow}$.[61] There is a normative orientation of these imperfect sciences towards mechanical physics: we should strive to reduce the explanations given in these sciences to mechanical$_{narrow}$ explanations. However, this reduction has not yet happened *and furthermore* this reduction can in principle always *only be approached, never completed*. Hence all appearances stand under the idea of mechanistic nature, yet it is in principle impossible to reduce all explanation of appearances to mechanical$_{narrow}$ explanations. Thus there is room for non-mechanistic$_{narrow}$ explanations—even if such explanations are modeled on mechanistic$_{narrow}$ explanations, as Kant

[60] I here concur with Rachel Zuckert (2007, 103).

[61] Conceiving of <mechanistic nature> as an idea solves the problem that Angela Breitenbach sees in understanding 'mechanism,' as used in the *third Critique*, to refer to the principles of mechanism of the *Anfangsgründe*. She thinks this cannot be done because many natural phenomena cannot directly be explained by means of the principles of mechanics$_{narrow}$ (2009, 44). On the suggested account, this point of Breitenbach's is acknowledged, while the *demand* to explain all natural phenomena mechanistically$_{narrow}$ is added.

states regarding chemical explanations, or if they need a mechanical explanation as its matter, as the teleological explanations in biology do.[62]

This construction is central to Kant's Critical philosophy: Concepts that his pre-Critical predecessors considered to have objective reality, i.e., to straightforwardly relate to reality, Kant assigns a guiding role regarding experience. If <mechanistic nature> had objective reality, then this concept would settle what all there is and can be in nature. In that case, explanations that are not mechanistic$_{narrow}$ would be ruled out. Yet <mechanistic nature> is merely an idea, which provides the room for natural phenomena that are not mechanistic$_{narrow}$.[63]

We can deepen our understanding of Kant's conception of ideas by considering how the suggested interpretation can explain Kant's claim in the passage from the B-preface, quoted at the beginning of this essay on p.4. In that passage, Kant says that without transcendental idealism "the principle of causality, and *hence the mechanism of nature* in determining causality, would be valid of all things in general as efficient causes." In that case, a human being's being subject to the principle of causality would rule out agential freedom. The Critical Kant emphasizes that the objects of our cognition are appearances, i.e., objects taken in through the senses. (In contrast, things in themselves are noumena, i.e., thought-entities, which are not taken in through the senses.[64]) Now, since the objects of cognition are taken in through the senses, we can never be done with the task of taking in the variety of laws of nature and with reducing

[62] *KU*, §78, 4:414. For Kant's claims as to the reality of teleological explanations in biology, see p.10 above. For the centrality of the concept-pair 'form and matter' to Kant's philosophy, cf. Pippin 1982 and Engstrom 2009.

[63] Cf. *KU*, §23, 5:246.11-14 for Kant's claim that even natural beauty expands our concept of nature.

[64] Cf. B306, A252, A254/B310. That things in themselves area noumena (in the negative sense) does not preclude *indeterminate* existence claims, which can be made on the basis of the determinate existence claims that are possible about appearances.

these laws to mechanical ones. That is, because human cognition is a cooperation of the understanding and sensibility, <mechanistic nature> is an idea. Hence there is a gap between the principle of causality—which is constitutive of experience—and the regulative idea of mechanistic nature.[65] That is, we unify what we experience by means of (our cognition of) laws of nature, but these laws of nature are not thereby mechanical laws. Hence, transcendental idealism's focus on the fact that the objects of our cognition are given in sensibility, and are hence appearances, allows for causation that is not mechanical$_{\text{narrow}}$ causation. If we do not have this fact in view, and hence do not make the distinction between appearances and things in themselves, then the conception of how nature can possibly be materially unified—the spelled out conception of nature—would not be an idea, but would just state how nature is. In that case, all causation would be mechanical$_{\text{narrow}}$ causation and freedom would be ruled out. (There are other passages in which Kant employs 'mechanism' in basically the same sense as in the discussed quote from the B-preface. These passages can be interpreted in a similar way.[66])

I have argued that appreciating that <mechanistic nature> is, for Kant, an idea is the key to our understanding the unity of Kant's uses of 'mechanism'. Most uses of 'mechanism' in the *third Critique* occur in the context of the antinomy about organisms, and hence refer to the idea of mechanistic nature, which underlies the maxim of the reflecting power of judgment that is the thesis of that antinomy.[67] This also pertains to two further senses of 'mechanism,' regarding

[65] For passages in which Kant asserts non-mechanical causation, cf. fn 14.

[66] I am thinking of passages such as *KpV*, 5:6 fn and 5:97. For the latter passage, my reply to Zuckert in fn 14 should also be taken into account.

[67] There is an idea underlying that maxim, because a maxim of the reflecting power of judgment is a regulative principle (cf. *KU*, Preface, 5:167-8; §70, 5:387.10), and regulative principles must be grounded in an idea, as Kant says at A771/B799 (cf. also *KU*, §76, 5:401.11-7).

which I now want to lay out how the suggested reading works. (We will then have covered basically all senses in which Kant uses 'mechanism' in his Critical writings.) "According to the constitution of our understanding," Kant says in §77 of the *third Critique*, "a real whole of nature is to be regarded … as the effect of the concurrent moving forces of the parts."[68] How does this sense of 'mechanism' relate to the other ones? First, note that if an object or phenomenon is explained by means of the moving forces of its parts, it is explained by means of the mechanistic principles in which the Phoronomy and Dynamics chapter of the *Anfangsgründe* culminate. Now, as argued above, the only way in which experience and hence nature can be unified is by means of these principles. Hence, explanation of "a real whole of nature" by means of "the concurrent moving forces of the parts" follows from the constitution of our understanding. For once we assume that something is given to our senses, the *Anfangsgründe* follow from the constitution of our understanding laid out in the *first Critique*. A real whole of nature *is to be regarded* as the effect of the concurrent moving forces of the parts, on the suggested interpretation, because qua space-filling, a real whole of nature is, in the ultimate analysis, to be explained mechanistically$_{\text{narrow}}$. Yet it also follows from "the constitution of our understanding" that mechanistic reduction of all natural phenomena is merely an idea.

