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## KANT ON FORMATIVE POWER

The notion of a formative power is one of the most obscure in Kant's theory of biology<sup>1</sup>. Before I discuss Kant's biological use of the term 'formative power', in section 1 of this paper I provide a list of all passages in which Kant uses the term, claiming that the older meaning of 'formative power' in Kant's writings is an epistemological one, whereas the biological meaning of the term appears not before the mid-1780s. I present and discuss some of those passages in closer detail, and give a precise interpretation of the most central passage in Kant's philosophy of biology in §65 of the *Critique of the power of judgment*<sup>2</sup>. I defend the view that, for Kant, the formative power is a basic, immaterial, and intrinsic natural power in the organism belonging to an account of final causation. As a cause, it does not generate form and matter, or the matter of organisms, but only the end-directed teleological form of the matter of an organism. As an alternative to White's<sup>3</sup> claim

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<sup>1</sup> For recent inquiries see H. van den Berg, *Kant on vital force. Metaphysical concerns versus scientific practice*, in E.-O. Onnasch (ed.), *Kants Philosophie der Natur. Ihre Entwicklung im Opus postumum und ihre Wirkung*, Berlin - New York, De Gruyter, 2009, pp. 115-136; G.F. Frigo, *Bildungskraft und Bildungstrieb bei Kant*, in *ibid.*, pp. 9-23; T. Cheung, *Der Baum im Baum. Modellkörper, reproductive Systeme und die Differenz zwischen Lebendigem und Unlebendigem bei Kant und Bonnet*, in *ibid.*, pp. 25-50; B.C. Look, *Blumenbach and Kant on mechanism and teleology in nature: the case of the formative drive*, in J. Smith (ed.), *The problem of animal generation in early modern philosophy*, Cambridge, Cambridge University Press, 2006, pp. 355-372; J.R. Richards, *Kant and Blumenbach on the Bildungstrieb: a historical misunderstanding*, «Studies in the history and philosophy of biological and biomedical sciences» 31 (2000), pp. 11-32, and see also Id., *Early theories of development: Blumenbach and Kant*, in *The romantic conception of life*, Chicago - London, University of Chicago Press, 2002, pp. 207-237; H. Müller-Sievers, *From preformation to epigenesis/self-generation in philosophy: Kant*, in *Self-generation: biology, philosophy, and literature around 1800*, Stanford, Stanford University Press, 2000, pp. 26-64; and T. Lenoir, *Kant, Blumenbach and vital materialism in German biology*, «Isis» 71 (1980), pp. 77-95, and *Vital materialism. Blumenbach, Kant, and the teleomechanical approach to life*, in *The strategy of life. Teleology and mechanics in nineteenth century German biology*, Dordrecht - Boston - London, Springer, 1982.

<sup>2</sup> CPJ, 5:374.21-6.

<sup>3</sup> See D.A. White, *Kant's notion of a purpose*, «Studies in philosophy and the history of philosophy» 30 (1997), special issue: *Final causality in nature and human affairs*, ed. by F.R. Hassing, p. 137.

that ‘form’ means species, and Richards’<sup>4</sup> opinion that ‘form’ is a synonym for (a mistaken notion of an) ‘archetype’, I defend the view that ‘form’ means the necessary directedness of the features of a being towards its purpose. A purpose is the unifying idea of an organism in our consciousness, and an ectype of its archetype in God’s consciousness.

Reading the formative force as form-giving allows for a more careful analysis of Kant’s famous tree example in §64, which I investigate in section 2. The self-generation of a tree with regards to its species, as an individual and in its parts, does not generally imply the generation of form and matter of a tree, or in particular the generation of its matter, but only the causation of the form of the matter of a tree. In section 3, I briefly outline consequences of my interpretation for a placement of Kant’s position within theological and philosophical accounts of organic generation. I claim that although the formative power as a form giving capacity in the organism is a natural epigenetic power, this does not rule out a supernatural preformistic interpretation of the creation of matter, and also not a supernatural creation of the formative power. The formative power of nature can be read as a secondary cause in support of the primary cause of God’s creation, and Kant’s position as mediating between philosophy and theology.

## 1. Kant on formative power

### 1.1. Two uses of ‘formative power’

The term ‘formative power (*bildende(n) Kraft*)’ appears in fourteen passages within the whole Kantian *oeuvre*<sup>5</sup>. Only two of those passages – *CPJ* 5:374.21-6 in §65 and *CPJ* 5:423.12-424.6 in §81 – belong to Kant’s published writings, though only passage *CPJ* 5:374.21-6 in §65 refers to Kant’s own account, whereas the passage *CPJ* 5:423.12-424.6 in §81 refers to contemporary positions of Kant’s own time, especially Blumenbach’s. All other appearances

<sup>4</sup> See J.R. Richards, *Kant and Blumenbach on the Bildungstrieb* cit., p. 28.

<sup>5</sup> There are, of course, more passages in which Kant discusses epigenetic conceptions of powers under varying names, for instance a «capacity for [...] formation [*Bildungsvermögen*]» (*CPJ* 5:371.25) in §64 of the *CPJ*, and a «generative power [*Zeugungskraft, zeugende Kraft*]» in his two early writings on races (*Races* 2:435.1-436.8, *Human Race* 8:98.11-99.12). In §81 of the *CPJ*, he mentions Blumenbach’s «formative drive [*Bildungstrieb*]» (*CPJ* 5:424.34) in a review of epigenetic positions. Furthermore in §58 he talks about a chemical version of «formation [*Bildung*]» (*CPJ* 5:348.11, 21, 25; 349.1; 350.1). The boundary but also the worth of the following investigation is its concentration on those selected passages where Kant precisely uses the term «formative power». Further statistics could follow up including more related passages.

occur in lectures, notes, reflections, fragments – texts which Kant himself did not authorize for publication. The notion ‘formative power’ is a rare term. Nevertheless, placed at the center of §65, the formative power might be an indispensable part of Kant’s account of biological causation.

