

# Spontaneous generation

## The fantasy of the birth of concepts in Kant's *Critique of Pure Reason*

**Stella Sandford**

In the second edition of the *Critique of Pure Reason*, at the end of the transcendental deduction of the categories, Kant distinguishes the doctrine of transcendental idealism from competing theories of knowledge – or, more specifically, theories of the relation between concepts and experience – by characterizing them in terms of various theories of biological generation. Transcendental idealism, he writes there, is ‘a system of the epigenesis of pure reason’, while empiricism is akin to *generatio aequivoca* (what we now call ‘spontaneous generation’). If there is a ‘middle way’ between these – Cartesian innatism, perhaps – it is ‘a kind of preformation-system of pure reason’.<sup>1</sup>

Attempts to explain the enigmatic idea of an ‘epigenesis of pure reason’ have tended to seek illumination from what is known of Kant’s theoretical commitments in and contributions to the natural sciences – specifically, theories of generation and embryological development – from which the metaphor is drawn. No one pretends that this is straightforward, not least because Kant’s position (especially during the period of the two editions of the *Critique of Pure Reason*) is difficult to pin down, and commentators have come to very different conclusions. Further, it is not simply a question of determining where Kant stood in relation to the competing theories in order to read that position back into the metaphor in the *Critique of Pure Reason*. For aspects of Kant’s philosophy were influential in biological theory itself. In particular, Kant’s explication and defence of the necessity of the regulative idea of purposiveness in the study of natural organisms in the ‘Critique of Teleological Judgment’ chimed with, and was further taken up in, some of the most important work in biology in Germany at that time.<sup>2</sup> Connected with this, remarks in the Transcendental Dialectic in the *Critique of Pure Reason* show how Kant understood the essential regulative function of the ideas of pure reason in the field of natural history, concerning, specifically, the classification of nature, including

classifications of ‘race’. Indeed, Kant’s own theory of race – a bio-geographical anthropology of human diversity – is both based on and suggests further developments in the theory of human generation.<sup>3</sup>

The Kant literature has recently become increasingly interested in his contributions to the natural, social and human sciences (particularly geography and anthropology) and their possible relations to the canonical philosophical works. Discussions of the metaphor of epigenesis in relation to eighteenth-century German biology are part of this trend and as such are intrinsically interesting. Furthermore, there is no other way into the metaphor of epigenesis than via these theories of biological generation, for they supply the frame of reference within which the metaphor works. However, the limitation of this approach is that it explains precisely nothing about transcendental idealism that we did not already know. Treating the biological theories, including Kant’s own contributions to those theories, as a neutral basis for explanation, commentators who take this approach attempt to produce some accommodation between the biological theory of epigenesis and the doctrine of transcendental idealism, to lay out the terms of an analogy between them, but they do not ask, further, what the ground of the affinity between them might be. In a sense, these are interpretations of the metaphor devoid of all *suspicion*. But there is something very suspicious about the metaphor of epigenesis in the *Critique of Pure Reason*, not least its exceedingly ill-fitting relation to the doctrine of transcendental idealism. These are also interpretations devoid of all *criticism*, both of the biological theories at issue and of Kant’s philosophy.

In what follows I will locate the metaphor, as one must, within the field of eighteenth-century theories of generation, but also view it textually, in the context of the larger set of metaphors of generation, birth and biological ancestry in the *Critique of Pure Reason*. For although this is the only reference to epigenesis in the

*Critique of Pure Reason*, other biological metaphors and metaphors of generation permeate the book, most particularly and perhaps most unexpectedly where the characterization of the pure concepts of the understanding – ‘the ancestral concepts [*Stammbegriffe*] that comprise the pure cognition<sup>4</sup> – are concerned. Following this textual lead, I will suggest a suspicious, critical interpretation of the meaning of the metaphor of epigenesis, one which goes significantly beyond the idea that it corresponds to the biological theory. Pulling together some of Kant’s scattered references to and various uses of theories of biological generation, I propose a feminist interpretation of the generative metaphors of Kant’s presentation of the spontaneous production of the pure concepts by the understanding, arguing that the dominant generative model for the production or origin of the categories is in fact not epigenesis but *parthenogenesis*, the only generative model that could have secured the epistemic status and legitimacy – the *a priori* purity – of the categories in the *Critique of Pure Reason* for Kant. Finally, I will show how this generative model – both required by and *destructive of* the ‘purism’<sup>5</sup> of the *Critique of Pure Reason* – is part of the gendered imaginary subtending Kant’s transcendental idealism, in which the biological metaphor simultaneously attempts to deny and yet cannot fail to reveal the empirical stain on the purity of the *a priori* concepts.