Finally, there is a wide, *negative* sense of mechanism invoked in §77 of the *KU*. According to this wide sense, "a causal connection for which an understanding is *not* assumed as the only possible cause" is mechanical.[69] In other words, according to this sense, a causal relation that is

[68] *KU*, §77, 5:407.28-30. Cf. 5:408.24-27. I omit the term 'only' in the quotation, because, as the context of the sentence makes clear, it merely indicates that our cognition is not capable of what the "imagined" intuitive intellect is capable of. If the 'only' were read in the sense of 'exclusively,' this sentence would contradict those passages in which Kant claims that chemistry and biology are sciences which explain their phenomena.

[69] *KU*, §77, 5:405. Cf. also *KU*, First Introduction, 20:219, 235.

not *agential* counts as mechanistic. That non-agential causation is mechanistic causation makes sense if we think of the consideration in which this sense is employed: It is a consideration which is a priori insofar as we consider how an object or phenomenon should be *in principle* explainable.[70] However, Kant introduces this wide sense of mechanism in order to say that for us human, i.e., finite, cognizers natural phenomena are in principle explainable in terms of $\text{mechanism}_{\text{narrow}}$, yet that we can form the *limiting concept* of a different kind of cognizer for whom this is not so.[71] For us, organisms exhibit a form that we can only conceptualize on the basis of the concept of an end—a concept which has its transcendental source in practical reason. For this different kind of cognizer, this would not be so. Organisms would hence, for this different kind of cognizer, be mechanically explainable—in this wide sense of 'mechanism' as non-agential causation, that is. Nevertheless, if we want to *give content* to this negative conception of

[70] Contra Ginsborg (2001, 239-40), I do not think that this sense is narrower than the one from the above discussed passage from the B-preface, where mechanism is opposed to noumenal causation. For agents are only agents if they are capable of "noumenal causation," i.e., causation where a thought (or concept) is the cause of the effect. An artefact qua object in nature ought to be explained mechanically, yet qua product of an understanding it is an effect brought about by an agent.

Ginsborg also distinguishes a sense of 'mechanism' "as a synonym for "natural' as opposed to 'artificial,'" according to which organisms count as mechanical. I think that we can also say about this sense that Kant uses 'mechanism' here because everything natural stands under the idea of mechanistic nature. Here it is relevant that Kant says in *KU* §68 that biology abstracts from the question whether the purposiveness exhibited by organisms is intentional or not. And his discussion in §§72-74 seems to have the result that this is also the right attitude to adopt as a philosopher: The question whether the purposiveness of organisms is intentional or not "cannot even be raised, because the objective reality of the concept of a natural end is not demonstrable by means of reason at all", as Kant says at §74, 5:396.

[71] On Kant's notion of a 'limiting concept,' cf. Johannes Haag's insightful discussion at Haag 2015, 226-31. Cf. also James Conant's expanding on the concept of a limiting concept at Miguens 2020, 436-441.

'mechanism,' i.e., turn it into a positive conception, then we have to have recourse to the idea of mechanistic nature. Thus also this wide, negative sense of 'mechanism' is to be understood in light of the idea of mechanistic nature and hence by recourse to mechanistic$_{narrow}$ laws.

In this way, sense can be made of Kant's seemingly variegated usages of 'mechanism.' The primary or focal sense of 'mechanism' is that of the mechanistic principles laid out in the *Anfangsgründe*. All other usages of 'mechanism' are to be understood in light of this focal sense, often via the idea of mechanistic nature.[72] Asking about the unity of Kant's usages of 'mechanism' lead us to a point that is central to Kant's transcendental idealism: <mechanistic nature> does not describe how nature is, but is an idea. Because <mechanistic nature> is an idea, the *general* concept of nature can encompass organisms and human agents.

Conclusion

How can we understand Kant's seemingly disparate usages of 'mechanism,' while making sense of the necessity that <mechanism> must have qua figuring in the antinomy about organisms? On the interpretation suggested in this essay, we can do so by taking the following considerations into account. What was for Kant's mechanistic predecessors—such as Hobbes, Descartes, and Locke—a straightforward claim about nature, is for Kant merely an 'idea.' Rejecting the dogmatic claims of his predecessors, Kant relates 'ideas' to experience: he lays out what role ideas play in experience. Ideas are necessary, because they provide us with orientation. The idea of mechanistic nature provides us with orientation regarding how we can increase the unity among (objects of) experience. Yet ideas are unreachable. We can never succeed in

[72] Note that there is also the idea of nature as a teleological system. If we affirm the existence of organisms, we are lead to form this concept, Kant says. (Cf. *KU*, §67, 5:378-9.)

explaining all empirical phenomena by means of the mechanistic$_{narrow}$ principles. This construction allows Kant to hold that, on a priori grounds, all appearances are subject to mechanism, without ruling out the reality of non-mechanical phenomena and sciences, such as chemistry and biology. Put differently, while all objects in nature stand under the idea of mechanistic nature, this does not mean that natural objects are actually nothing but mechanical. The spelled out conception of nature as a mechanical system is merely an idea, which allows the general conception of nature to be more capacious than the former conception of nature, so as to include chemical phenomena, plants, animals, and human beings. Once this construction is taken into account, we can make sense of 'mechanism' in Kant and we gain insight into how Kant understands the concept of nature.

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