Reading all fourteen passages results in a surprisingly clear picture of two different treatments of the notion ‘formative power’ in Kant’s writings. Let us begin with a list of these passages:

*Lectures on metaphysics (Met. L<sub>1</sub>)*

(1) 28:230-40 mid 1770s  
epistemology

(2) 28:276 mid 1770s  
epistemology

*Reflections on metaphysics*

(3) 17:736, refl. 4811 phase  $\tau$  1775-6?,  $\mu$  1770-1?  
epistemology

*Reflections on anthropology*

(4) 15/I:95, refl. 251 phase  $\nu^1$  1771?,  $\rho^1$  1773-5?,  $\varphi^1$  1776-8,  
 $\chi^1$  1778-9

epistemology  
(5) 15/I:127, refl. 321 phase  $\lambda$  1769-70?,  $\xi$  1772?  
epistemology

(6) 15/I:383, refl. 872 phase  $\nu$  1776-8  
epistemology

(7) 15/II:699, refl. 1484 phase  $\sigma$  1775-7  
epistemology

*Lectures on moral philosophy (Moral Mrongovius)*

(8) 27/II.2:1498 1782  
epistemology

*Reflections on metaphysics*

(1) 18:574, refl. 6302 phase  $\psi^2$  1783-4  
biology

*Critique of the power of judgment*

(2) §65, 5:374 1790  
biology

(3) §81, 5:423-4 1790  
biology

*Lectures on metaphysics (Met. K<sub>2</sub>)*

(4) 28/II.1:761 early 1790s

biology	
<i>Opus postumum</i>	
(5) 21:475	1786-98
biology	
(6) 21:630	1798-9
biology	

The earlier meaning appears in eight passages and belongs to *epistemology*. Seven of these passages stem from the 1770s, one of them from the early 1780s. In this early (pre-critical) view, Kant treats the notion ‘formative power’ as a source of the spontaneous production of mental representations in human beings (seven passages) and in the animal’s mind (one passage). The term ‘formative power’ designates a productive force of our consciousness to spontaneously generate representations, on both the sensual and the conceptual level. In its most elaborate version Kant distinguishes six kinds of spontaneously generated *sensual* representations: re-formations (*Abbildungen*), post-formations (*Nachbildungen*), and pre-formations (*Vorbildungen*), in-formations (*Einbildungen*), anti-formations (*Gegenbildungen*), and ex-formations (*Ausbildungen*) – beside two kinds of spontaneously generated conceptual representations: concepts (categories) and laws of understanding. I briefly demonstrate this in Kant’s text.

In the lectures on metaphysics from the mid 1770s<sup>6</sup> the term ‘formative power’ designates an activity of the sensual faculty of the human mind that spontaneously produces sensual representations: «knowledge that has its origin in the spontaneity of the consciousness is called: *knowledge of the formative power* [*Erkenntnisse, die aus der Spontaneität des Gemüths entspringen, heißen: Erkenntnisse der bildenden Kraft*]»<sup>7</sup>. The formative power is an «*imitated knowledge of the senses* [*nachgeahmte Erkenntnis der Sinne*]», which is a capacity «to produce knowledge out of ourselves that nevertheless has the form according to which objects would affect our senses»<sup>8</sup>.

This sensual kind of formative power is a capacity of sensual recollection or anticipation of objects of experience. It encompasses

<sup>6</sup> *Met. L1* 28:230-40.

<sup>7</sup> *Met. L1* 28:230.21-2.

<sup>8</sup> «*Erkenntnisse aus uns selbst zu machen, die aber dennoch die Form an sich haben, nach der Gegenstände unsere Sinne afficiren würden*» (*Met. L1* 28:235.17-21).

six subordinate kinds of sensual representations, three of which are temporally distinct: the capacity of «re-formation [*Abbildung*]» generates «representations of the present time [*Vorstellungen der gegenwärtigen Zeit*]», the capacity of «post-formation [*Nachbildung*]» reproduces «representations of the past time [*Vorstellungen der vergangenen Zeit*]», and the faculty of «pre-formation [*Vorbildung*]» anticipates «representation of the future time [*Vorstellungen der zukünftigen Zeit*]»<sup>9</sup>. Three further subordinate kinds of a spontaneous, sensual capacity named ‘formative power’, are the «capacity of in-formation [*Vermögen der Einbildung*]», the «capacity of anti-formation [*Vermögen der Gegenbildung*]», and the «capacity of ex-formation [*Vermögen der Ausbildung*]»<sup>10</sup>.

Beside a capacity of sensibility, the formative power also describes a conceptual capacity, which spontaneously produces concepts of understanding:

How do the concepts of understanding come into our head? We have knowledge of the objects of intuition by the means of the formative power [...]. If this formative power is abstract, it is the understanding. Taken to be abstract the conditions and actions are pure concepts and categories of understanding [...]. All supreme principles of understanding *a priori* are general rules. They express the condition of a formative power in all appearances, on the basis of which we can determine how appearances are to be combined with each other.<sup>11</sup>

Three of these six subordinate kinds of the sensual formative power, namely post-formation (*Nachbildung*), pre-formation (*Vorbildung*), and in-formation (*Einbildung*), are also mentioned in a short reflection on anthropology<sup>12</sup>: «Formative power. Post- and pre-formation. Information. without or with consciousness [*Bildende Kraft. Nach- und Vorbildung. Einbildung. ohne oder mit Bewusstseyn*]»<sup>13</sup>. An epistemological meaning of ‘formative power’ can be found also in the postscript of Kant’s lecture on moral phi-

<sup>9</sup> *Met. L<sub>1</sub> 28:235.26-31*, see also *Met. L<sub>1</sub> 28:230.1-3*.

<sup>10</sup> *Met. L<sub>1</sub> 28:237.1-28*.

<sup>11</sup> «*Wie kommen aber die reinen Verstandesbegriffe in den Kopf? Von den Gegenständen der Anschauung haben wir Kenntnisse, vermöge der bildenden Kraft [...]. Ist diese bildende Kraft in abstracto, so ist es der Verstand. Die Bedingungen und Handlungen in abstracto genommen, sind reine Verstandesbegriffe und Kategorien des Verstandes [...]. Alle obersten Grundsätze des Verstandes a priori sind allgemeine Regeln, welche die Bedingung der bildenden Kraft in allen Erscheinungen ausdrücken, mit denen wir bestimmen können, wie die Erscheinungen untereinander zu verknüpfen sind*» (*Met. L<sub>1</sub> 28:239.13-29*).

<sup>12</sup> *Refl. 321*; phase λ 1769-70?, ξ 1772?.

<sup>13</sup> *Refl. Anth. 15/I:127.2-3*.

losophy written by his student Christoph Cölestin Mrongovius (1764-1855), who began to study in Königsberg in 1782. This is the only passage with an epistemological meaning of ‘formative power’ from the early 1780s. Also in this lecture, Kant mentions a sensual, spontaneous ‘formative power’ that he specifies as ‘in-formation (*Einbildung*)’. It is a capacity to produce imaginations and representations even if corresponding objects are not present in experience. Kant concedes to those imaginations more appeal on our consciousness than to objects given in experience:

We do not have the greatest in-formations and forms (images) based on the affection of objects, but based on our formative power [...]. Objects, which cause forms (images) in us, are not always present. Only in-formation can be constantly present.<sup>14</sup>

Kant does not continue to use the notion of ‘formative power’ as an epistemological term after the beginning of the 1780s. Although he pursues developing the notion of a spontaneous productive capacity of the human consciousness that originates concepts and laws of understanding in his critical philosophy – prominently in his first *Critique* (1781/7) – he does not name this activity ‘formative power’ any longer. It is also interesting to note that the sensual capacity, which Kant describes as a formative spontaneous power in his pre-critical notes, remains the only spontaneous part of the sensual capacity of our consciousness in the critical period<sup>15</sup> beside a receptive part of it (space and time as forms of intuition).