### Preformationism vs epigenesis

For Kant, the chief aim of transcendental philosophy, and hence of its outline in the *Critique of Pure Reason*, is that ‘absolutely no concepts must enter into it that contain anything empirical, or that the *a priori* cognition be entirely pure’. Pure *a priori* cognitions are ‘not those that occur independently of this or that experience, but rather those that occur *absolutely* independently of all experience’.<sup>6</sup> The ground of such cognitions are the pure concepts of the understanding, and part of the task of transcendental critique is to exhibit these concepts in their necessity. But this means: to demonstrate their necessity *for experience*, their objective reality, or their validity for empirical objects of cognition. This is the central problem: the *necessary* relation between the pure *a priori* concepts, which are absolutely independent of experience, and experience itself. The solution famously lies in thinking this necessity ‘transcendentally’.

Kant specifies the originality of transcendental critique by contrasting it with John Locke’s ‘physiology of the human understanding’. Locke’s ‘physiological derivation’ of general concepts, Kant says, concerns a

question of fact (‘the explanation of the possession of a pure cognition’<sup>7</sup>) whereas the transcendental deduction of the categories is a question of right, of the *legitimacy* of the postulation of the categories as not only subjectively necessary but also objectively valid and objectively real. But how is it, Kant asks, that there can be a necessary agreement between experience and the concepts of its objects? This can be thought, he says, in only two ways:

either the experience makes these concepts possible or these concepts make the experience possible. The first is not the case with the categories (nor with pure sensible intuition); for they are *a priori* concepts, hence independent of experience (the assertion of an empirical origin would be a sort of *generatio aequivoca*).<sup>8</sup>

By *generatio aequivoca*, or ‘equivocal generation’, Kant means what we now call ‘spontaneous generation’, the generation of living things from something essentially different, for example the spontaneous generation of worms from a compost heap. Having rejected this possibility, associated here with Locke’s physiological empiricism,

only the second way remains (as it were a system of the epigenesis of pure reason): namely that the categories contain the grounds of the possibility of all experience in general from the side of the understanding. If someone still wanted to propose a middle way between the only two, already named ways, namely that the categories were neither self-thought *a priori* first principles of our cognition nor drawn from experience, but were rather subjective predispositions for thinking, implanted in us along with our existence by our author in such a way that their use would agree exactly with the laws of nature along which experience runs (a kind of preformation-system of pure reason), then ... this would be decisive against the supposed middle way: that in such a case the categories would lack the necessity that is essential to their concept. For, e.g., the concept of cause, which asserts the necessity of a consequent under a presupposed condition, would be false if it rested only on a subjective necessity, arbitrarily implanted in us, of combining certain empirical representations according to such a rule of relation.<sup>9</sup>

The metaphorical association of the transcendental ideality of the categories with epigenesis is, on the face of it, rather odd. As the contrast with Locke’s empirical epistemology was meant to show, the categories cannot be explained naturalistically because they are legislative with regard to nature. Thus the biological metaphors, and most particularly the employment of the idea of epigenesis to explain something of the

specificity of the status of the categories, seems to offer us a paradox: they appeal – albeit metaphorically – to a theory of natural generation to explain the status of the categories in the context of an argument that the categories cannot be explained in natural terms. So what is the metaphor meant to do? Can the idea of epigenesis help explain the specificity of transcendental idealism? What, if anything, does it illuminate concerning the status or the function of the categories or of their ‘products’?