The second, and for the aims of this paper more interesting, meaning of the notion ‘formative power’ appears in six passages; one of them stems from the early 1780s, five from the 1790s onwards until Kant’s latest notes. All six passages belong to the field of *biology*. Different from the epistemological uses and meaning of the term, which overlap partly at least in some of the passages, the textual basis for the biological use of the term is more fragmentary, cryptic, and inconsistent. The contents and backgrounds of those six passages are so divers that they can hardly be used to interpret each other. Thus, I only consider the oft-cited passage in

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<sup>14</sup> «Die größte Einbildungen und Bilder haben wir nicht von dem Reitz der Gegenstände, sondern von unserer bildenden Kraft [...]. Die Gegenstände, die die Bilder in uns machen, sind uns nicht immer gegenwärtig, allein die Einbildungen können uns immer gegenwärtig seyn» (Mrongovius 27/II.2:1498.29-33).

<sup>15</sup> See *Einbildungskraft* (CPR A 78/B 103).

§65 of the *Critique of the power of judgment*, since it is the only authorized and, therefore, most authentic source for our understanding of Kant's own biological conception of a formative power. In this passage, Kant treats the 'formative power' as a natural force that is responsible not for creating or generating organized matter but for establishing and sustaining the organized teleological *order or form* of organized beings<sup>16</sup>.

The crucial passage in §65 consists of only one intricate sentence:

[a] An organized being is thus not a mere machine, for that has only a *motive* power, [b] while the organized being possesses in itself a *formative* power, [c] and indeed one that it communicates to the matter, which does not have it ([d] it organizes the latter): [e] thus it has a self-propagating formative power, which cannot be explained through the capacity for movement alone (that is, mechanism).<sup>17</sup>

The sentence entails the following five claims: a) the formative power distinguishes organized beings from machines with which they share motive powers; b) the formative power belongs to the organized being in itself; c) the formative power is communicated by the (organized) being to materials (matters), materials do not have formative power; d) when communicated to materials the formative power organizes a being; e) the formative power is a self-propagating formative power.

What do these claims mean? a) An organized being is partly identical with a machine, namely insofar as it possesses motive power. But it differs from a machine insofar as it possesses a formative power which cannot be identified with the capacity of motion alone. The formative power can involve but cannot be reduced to the mechanisms of motion. b) The formative power is an

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<sup>16</sup> The dating of the passages follows the editors of the *Academy edition* and the editors of *The Cambridge edition of the works of Immanuel Kant*. The reflections on metaphysics and anthropology are dated by Erich Adickes (see the editorial remarks in *Refl.* 16:xxv-liv); the lectures on metaphysics are dated by Gerhard Lehmann (for an overview of the dates see the editorial remarks of Karl Ameriks and Steve Naragon in the *Cambridge edition* of the *Lectures on metaphysics* 1997, xxii). The Mrongovius lecture on moral philosophy cannot be earlier written than 1782, since Mrongovius began his studies in Königsberg in 1782.

<sup>17</sup> «Ein organisirtes Wesen ist also nicht bloß Maschine: denn die hat lediglich bewegende Kraft; sondern es besitzt in sich bildende Kraft und zwar eine solche, die es den Materien mittheilt, welche sie nicht haben (sie organisirt): also eine sich fortpflanzende bildende Kraft, welche durch das Bewegungsvermögen allein (den Mechanism) nicht erklärt werden kann» (CPJ 5:374.21-6).

*intrinsic* power in the organized being. It does not externally cause the organized being (as for instance the formative power of an artisan that produces the artificial object). The formative power is a natural property of and is effective in the organized being.

Section c) is a difficult, ambiguous part of the sentence, which also has bearing on the different meanings of section d). The *Cambridge edition* translations of c) and d) fail to convey an important aspect of the German text. The original Kantian text says in c) and d) that an organized being has a formative power «*und zwar eine solche, die es den Materien mittheilt, welche sie nicht haben*». Using «den Materien» in c), and correspondingly «*welche*», and «*haben*» in d), Kant indicates plural, i.e. he does not suggest that the formative power acts upon matter, but upon several materials. In the *Cambridge edition* Paul Guyer and Eric Matthews translate «the matter, which does not have it». Using «matter» in c), and correspondingly «does» in d), they – at first glance – indicate a singular, even if «matter», as the word «*Materien*» in German does not exclusively designate a singular.

Possible readings of Kant's own claim, that an organized being communicates formative power to materials, which do not have formative power, are:

c $\alpha$ ) the organized being communicates the formative power to all materials (reading «den Materien» as '*allen Materien*'), which do not have formative power. This non-restrictive reading suggests that in an organized being the formative power acts upon all kinds of matter which themselves do not have formative power. The consequence of this reading is that the formative power is itself not material, for otherwise it would be part of matter. The formative power then is an immaterial power. In addition, an organized being that contains formative power 'in itself' cannot be an entirely material being, for at least its formative power is an immaterial element 'in' the organized being. In line with this reading White stresses «whatever form does determine a given quantity of matter it is in some essential sense distinguishable from the matter it so determines»<sup>18</sup>.

c $\beta$ ) Emphasizing «den Materien» in the sense of 'only those', an alternative reading<sup>19</sup> is that the organized being communicates the formative power only to those kinds of materials that do not have it. In this restrictive reading it is possible to interpret the

<sup>18</sup> D.A. White, *op. cit.*, p. 134.

<sup>19</sup> I am grateful to François Duchesneau who suggested this reading.



formative power itself as part of matter. It could be a material power that occupies some parts of matter (organized materials), whereas it is communicated to all other raw matter (unorganized materials) that do not have formative power and that will be formed by the formative power. The distinction between c $\alpha$ ) and c $\beta$ ) is that the formative power in c $\alpha$ ) is immaterial whereas in c $\beta$ ) it is material. The ambiguity of the passage allows both readings. Frigo describing «matter as formative power [*Materie als Bildungskraft*]» and «matter as formative drive [*Materie als Bildungstrieb*]» seems to hold c $\beta$ )<sup>20</sup>.

A defender of c $\alpha$ ), however, could object that Kant's text suggests at several places that the formative power as the cause of the purposive form of nature is analogous to the human will and the «practical faculty of reason»<sup>21</sup> as the cause of the purposive form of our human actions. The human will and its faculty of reason is an immaterial power for Kant. This analogy between the formative power and the human will does imply that Kant ascribes reason to nature, since, in the Kantian sense, nature does not have practical reason. Some of Müller-Sievers'<sup>22</sup> remarks are therefore misleading, for instance, when he says that the «formative drive» is «the expression of a will for self-organization in nature». Even if the formative power is not identical with practical reason it can be an immaterial power: Kant emphasizes that «the organized being» communicates the «*formative power*» to «the matter [*den Materien*]», «which do not have it [*welche sie nicht haben*]» (my translation). He insists on the fact that the formative power is not entailed in all materials and is not originally part of matter. He could have said 'those materials (*jenen Materien*)' instead of 'the matter (*den Materien*)' to insist on a restrictive instead of a non-restrictive reading. Look's<sup>23</sup> proposal provides indirect support for c $\alpha$ ). He argues that precisely since Blumenbach identifies the formative power as a part ('feature') of matter, Kant thought that he had to depart from Blumenbach. Kant criticized Blumenbach for determining the formative drive as 'a feature of

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<sup>20</sup> See G.F. Frigo, *op. cit.*, pp. 13, 15. Although it is not precisely clear to me what Frigo's position is, he seems to identify the formative power in Kant with matter. But his analysis of Kant's account is not very straightforward in slipping into descriptions of Blumenbach's account of a formative drive and Wolff's account of a *vis essentialis*.

<sup>21</sup> *CPJ* 5:375.24-5.

<sup>22</sup> See H. Müller-Sievers, *op. cit.*, p. 61.

<sup>23</sup> See B.C. Look, *op. cit.*, p. 372.

*all matter*'. I am also inclined to say that  $\alpha$ ) has more support in the text.

d) The formative power acts upon matters and thereby organizes the materials. In d) Kant describes the effect of the formative power: it organizes matter. The meaning of 'organization' is explained in a brief footnote where Kant says that an organized being is a «whole» in which each part is «not merely a mean, but at the same time also an end, and, insofar as it contributes to the possibility of the whole, its position and function should also be determined by the idea of the whole»<sup>24</sup>. In an organized being, whole and part are purposes for each other:

For a body [...] which is to be judged as a natural end in itself and in accordance with its internal possibility, it is required that its parts reciprocally produce each other, *as far as both their form and their combination is concerned*, and thus produce a whole out of their own causality, the concept of which, conversely, [...] is in turn the cause of it in accordance with a principle; consequently the *connection of efficient causes* could at the same time be judged as an *effect through final causes*.<sup>25</sup>

One effect of the formative power is that it causes the «form» and «combination» of the parts. Significant for this form of the parts and their combination is that each part «exists through the others», which means that its form or purpose is brought about by other parts as much as it brings about the form or purpose of others, and that other parts exist for the sake of it as much as it exists «for the sake of the others»<sup>26</sup>. Parts do not only coexist beside each other but with, through, and dependent upon each other, which means that, for instance, the injury or functional efficiency of one part influences the functioning of all other parts.

Another effect of the formative power is that it brings about the form or purpose of the whole and establishes a mutual supportive relation between the particular purposes of the parts and the general purpose of the whole. The fulfillment of the particular purposes of the parts helps to bring about the purpose of the whole. In turn, the purpose of the whole helps to determine and find the particular purposes of the parts. This also sheds light on the relation between the natural laws: mechanical features of a being might be directed, however, not directed towards a purpose.

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<sup>24</sup> *CPJ* 5:375.34-7.

<sup>25</sup> *CPJ* 5:373.26-34, the first two italics are mine.

<sup>26</sup> *CPJ* 5:373.35-7.

The purposive formal relations between the mechanical features of organisms are caused by final causes, i.e. the formative power in the organic beings.

The most astonishing claim is e): the formative power is «a self-propagating formative power [*eine sich fortpflanzende bildende Kraft*]»<sup>27</sup>. Kant does not say ‘a propagating power (*eine fortpflanzende Kraft*)’; i.e. he does not claim that the formative power causes the process of the impregnation and generation (*Fortpflanzung*) of organized beings, at least not on a material level. Instead, he says «a self-propagating formative power [*eine sich fortpflanzende bildende Kraft*]»<sup>28</sup>. The word «self» might be read in two ways:

eα) in German ‘to propagate (*sich fortpflanzen*)’ is used as a metaphor to say that something spreads out or extends itself. If we say that a wave, caused by a tsunami, spreads out in the ocean and along the coast, we could say: ‘*Die Welle pflanzt sich im Meer und an der Küste fort*’. The domino effect of an economic crisis in one country, which causes an economic crisis in the neighboring countries, would be another example for ‘*sich fortpflanzen*’. For we could say: ‘*Die wirtschaftliche Krise pflanzt sich in den benachbarten Ländern fort*’. This meaning does not necessarily describe a new generation of something, but only an extension of something (a form or order or even disorder) in something else, without the new generation of this something else. The ‘formative power’ in this sense would be an immaterial power that is transferred to and spread out in something else: namely matter, without generating matter. It only generates a new form of matter – its organization. The cited sentence would say that in the organized being an immaterial formative power is transferred to and spread out in matter, which does not have a formative power originally. It thereby generates a new organization in this matter. It self-organizes matter.

eβ) In German ‘to propagate (*sich fortpflanzen*)’ is used literally with regard to plants, animals, and humans. However, Kant claims the self-propagating capacity not with regard to plants, animals, and humans but with regard to a power. In this sense, the «self-propagating formative power [*eine sich fortpflanzende bildende Kraft*]» can have a self-reflexive meaning, namely ‘a formative power that propagates itself (*eine sich selbst fortpflanzende bil-*

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<sup>27</sup> My italics.

<sup>28</sup> My italics.

*dende Kraft*)'. The formative power would then be a power that generates and/or preserves *itself*. How can we make sense of such a claim without making it sound mystical? A possible self-reflexive reading would be to say that a formative power is a self-explanatory and self-evident basic power. In his writing *Teleological principles*, written two years before the *Critique of the power of judgment* in 1788, Kant describes such a basic power as follows:

[We] can only know a basic power through the relation of a cause to an effect [...]. Now the concept of an organic being is this: that it is a material being which is possible only through the relation of everything contained in it to each other as end and means [...]. Therefore a basic power that is effectuated through an organization has to be thought as a cause effective according to *ends*, and this in such a manner that these ends have to be presupposed for the possibility of the effect. But we know such powers, *in terms of their ground of determination only in ourselves*, namely in our understanding and will, as a cause of the possibility of certain products that are arranged entirely according to ends, namely that of *works of art*. In us understanding and will are basic powers, of which the latter, insofar as it is determined by the former, is a faculty to produce something *according to an idea* which is called an end.<sup>29</sup>

The formative power then would be a final and fundamental purpose (or end) setting force of nature, which cannot lead back to another principle. Equivalent to the human understanding and will as inner capacities (causes), it brings about an end as its effect and generates the order among the means to achieve this end.