Although the metaphor of epigenesis and the related metaphors of generation in the *Critique of Pure Reason* evoke more of the context of the scientific debates concerning theories of generation than simply the alternatives of preformationism and epigenesis, a brief account of these two different theories and Kant’s attempts to mediate between them is nevertheless a good place to start in attempting to answer these questions. According to the earliest versions of preformationism, all of the embryos that will develop into the generations of adult organisms ‘pre-exist’ either in the female egg (the ‘ovist’ theory of preformation) or the male spermatozoon (the ‘animaculist’ or ‘vermist’ variants of the theory).<sup>10</sup> Preformationist theories hold that in biological reproduction a pre-existent embryo is somehow provoked into development, where ‘development’ means the growth or enlargement of pre-existent parts, not the generation by the parents of a new organism. Perhaps the best-known exponent of preformationism is Nicolas Malebranche, who first formulated the idea in 1674 that all embryos had existed since the beginning of the world, created by God, all contained or encased one within the other, awaiting their appointed time. This is the theory of individual preformationism, or *emboîtement*, what Phillip Sloan calls the ‘strong preformationist’ or ‘pre-existence’ theory.<sup>11</sup> By Kant’s time the most prominent preformationists (notably Albrecht von Haller) did not endorse individual preformation, but a version of the theory according to which preformed *germs* contain all the essential parts of the foetus. In Haller’s words, from 1758:

It appears very probable to me that the essential parts of the fetus exist formed at all times; not, it is true, in the way that they appear in the adult animal: they are arranged in such a way that certain prepared causes ... form in the end an animal which is very different from the embryo, and yet in which there is no part that did not exist essentially in the embryo. It is thus that I explain development.<sup>12</sup>

Preformationism was motivated, in great part, by the inadequacy – or indeed absence – of any plausible

contemporary mechanical explanation for the complex phenomena of life and organic organization. It was also, of course, theologically motivated. These considerations, it seems, were more important than whether the preformed embryo or germ was located in either the ovum or the spermatozoon, although in fact *ovist* preformationism was the dominant version.<sup>13</sup> The force of the sexual-political context of these preformationist debates was such that both versions – ovist and spermist – tended to be interpreted in terms of the privileged, active role of the male, either in providing the crucial spark that provoked the passive ovum into development (in ovism) or in providing the active animacule itself (animaculiam).<sup>14</sup>

The epigenic view, on the other hand, according to which each embryo was a newly generated organism – the *production* of something genuinely new that had not existed before – was generally based on the presumption of the bi-parental contribution to generation, the mixing of male and female generative fluids or semen. The early mechanistic epigenist theories of Descartes, Maupertuis and Buffon foundered on their inability to offer plausible accounts of how the organism was produced, how the organization of the embryo and its parts developed from previously unorganized material. But a later generation of epigenists – including, notably, Hans Blumenbach – influenced by Kant’s account of the regulative principle of purposiveness in the understanding of organisms, ‘embraced a teleological view of embryological development, based on a presupposed original state of organization in the generative material’.<sup>15</sup> These theories do not attempt to explain the origin of organization; rather, they presuppose it. With recourse to avowedly mysterious forces (on the Newtonian model) they then attempt to explain the mechanism of the expression of this organization in the generation, growth and maintenance of the organism. For example, Blumenbach – converted to epigenesis after an earlier adherence to Hallerian preformationism – postulated a ‘formative drive’ (*Bildungstrieb*) to explain this:

in the previously unformed generative matter of the organised body, after it attained its maturation and arrived at the place of its destiny [namely, the womb], a particular, lifelong active drive is stirred up to initially shape its definite form, then to preserve it for a lifetime, and if it by chance becomes mutilated, to reestablish it if possible.<sup>16</sup>

Kant’s relation to the preformation–epigenesis debate was complex.<sup>17</sup> In an early work, ‘The Only Possible Argument in Support of a Demonstration of the Existence of God’ (1763), Kant proclaims the

rule (never abjured) that in seeking the causes of any particular effects we should first of all regard those effects as the necessary results of general laws, presuming the unity of nature, before ‘suppos[ing] the existence of new and diverse operative causes’. This is the case even when ‘a very precise symmetry seems to require the postulation of a specifically instituted and artificially devised arrangement’, as with the delicate beauty of each individual snowflake.<sup>18</sup> But where we find ‘products’ of nature in which are manifested ‘great art and a contingent combination of factors which has been made by free choice in accordance with certain intentions’, such as we find in the constitution of plants and animals, this constitution ‘cannot be explained by appeal to the universal and necessary laws of nature’. For Kant, ‘it would be absurd to regard the initial generation of a plant or animal as a mechanical effect incidentally arising from the universal laws of nature.’ Thus two possible explanations for their generation present themselves:

Is each individual member of the plant- and animal-kingdoms directly formed by God, and thus of supernatural origin, with only propagation, that is to say, only the periodic transmission for the purposes of development, being entrusted to a natural law? Or do some individual members of the plant- and animal-kingdoms, although immediately formed by God and thus of divine origin, possess the capacity, which we cannot understand, actually to generate their own kind in accordance with a regular law of nature, and not merely to unfold them?<sup>19</sup>

These alternatives are versions of individual preformationism and epigenesis. Kant sees problems with both views, and in ‘The Only Possible Argument’ remains agnostic as to which of the two positions should prevail; the issue cannot be decided on either metaphysical or empirical grounds. Kant rejects the specific *mechanistic* epigenist theories of Maupertuis and Buffon, which postulate explanatory elements that ‘are either as incomprehensible as the thing itself [that they purport to explain], or they are entirely arbitrary inventions’; but the alternative – the postulation of a supernatural origin – is ‘just as arbitrary’: ‘Has anyone ever offered a mechanical explanation of the capacity of yeast to generate its kind? And yet one does not appeal for that reason to a supernatural ground.’<sup>20</sup>

However, in an essay from 1775, revised and expanded in 1777, ‘Of the Different Human Races’, Kant draws on the germ theory of preformation to explain the establishment of what he sees as the different human ‘races’, adding to this, as Phillip Sloan has pointed out, a conception of ‘natural predispositions’

(*Naturanlagen*).<sup>21</sup> From the one human species, the development of the different human ‘races’ is explained in this way:

various germs [*Keime*] and natural predispositions [*natürliche Anlagen*] had to lie ready in him to be on occasion either unfolded or restrained, so that he would become suited to his place in the world and over the course of the generations would appear to be as it were native and to be made for that place.<sup>22</sup>

The possibilities for the development of different characteristics are, Kant says, ‘preformed’ (*vorgebildet*),<sup>23</sup> but the spur to the development of these possibilities is environmental and may be absent. Kant uses the same preformationist terminology in the first edition of the *Critique of Pure Reason* in 1781 (though the passage remains in the second edition, too) in relation to the pure concepts of the understanding. The analytic of concepts, he writes, is not an analysis of the content of concepts, but

the much less frequently attempted analysis of the faculty of the understanding itself, in order to research the possibility of a priori concepts by seeking them only in the understanding as their birthplace [*Geburtsorte*] and analysing its pure use in general; for this is the proper business of a transcendental philosophy; the rest is the logical treatment of concepts in philosophy in general. We will therefore pursue the concepts to their first seeds and predispositions [*Keimen und Anlagen*] in the human understanding, where they lie ready, until with the opportunity of experience they are finally developed [*entwickelt*] and exhibited in their clarity by the very same understanding, liberated from the empirical conditions attaching to them.<sup>24</sup>

Here it is clear that it is the categories themselves that are to be understood as ‘preformed’, but whether this is a literal claim about their biological origin, as Sloan claims,<sup>25</sup> is debatable; the metaphorical use of the idea of ‘birthplace’ in the first sentence suggests rather that it is part of an extended metaphor.

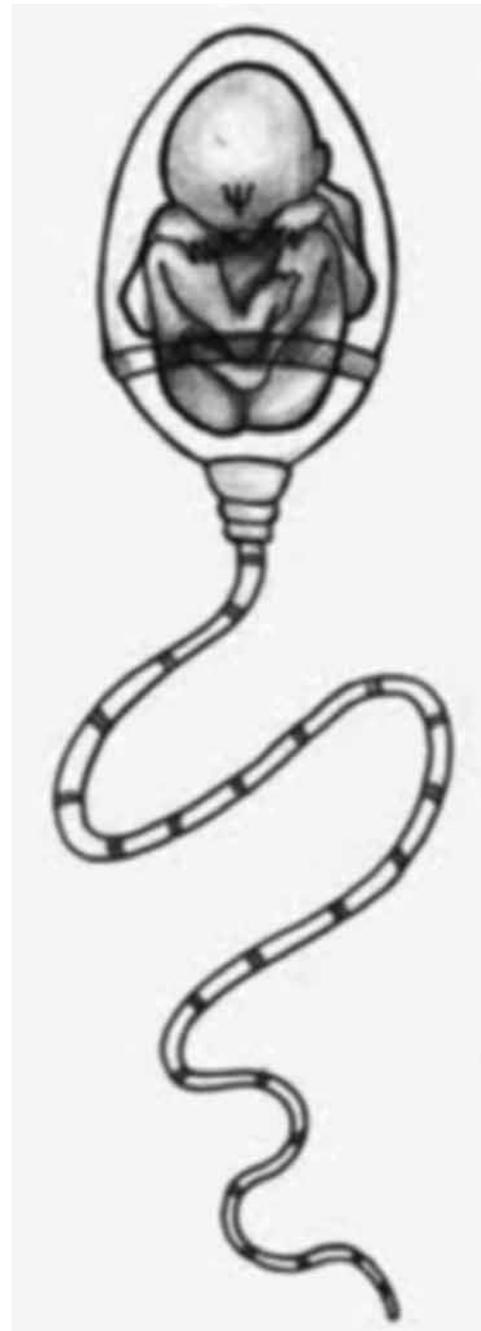
### ‘Generic preformation’