Given d) and e) it is likely that the formative power itself is not a power of generation. Although Kant calls this power 'fortpflanzend' it does not necessarily function as seminal fluid. The immaterial, natural formative power is a basic, ordering and *form*<sup>30</sup> giving principle which is directed towards an end or pur-

<sup>29</sup> *Teleological principles* 8:180.18-181.14.

<sup>30</sup> The majority of passages throughout the second half of the third *Critique* supports a reading according to which the formative power is responsible for the form of the being; see for instance *CPJ* 5:369.33-370.15, 373.4-34, 377.1-23, 378.12-379.9, 407.13-409.22, 410.16-411.29. This reading seems contradicted at some points, but even passages which could be read as suggesting a formative force that generates matter should be understood as suggesting that the formative power only selects the required matter: it «might always be possible that in, e.g. an animal body, many parts could be conceived as consequences of merely mechanical laws [...]. Yet the cause that provides the appropriate material, modifies it, forms it, and deposits it in its appropriate place must always be judged teleologically, so that everything in it must be considered as organized, and everything is also, in a certain relation to the thing itself, an organ in turn [*Es mag immer sein, daß z.B. in einem thierischen Körper manche Theile als Concretionen nach bloß mechanischen Gesetzen begriffen werden können [...]. Doch muß die Ursache, welche die dazu*

pose, and spreads out its organizing and ordering capacity in matter. But it does not necessarily bring matter into existence.

In the second passage of those that Kant authorized for publishing, i.e. in §81<sup>31</sup>, Kant uses the term ‘formative power’ only as part of a description of contemporary approaches in his time, but not as a characteristic term in his own theory. Nevertheless it is decisive that also in this passage the formative power is a «*purposive formative power*»<sup>32</sup>. Using Blumenbach’s theory as an example, Kant demonstrates that the formative drive – Blumenbach’s term for the equivalent to Kant’s formative power – is responsible for an «original *organization*» of matter, which brings matter «into the *form* of a self-preserving purposiveness»<sup>33</sup>. Also regarding Blumenbach’s view, Kant claims that the formative drive is the cause of the purposive form of an organism, even though in this passage it is less clear whether Blumenbach understood the formative drive as a material or immaterial capacity.

Since the investigated propositions shed more light on the meaning of ‘formative’ (form-giving, cause of form) than of ‘power’, a closer consideration of Kant’s metaphysical view of the notion of power or force would be required. I want to outline briefly how such an investigation could proceed: as Kant says in the first *Critique*<sup>34</sup>, power or force is a «*predicable*», i.e. it is not one of the categories or «*ancestral concepts [Stammbegriffe]* of pure understanding», but a derivative concept, subordinate to the category of causality (which is, itself not further specified as efficient or final causality)<sup>35</sup>. In the *Teleological principles* Kant says that power is:

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*schickliche Materie herbeischafft, diese so modificirt, formt und an ihren gehörigen Stellen absetzt, immer teleologisch beurtheilt werden, so daß alles an ihm organisirt betrachtet werden muß, und alles auch in gewisser Beziehung auf das Ding wiederum Organ ist]» (CPJ 5:377.17-23).*

<sup>31</sup> CPJ 5:423.12-424.6.

<sup>32</sup> CPJ 5:424.4, my italics.

<sup>33</sup> CPJ 5:424.23-34, my italics.

<sup>34</sup> CPR A 81-2/B 107-8.

<sup>35</sup> For further explanation, Kant alludes to ontological textbooks of his time. More precisely, however, than relevant passages in Baumgarten’s *Metaphysica* (§§127-36), for instance, are the few remarks regarding the terminological character of the notion ‘power’ in Kant’s own writings. In Baumgartens *Metaphysica*, which Kant himself used in his lectures on metaphysics, the notion of ‘power’ or ‘force’ is treated in the §§127-36, on substance and accident. In §131 Baumgarten claims: «Wenn in einer Substanz Accidenzien wirklich sind, so muß diese Wirklichkeit 1) einen Grund haben [...] und der wird eine Kraft in der weitern Bedeutung genennt [...], und 2) einen hinreichenden Grund [...]. Dieser ist die Kraft in der engeren Bedeutung [If the accidents are real in a substance, this reality must 1) have a ground [...] which is named power in the broader sense [...], and must have 2) a sufficient ground [...]. And this ground is the power in the narrower

Not what contains the ground of the reality of the accidents (since this is the substance), but is only the relation of the substance to the accidents insofar as the substance entails the ground of their reality<sup>36</sup>.

Nearly identical<sup>37</sup> to this is Kant's claim in his writing *Discovery* (1790) that:

Power is not what entails the ground of the existence of the accident (since this is the substance), but is only the notion of the relation of the substance to the latter [the accidents] insofar it [the substance] entails their ground, and this relation is entirely different from inherence<sup>38</sup>.

As I take it, these remarks suggest that the formative power can be read as part of an account of final causation: within the organized being the formative power is intentionally directed towards the (idea of a) purpose and organizes the accidents of an organic substance such that their relation to the substance is formed by (the idea of) the purpose.

## 1.2. Formative power as form giving: the meaning of 'form'

Now I return again to the question as to what it means to say that the formative power causes the 'form' of the matter of an organism. White suggests that 'form' does not describe the physical outer shape of an organism but rather means that an individual organism shares the basic properties of its species: the «form of a natural thing [...] is equivalent to the species of that thing»<sup>39</sup>. Richards, in contrast, argues that 'form' is used as a synonym for 'archetype', and in doing so takes 'archetype' as a common pattern underlying even the diversity of species. Kant

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sense». He continues in §132: «Die Kraft in der engern Bedeutung ist [...] der hinreichende Grund aller Accidenzien [...] folglich ist sie eine Substanz, und in so ferne die Accidenzien in ihr wirklich seyn können, das Substantielle [The power in the narrower sense is [...] the sufficient ground of all accidents [...] and thus it is a substance, and, insofar the accidents can be real in it, the substantial]. Accidences are the parts and properties of such a substance (§135).

<sup>36</sup> «Kraft ist nicht das, was den Grund der Wirklichkeit der Accidenzen enthält (das ist die Substanz), sondern ist blos das Verhältnis der Substanz zu den Accidenzen, so fern sie den Grund ihrer Wirklichkeit enthält» (*Teleological principles* 8:181.35-8).

<sup>37</sup> See also *Negative magnitudes* (1763, 2:201.23-204.11), and *Met. Herder* (1762-4, 28:23.29-28.14).

<sup>38</sup> «Die Kraft ist nicht das, was den Grund der Existenz der Accidenzen enthält (denn den enthält die Substanz): sondern ist der Begriff von dem bloßen Verhältnisse der Substanz zu den letzteren, so fern sie den Grund derselben enthält, und dieses Verhältnis ist von dem der Inhärenz gänzlich unterschieden» (*Discovery* VIII 224.35-9).

<sup>39</sup> See D.A. White, *op. cit.*, p. 137.

saw in the *Bildungstrieb* a way to understand the nature of organic form. In his consideration of this topic, he broached two interrelated conceptions [...] the 'archetype' [...] [and] a gradual biological development, that is, an evolution [...] of animal forms out of the inorganic, and their continued transformation into the multitude of species. In his discussion, Kant admitted that animal species, despite their variety, seemed to display common patterns, or archetypes [*Urbilde*].<sup>40</sup>

White's view suggests that the formative power drives an organism to fulfill the formal conditions of its species, which – according to Kant's account (as I take it) – would be represented as an empirical concept in our human understanding. Such an empirical concept of the understanding would be abstracted by means of a comparison of many organisms and would encompass the common features shared by all members of a species. Richards' view suggests that the formative power drives an organism to fulfill the formal conditions of its archetype. In this claim, Richards confuses Kant's terms – since an archetype, for Kant, is not a species concept, i.e. an empirical concept abstracted from a group of individuals and represented in the human consciousness, and also not a concept that underlies several species, but an *a priori*, original intuition of an organism in God's consciousness<sup>41</sup>. It is the representation of a being in a divine, intuitive understanding, which is inaccessible to the human understanding. An archetype does not underlie the species or the diversity of several species, but each individual as an individual and representative of its species.

There are objections to both readings. White's view that the formative power is form giving in the sense that it causes the directedness of the formal properties of an organism to the species seems too narrow. It is inconsistent with Kant's claim that an individual organism is an end (purpose, idea) in itself, i.e. that the formative power forms exactly *this* individual insofar as it fulfills *this* individual idea of its purpose or end. I doubt whether fulfilling the common features of the species of an oak tree, or fulfilling the common features of the species of a polar bear, or fulfilling the common features of being a human being is precisely the same as fulfilling the purpose of what *this* individual oak tree, of *this* individual polar bear, of *this* individual woman is supposed to be. If

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<sup>40</sup> R.J. Richards, *Kant and Blumenbach on the Bildungstrieb* cit., p. 28. See also Id., *Early theories of development: Blumenbach and Kant*, in *The romantic conception of life* cit., p. 232.

<sup>41</sup> *CPJ* 5:405.1-410.11, 5:408.19.

we take 'form' as species, the idea of *the* individual purpose of a singular being is lost.

In addition, the concept of 'form' interpreted as species would entail those general and common features that are abstracted from the observation of a group of similar, empirically given organisms. But it is clear from Kant's text that what Kant calls the 'form' of an organism is not represented by an empirical concept of understanding, but by an idea of reason:

Since reason must be able to cognize the necessity in every *form* of a natural product if it would understand the conditions connected with its generation, the *contingency* of their *form* with respect to all empirical laws of nature in relation to reason is itself a ground for regarding their causality as if it were possible only through reason.<sup>42</sup>

An archetype (as I take Richards' claim in a corrected, more appropriate Kantian sense) is the *a priori*, original intuition of a being in God's consciousness<sup>43</sup>. It is the representation of a being in a divine, intuitive understanding. If, as Richards suggests, the formative power is form giving in the sense that it orders the formal features of an organism such that they are directed towards the 'archetype' of the being in God's consciousness, this archetype at least entails both, i.e. the features of a being as an individual and as a part of its species, since God has complete insight into a being. Insofar, Richards' view (the way I amend it) would be more appropriate than White's reading in which the instantiation of the species in an individual is missed. However, the intuition of an archetype is not accessible to our human understanding, and the formative power according to this view would be directed towards a form that is only present and transparent in God's consciousness. But this also seems to contradict Kant's claim that the formative power of an organism is directed towards an end that is represented as a concept of reason – since God's consciousness is a divine understanding that is never addressed by Kant as reason but as understanding, and which does not cognize based on concepts or ideas, but based on intuitions.

As a solution, I suggest a reading that includes but cannot be reduced to White's view and is in line although not identical with Richards' view. In saying that the formative power strives to fulfill the form of an organism, by 'form' Kant means the purpose or end

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<sup>42</sup> *CPJ* 5:370.5-12, partly my italics.

<sup>43</sup> *CPJ* 5:408.19.



of the being that is represented for us as an idea of reason. This idea of a purpose includes both that a being fulfills the formal features of its species (thus it includes White's claim) and that it is an individual displaying the formal features of a species in a specific, individual way (thus it claims more than White's view). For, since Kant argues that the teleological or final law unifies the particular empirical laws of nature that apply to an organism<sup>44</sup>, we can conclude that the idea of a purpose not only entails the common and general features shared by all members of the species but also its individual implementation, and even those features which are irrelevant for the implementation of the species and are just additional individual peculiarities of an organism that might on the surface be redundant, contingent, or inconsistent with the purpose of the being.

According to §§76-7, the purpose or end of an organic being is represented as an intuition or archetype in a divine consciousness by an intuitive understanding; whereas it appears in our human consciousness as an idea represented by the faculty of reason. But the representation of a purposive being in God's consciousness is thought to be the archetype for the representation of the purposive being in our human consciousness as its ectype. Insofar there is some truth in Richards' claim that the form that the formative power brings about in an organism is the divine intuition of its archetype or *Urbild*, for which reason's idea of a purpose is a limited ectype in our human consciousness. But it would be more appropriate to claim equally that the formative power causes the purposive form of the organism, which is represented in our human consciousness as reason's idea of the purpose of the organism, and in the divine consciousness as God's intuition or of the archetype of the organism.

## **2. The formative power as a cause of the purposive form of organisms: Kant's tree example**

To demonstrate the principle of organic self-generation (self-formation), scholars usually rely on Kant's famous tree example in §64 of the *Critique of the power of judgment* – but unfortunately often only to provide a synopsis of Kant's text. My reading of Kant's formative power as a form-giving principle has direct consequences for the interpretation of the threefold generative fun-

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<sup>44</sup> See *CPJ* §70, 5:386.21-387.9.

ction that Kant ascribes to the formative power in §64 of the *Critique of the power of judgment*. The self-generation of a tree with regards to its species, as an individual, and in its parts as caused by the formative power, does not imply in general the generation of the form and matter of the tree, or in particular the generation of its matter, but only the causation of the purposive form of the matter of the tree.