A few years later, in his review of Herder’s *Ideas for the Philosophy of History of Humanity*, 1784/5, Kant staked out a definite – and original – position on the preformationism–epigenesis debate. In his discussion of epigenesis Herder had proposed a ‘genetic force’ (*genetische Kraft*) to explain adaption to environmental circumstances. To the extent that this offers an alternative to strict preformationism, spontaneous generation and purely mechanistic epigenesis, Kant was prepared to accept it, with conditions. Herder assumes, Kant says,

a principle of life, which appropriately modifies *itself* internally in accordance with differences of the external circumstances; with this the reviewer fully concurs, only with this reservation, that if the cause organising itself *from within* were limited by its nature only perhaps to a certain number and degree of differences in the formation of a creature (so that after the institution of which it were not further free to form yet another type under altered circumstances), then one could call this natural vocation of the forming nature also ‘germs’ or ‘original predispositions’, without thereby regarding the former as primordially implanted machines and buds that unfold themselves only when occasioned (as in the system of evolution [i.e. preformation]), but merely as limitations, not further explicable, of a self-forming faculty [*eines sich selbst bildenden Vermögens*], which latter we can just as little explain or make comprehensible.<sup>26</sup>

Distancing himself from individual preformationism, Kant seems to suggest, as John Zammito says, that epigenesis itself implies the weaker form of germ preformation: ‘at the origin there had to be some inexplicable (transcendent) endowment, and with it, in [Kant’s view], some determinate restriction in species variation.’<sup>27</sup>

It was a couple of years after this (in 1787) that Kant introduced the idea of epigenesis as an analogy for the explanation of the relation between the categories and experience in the revised, second edition of the *Critique of Pure Reason*, at the same time explicitly rejecting the use of the idea of preformation for the same purposes. But it is later, in the ‘Critique of Teleological Judgment’ (1790), that we find Kant’s longest discussions of the theories of preformation and epigenesis in the statement of what seems to be his mature position in the debate. And here Kant distinguishes between other aspects of the various theories of generation in a way that helps us to understand the associated field of reference of the epigenesis metaphor in the *Critique of Pure Reason*. In section 80, ‘On the Necessary Subordination of the Principle of Mechanism to the Teleological Principle in Explaining a Thing [Considered] as a Natural Purpose’, Kant distinguishes, in a footnote, between ‘*generatio aequivoca*, which is the production of an organized being by the mechanics of crude, unorganized matter’ and *generatio univoca*, the production of an organized being from another organized being. As we have seen, the former, *generatio aequivoca*, refers to the idea of spontaneous generation. The latter, *generatio univoca*, may be either *generatio univoca homonyma* – ‘where the product shares even the organization of what produced it’ (for example, where parents of one species produce



offspring of the same species) or *generatio univoca heteronyma*, where the product is an organized being that is different in kind from the organized being that produced it, ‘as when, e.g. certain aquatic animals developed gradually into marsh animals and from these, after several generations, into land animals’. In Kant’s view the idea of *generatio aequivoca* is absurd. The idea of *generatio univoca heteronyma* is ‘not absurd ... not inconsistent a priori, in the judgment of mere reason’ but ‘[e]xperience however does not show an example of it’,<sup>28</sup> only examples of *generatio univoca homonyma*: the generation of the same from the same.