Kant's first claim regarding the tree is that:

A tree generates another tree in accordance with a known natural law. However, the tree that it generates is of the same species, and so it generates itself as far as the *species* is concerned, in which it, on one side as effect, in the other as cause, unceasingly produces itself, and likewise, often producing itself, continuously preserves itself, as species.<sup>45</sup>

In this quote Kant provides a description of the self-generation of an organism on the level of its species. Scholars mostly reconstruct this statement as claiming that a tree brings about the members of its species, i.e. as saying that, by means of its formative power, a tree generates itself regarding both, namely matter and form. But if so, where does the first tree come from? How does it come into existence? Does it generate itself – its matter, its form – out of nothing? What is the 'it' in 'itself', if 'it', i.e. the first member of a species does not already exist? Where is the formative power if it is not in the tree since a tree does not exist yet? To avoid being committed to the obscurity of a *generatio ex nihilo*, scholars<sup>46</sup> suggest that the term species can be applied not before the first two members of the species exist<sup>47</sup>. Kant's modified claim then would be that it is significant for organisms that two already existing members of a species can reproduce the matter and form of further members of their species based on their formative power, and thereby preserve their species. This claim is less vulnerable,

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<sup>45</sup> *CPJ* 5:371.7-12.

<sup>46</sup> See T. Cheung, *op. cit.*

<sup>47</sup> This view is supported by a remark in §82 of the *CPJ* (5:425.24-33), where Kant claims, that «in the organization of the two sexes in relation to one another for the propagation of their kind» the first pair of each species constitutes an original «organizing whole, although not one that is organized in a single body». Cheung refers to this passage in his discussion of the self-generation claim regarding the species. Probably he does not press Kant's position with questions like mine since he reads Kant's view in §82 into Kant's claims in §64, and therefore sees no reason to ask for the self-generation of the first two members of a species. But one could also draw into question (as I do) the persuasiveness of Kant's claim that the first pair of the species functions as «an organizing whole, although not one that is organized in a single body».

but (somehow arbitrarily) excludes the first two members of the species from the self-generation claim, and in doing so the organic generation of these two members of the species remains in need of explanation.

Alternatively one could avoid the obscurity of a *generatio ex nihilo* by arguing that the self-preservation of an organism regarding its species concerns only the self-preservation of the form but not of the matter and form of the members of a species. Then Kant's weaker claim would be that, based on their formative power, organisms preserve themselves regarding their form, and thereby preserve their species. This claim has the advantage that it is not committed to an explanation of the origin of the matter of the members of the species and does not exclude the first two members of the species from the claim that the formative power is responsible for the preservation of the form of the species. The disadvantage of this reading is that it is not by itself sufficient as an explanation of the generation of a species of organisms, since an additional explanation is required to give an account as to, where the matter of organisms comes from and how the formative power itself was brought into existence (I return to this point in section III of the paper).

Kant's second claim regarding the tree example is that:

A tree also generates itself as an *individual*. This sort of effect we call [...] growth; but this is [...] distinct from [...] increase in magnitude in accordance with mechanical laws [...]. This plant first prepares the matter that it adds to itself with a quality peculiar to its species [...] and develops itself further by means of material which, *as far as its composition is concerned, is its own product*. For although as far as the components that it receives from nature outside of itself are concerned, it must be regarded only as educt, nevertheless in the *separation and new composition* of this raw material there is to be found *an originality of the capacity for separation and formation* in this sort of natural being.<sup>48</sup>

In this quote, Kant provides a second description of the self-generation of an organism on the level of an individual. It is important to note that Kant equates self-generation here to an explanation of the growth of the individual organism. Thereby he distinguishes between a statement regarding the matter and a statement regarding the form of an organism. Kant claims that an organism's growth appears as an «educt» regarding its matter: the tree rece-

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<sup>48</sup> *CPJ* 5:371.13-29, italics partly added.

ives matter «from nature outside of itself». But it appears as a «product» regarding the «separation and new composition» of (the form) of matter, since the tree demonstrates an «originality of the capacity for separation and formation» of the matter. These claims clearly support the view that the self-generative aspect of a tree is only concerned with the generation of a specific form of an organism but not of its matter. Whereas the tree receives matter passively «from nature outside of itself», the «originality» (namely the self-organization) of the form – the «separation», «formation», and «composition» of the matter is its own product.

This is suggested also by Kant's application of two terms, «educt» and «product», which have a specific meaning for Kant and in Kant's time. The term «product» belongs to an epigenetic account of natural generation. «Production» describes the intrinsic self-generation or self-causation of nature. The term «educt», however, belongs to a preformistic view of supernatural creation. 'Education' in this sense designates a subordinate act of natural causation, accompanied by the superordinate divine act of creation and supernatural causation of nature<sup>49</sup>. 'E-ducation' means the secondary enfolding of features of an organism by nature that a primary divine act of creation sets into the germ of the organism. This means that also the second level of the tree example suggests a self-generation of the form of the individual organism only, whereas it neglects the self-generation of its matter (the term «educt» regarding the generation of matter suggests a theological causation of matter – I will come back to this point in section 3).

Kant's third claim regarding the tree example says that:

One part of this creature [the tree] also generates itself in such a way that the preservation of the one is reciprocally dependent on the preservation of the others. An eye from the leaf of one tree grafted into the twig

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<sup>49</sup> See: «The idea of a being that would be the author of itself would be the original being and a product (not educt) of pure practical reason [*Die Idee von einem Wesen das von sich selbst Urheber wäre, würde das Urwesen seyn und ein Product (nicht Edukt) der reinen practischen Vernunft*]» (OP 22:130.13-5). See also Kant on preestablishment: «*preestablishment* can in turn proceed in two ways. Namely, it considers each organic being generated from its own kind as either the *educt* or the *product* of the latter. The system of generatings as mere educts is called that of *individual preformation* or the *theory of evolution*; the system of generatings as products is called the system of *epigenesis*. The latter can also be called the system of *generic preformation*, since the productive capacity of the progenitor is still preformed in accordance with the internally purposive predispositions that were imparted to its stock, and thus the specific form was preformed *virtually*. Given this, the opposing theory of individual preformation might better be called the *theory of involution* (or that of encapsulation)» (CPJ 5:422.36-423.11).

of another brings forth a growth of its own kind in an alien stock, and similarly a scion attached to another trunk. Hence one can regard every twig or leaf of one tree as merely grafted or inoculated into it, hence as a tree existing in itself, which only depends on the other and nourishes itself parasitically. At the same time, the leaves are certainly products of the tree, yet they preserve it in turn, for repeated defoliation would kill it, and its growth depends upon their effect on the stem. The self-help of nature in the case of injury [...] I mention only in passing.<sup>50</sup>

In this quote Kant presents another aspect of the self-generation and self-formation of an organism on the level of its parts. In the procedure of inoculation and grafting, the eye of a leaf or a twig («scion [*Pfropfreis*]»), for instance of a cherry tree, grafted into the stem of an apple tree, fulfills the form and function of an apple leaf or twig, even though its matter continues to grow as a cherry leaf or twig. Although the matter of the leaf or the twig grafted into an apple tree remains the matter of a cherry leaf or twig, its form and function carries over and substitutes the functions and form of an apple leaf or twig. This means the cherry leaf or twig serves to fulfill the specific function of the part of an apple tree and in doing so supports the purpose of the apple tree as a whole.

In addition, Kant claims that one could even consider twigs which originally belong to the apple tree as twigs which (as apple twigs) have been grafted into the apple tree. This equation of apple and cherry twigs clearly concerns the functional or formal equivalence of both kinds of twigs regardless of whether their matter is apple or cherry like. Thus, Kant's third consideration can also be read in support of my view that Kant's claim about the formative power as cause of the self-generation of organisms is a claim about the self-formation of organisms, but not a claim about the generation of their matter.

### 3. God and nature

So far I have argued that the formative power brings about the purposive form of an organism, where form is understood as the purpose (end, function) of an organism. The formative power causes the directedness of the properties of an organism towards its purpose. The form or purpose of an organism is represented in our human cognition by an idea of reason, and in God's consciousness as the divine intuition of an archetype. As already indicated, Kant's account of the formative power does not suffice to explain the

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<sup>50</sup> *CPJ* 5:371.30-372.10.

generation of organisms entirely, since it does not explain the generation of matter and the generation of the formative power itself. Are the matters and mechanical laws, and are the formative power and teleological laws of organic nature created or eternal?

I will try to outline an account that consistently connects to the already established interpretation. Kant's most sophisticated<sup>51</sup> discussion on the relationship between God and nature, i.e. between divine and natural orders, can be found in his early essay *Argument* (1763). Already in this writing, three decades before the *Critique of the power of judgment*, Kant uses the tree example as evidence for an account of organic self-formation grounded in an account of divine creation. He claims that the structure of plants and animals displays a constitution that cannot be explained by appeal to universal and necessary laws of nature alone:

It is utterly unintelligible to us that a tree should be able, in virtue of an internal mechanical constitution, to form and process its sap in such a way that there should arise in the bud or the seed something containing a tree like itself in miniature, or something from which the tree could develop.<sup>52</sup>

The complete explanation of organic generation can be given on the basis of a «revised method of physico-theology» which poses God not only as an «Architect» of the form of the world but also as the «creator» of its matter<sup>53</sup>. Kant argues for the «complete dependency of nature upon God»<sup>54</sup>. God appears as both the first supernatural cause of the formal and of the material structures of nature. The creation of nature is «*materially supernatural*» since God is «the immediate efficient cause» of natural objects, and it is «*formally supernatural*» since God's supernatural power causes «the manner in which the forces of nature are directed to producing the effect»<sup>55</sup>. The specific directedness of natural powers and

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<sup>51</sup> The discussion of the relation between God and the laws of nature in Kant's *Argument* covers more than 70 pages. It is exceedingly instructive and precise, even compared to other elaborate theological writings like Kant's *Religion* (1794) or other writings on biology like the second half of the third *Critique* (1790).

<sup>52</sup> *Argument* 2:114.31-115.4. This thought resembles the third aspect of the tree example in §64 of the *Critique of the power of judgment*. In this early passages Kant imagines that the idea of the whole tree is somehow present in the twig so that the twig itself develops like a new tree.

<sup>53</sup> *Argument* 2:123.1-2.

<sup>54</sup> *Argument* 2:125.18-27.

<sup>55</sup> *Argument* 2:104.2-7.

their effects is not itself subject to a rule of nature. Natural laws can only be secondary causes of nature<sup>56</sup>.

The dependence of natural secondary causes on supernatural (material and formal) first causes can be consistently read into the relation of God and nature in the third *Critique*. This is because it is possible to say that God according to the account of the third *Critique* is the first efficient cause of nature, which brings natural materials into existence, and endows them with mechanical laws as secondary causes. In addition, the divine intuitions of purposes are the first formal and teleological causes of nature. To support these divine formal causes, God implants the formative power and teleological laws in nature as secondary natural laws and powers. By means of the formative power and teleological laws of nature, God causes the directedness of the mechanical natural powers and their effects towards the purpose of the organic object.

One could raise the objection that the *Argument* essay, written in 1763, is a pre-critical writing whereas the *Critique of the power of judgment*, written 1790, belongs to the end of the critical period. Kant's (physico-)theological views might have changed over the years, and we are not allowed to re-introduce pre-critical views into his critical philosophy and theology. I admit the strength of this objection in principle. However, Kant still claims the formal and material dependency of nature's generation on God in his lectures on rational theology, held in the 1780s<sup>57</sup>, i.e. during the period of the writing of the *Critique of the power of judgment*. And one should also be aware of the changes that Kant's theological views undergo in the critical period, especially regarding the physico-theological argument. The argument is under attack in Kant's first *Critique*. In 1781 Kant does not only criticize the physico-theological idea of God for being merely regulative, but also for the internal inconsistencies depending on the inconsistencies of the ontological argument that it implies<sup>58</sup>. The physico-theological argument disappears entirely in 1788 in Kant's second *Critique*. But in 1790, and this is the decisive point, it reappears at the end of the third *Critique* in §85<sup>59</sup>. And it even reappears in a new light, namely not as one of the criticized proofs for the existence of God as in the first *Critique*, but as the penultimate step in the criti-

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<sup>56</sup> *Argument* 2:126.5-137.6.

<sup>57</sup> Pöhlitz, 28/2.2:1094-8, 1196-9.

<sup>58</sup> *CPR* A 620-30/B 648-58.

<sup>59</sup> *CPJ* 5:436.3-442.10, 476.17-480.36.

cal system which has a limited explanatory function within the critical system: to account for the unity of the theoretical (i.e. the teleological and mechanical) laws of nature. The differences between the accounts in the *Argument* essay and the third *Critique* are that Kant treats the physico-theological God in the third *Critique* as a regulative idea, whereas in the pre-critical *Argument* essay he discusses it as a proof for the existence of such a God. Additionally, in the third *Critique* Kant introduces the formative power as a secondary teleological cause of nature and ascribes nature a power that – although created – is a spontaneous ordering force of nature. That is to say, Kant increases nature's independence, although only within the boundaries of a theological view. Taking Kant's strong theological commitments into consideration, and the fact that all natural causes are secondary causes for Kant, his philosophy of biology turns out to be more traditionalist than one would have expected.

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