A few pages later two more sets of distinctions are introduced. Assuming, as for Kant we must, the teleological principle for natural products, the purposive form somehow generated in the ‘cause’ of

the products of nature can be understood, according to Kant, in terms of either occasionalism or pre-established harmony. The issue here is the explanation for the relationship – or the ‘conjoining’ – of the teleological principle and the mechanistic process in the generation of organisms. Accordingly occasionalism is rejected because if we assume that ‘the supreme cause of the world would, in conformity with an idea and on the occasion of every copulation, directly give the mingling matter its organic structure ... all nature in this production is lost entirely’.<sup>29</sup> We are thus left with the theory of pre-established harmony as a frame for both preformationism and epigenesis. Within this theory, Kant says, we can distinguish between preformationism and epigenesis in terms of another distinction, taken from chemistry – between ‘educt’ and ‘product’. This distinction is explained in the *Lectures on Metaphysics*, in 1793: an *educt* is the result of pre-existent matter (‘what was previously there’) receiving a new form, whereas a material *product* is something that ‘was not previously there at all’.<sup>30</sup> Applying this distinction to the issue of biological generation:

any organic being generated by another of its kind is considered by this theory [pre-established harmony] to be either the *educt* or the *product* of that other being. The system that considers the generated beings as mere educts is called the system of *individual preformation*, or the *theory of evolution*. The system that considers them as products is called the system of *epigenesis*.<sup>31</sup>

Thus we have the theory of pre-established harmony, according to which ‘the supreme cause would have imparted to the initial products of its wisdom only the predisposition [*Anlage*] by means of which an organic being produces another of its kind and the species perpetuates itself’,<sup>32</sup> and the two possible ‘ways’ – both examples of *generatio univoca* – in which it can proceed, individual preformation and epigenesis. Kant now claims that epigenesis is to be preferred on both empirical and rational grounds. Even without the empirical grounds, reason, he says, would

from the start be greatly in favor of the kind of explanation [it offers]. For in considering those things whose origin can be conceived only in terms of a causality of purposes, this theory, at least as far as propagation is concerned, regards nature as itself producing [*als selbst hervorbringend*] them rather than as merely developing [*entwickelnd*] them; and so it minimizes appeal to the supernatural, [and] after the first beginning leaves everything to nature.<sup>33</sup>

But epigenesis, which Kant here associates with Blumenbach, must also involve an appeal to a principle

of original organization, Blumenbach’s *Bildungstrieb* being ‘the ability of the matter in an organized body to [take on] this organization’. Thus, in fact, he says, the system of epigenesis might actually be called ‘the system of *generic preformation* [*generischen Präformation*], since the productive power of the generating beings, and therefore the form of the species, was still preformed *virtualiter* in the intrinsic purposive predispositions [*Anlagen*] imparted to the stock’.<sup>34</sup> This is a version of epigenesis with strong preformationist elements, or even a preformationist basis. Together, the preformationist basis and the epigenic process are, perhaps, the two elements in the ‘conjoining’ of the teleological principle and mechanism necessary to the understanding of natural products.

It is worth noting that Kant’s idea of ‘generic preformation’ concerns the generation of organisms within the limits of species variation (species themselves, for Kant, being fixed). As concerns the diversity of the different ‘races’ of the human species, Kant advocates a stronger preformationist element – with seeds or germs as well as natural predispositions. No doubt part of the explanation for the apparent discrepancy between Kant’s appeal to preformationism (with germs and natural predispositions) in the theory of the different human ‘races’ and the move to a version of epigenesis with preformationist elements (but no germs) in the theory of the generation of organisms is explained by the specificity of the idea of ‘race’ itself. ‘Races’ are neither species nor variations, for Kant; that they, then, might be the result of the development of preformed germs, when species, variations and indeed individuals are not, is not self-contradictory. But the *need* for preformed germs or seeds in the theory of race – the need to distinguish the human races from each other *as preformed* in this way – is interesting. The germs make the distinction of race greater than the distinctions between varieties of the same species. Kant was committed to the idea of monogenesis<sup>35</sup> – of the unity of the human species – but ‘races’ are not species variations, despite the fact that they, like variations (and unlike species), may mix.<sup>36</sup> Here it is clear that cultural and political concerns drive the biological theory, at least in part.

### The parthenogenesis of pure reason

Concerning the metaphor of epigenesis, however, commentators have tended to look to the biological theory as the final basis of explanation. But, despite its being the obvious reference in the metaphor, the biological theories of epigenesis, including Kant’s own ‘generic preformation’, in fact offer little help in understanding

the meaning of the metaphor for the *Critique of Pure Reason*. Prominent commentators – notably Phillip Sloan, Günter Zöller and John Zammito – have tried to map specific features of preformationism and epigenesis or Kant’s ‘generic preformationism’ onto specific features of Kant’s transcendental idealism, especially concerning either the status of the categories themselves or the *a priori* knowledge produced with them.<sup>37</sup> In a limited sense, this is not difficult to do. For example, we might think that the ‘self-forming faculty’ identified in the review of Herder is *reason*, as distinct from the faculty of understanding; in which case the categories could be understood as the limits to the self-forming power – limits to the production of knowledge. On this interpretation reason would be the epigenic force, with the categories the preformed limitations to it. But what does this teach us about transcendental idealism that we did not already know? Rather than explaining how the epigenesis metaphor illuminates anything for us about Kant’s position, this interpretative approach tends to draw attention to aspects of Kant’s theory of knowledge to *justify* the use of the metaphor. As Zöller concedes (in the context of a criticism of an argument that fails to do this): ‘Kant’s notion of transcendental epigenesis has to be explained in accordance with the very doctrine that it is supposed to illustrate by means of analogy.’<sup>38</sup>

So how else might we approach the epigenesis metaphor? Granted that the contemporary debate on the biological theories is part of the manifest content of the passage that includes the epigenesis metaphor at B167, what is also latent there, and to what associative chains is it linked? What does the scientific context of the preformation–epigenesis debate *obscure* in the invocation of the epigenesis metaphor in the *Critique of Pure Reason* and what does an excavation of its relation to the other metaphors of generation, ancestry and birth reveal? What does a textual analysis reveal that the historical analysis in terms of biological theory misses?

We might first note that the epigenesis metaphor inevitably raises the question of the *origin* of the categories, even though that is, according to Kant’s explicit remarks on the matter, outside of the problem field of the *Critique of Pure Reason*. That the categories are necessary for cognition is, Kant writes, a ‘peculiarity of our understanding’ for which no further ground can be found.<sup>39</sup> And to some extent the appeal to epigenesis confirms this. Especially in the form proposed by Blumenbach and part-endorsed by Kant, epigenesis was dominantly concerned with the forces or drives powering the organized development of the

embryo rather than the explanation of the generation of the embryo itself at the moment of conception (the ‘epi’ in epigenesis means ‘after’). As concerns natural science, this limitation would have recommended the theory to Kant. In the ‘Critique of Teleological Judgment’ Kant says that although we cannot rule out the possibility that ‘organized natural products’ are merely mechanically produced, it is certain that ‘the mere mechanism of nature cannot provide *our cognitive power* with a basis on which we could explain the production of organized beings’,<sup>40</sup> hence the need for us to think natural products through the idea of a purposive (intelligent) causality – the *regulative* idea of purposive organization. The question of the origin of all organization, Kant says elsewhere, lies ‘*outside* natural science, in *metaphysics*’,<sup>41</sup> and the point holds for the origin of any particular product of nature. Thus the legitimate concern of natural science would begin after the act of generation according to purposive causality. As Shirley Roe puts it, Kant proposed that once one accepts organization as a teleological fact, ‘one can proceed to explain on a mechanical basis how this organization functions and is maintained’.<sup>42</sup>

That might tempt us to say something similar about the fact of the categories, and to see the virtue of the epigenesis metaphor in its avoidance of the question of their origin. However, as the task of the Transcendental Analytic is not merely to accept the transcendental fact of the categories and then proceed to explain how these categories function in cognition, but also to justify the *necessity* – and hence the legitimacy – of the categories, to deny that their role in cognition is merely subjective or accidental, the question of their *origin* inescapably arises in the transcendental deduction, if only in negative form (they *do not* come from experience, they *are not* implanted from outside). This is what Frederick Beiser calls the ineliminable ‘genetic’ dimension of transcendental discourse.<sup>43</sup> Indeed the question of the origin of the categories is quite explicit in the introduction of the epigenesis metaphor, which first offers us an alternative to the idea of an empirical origin or an alternative to the idea that the origin of the categories lies in something *different in kind* from the categories themselves, as the ‘epigenesis of pure reason’ is contrasted first with *generatio aequivoca*, ‘spontaneous generation’, *not* with preformationism.

In one of the few references to epigenesis in Kant’s notes on metaphysics – notes which reiterate the description of Locke as a physiologist, or as having a physiological method<sup>44</sup> – epigenesis is distinguished from preformationism via the distinction between educt and product:

Whether concepts are mere *educta* or *producta*. Preformation or genesis. (*Producta* either through physical (empirical) influence or through the consciousness of the formal constitution of our sensibility and understanding on the occasion of experience, hence *producta a priori*, not *a posteriori*.)<sup>45</sup>

Putting the passage from the *Critique of Pure Reason* together with this note allows us to see the main relevant distinction as that between empirical *a posteriori* production of concepts (*generatio aequivoca*, the production of the intellectual from the physical, or *influxo physico*<sup>46</sup>) and epigenic *a priori* production of concepts (*generatio univoca*, the production of the intellectual by the intellect, or *epigenesis intellectualis*).<sup>47</sup> If we have become accustomed to call *generatio aequivoca* ‘spontaneous generation’, this should not blind us to the fact that for Kant it is epigenesis as *generatio univoca* that is connected to the *spontaneous generation* of the pure concepts in the understanding (*epigenesis intellectualis*).

Indeed, the idea of a ‘spontaneous generation’ of the categories by the understanding imposes itself more and more when we look beyond the single reference to epigenesis in the *Critique of Pure Reason* to the wider set of metaphors of generation, birth and ancestry there. Contrasting the faculties of sensibility and understanding in the Introduction to the Transcendental Logic, Kant characterizes the former as ‘the receptivity of our mind to receive representations insofar as it is affected in some way’, while understanding is ‘the faculty for bringing forth representations itself [*Vorstellungen selbst hervorzubringen*], or the spontaneity of cognition’.<sup>48</sup> Kant frequently talks of the ‘origin’ (*Ursprung*) of the categories in the understanding<sup>49</sup> and says that they ‘spring pure and unmixed [*rein und unvermischt entspringen*] from the understanding’, a fact which a little later requires, he says, the production of ‘an entirely different birth certificate than that of an ancestry from experiences’.<sup>50</sup> Referring to them often as ‘ancestral concepts’ (*Stammbegriffe*)<sup>51</sup> Kant speaks of the need to ‘bring [them] forth [*hervorzubringen*]’ by a special act of the understanding;<sup>52</sup> they are, as the epigenesis passage itself says, ‘self-thought’. In the Transcendental Doctrine of Method, Kant speaks of the possibility of synthetic *a priori* judgments in the same way, as ‘this augmentation of concepts out of themselves [*diese Vermehrung der Begriffe aus sich selbst*] and the parthenogenesis [*die Selbstgebärung*], so to speak, of our understanding (together with reason), without impregnation by experience [*ohne durch Erfahrung geschwängert*]’.<sup>53</sup> As all of these quotations show, then, but the last shows most

explicitly, the most insistent generative model evoked in the *Critique of Pure Reason* is in fact neither preformationism nor epigenesis but something much more like *parthenogenesis*, in the sense of a spontaneous production without fertilization or impregnation. The categories spring from the understanding as Athena sprang from the head of Zeus. Kant’s earliest critic, Johann Georg Hamann, noted precisely this parthenogenesis of pure reason as part and parcel of Kant’s ‘violent, unjustified, wilful divorce’ of sensibility and understanding: the ‘mythology’ of ‘a new immaculate virgin’<sup>54</sup> and the miraculous birth of principles and concepts.<sup>55</sup> This, for Hamann, was *the illusion* at the heart of the *Critique of Pure Reason*.

But if parthenogenesis is the model for the generation of the pure concepts of the understanding, why is there no explicit reference to it among Kant’s various analogies between theories of generation and theories of knowledge? For parthenogenesis was recognized among Kant’s contemporaries (as it is today) as an existing method of reproduction – the method of the reproduction of aphids, for example.<sup>56</sup> Although there are no explicit references to parthenogenesis in the analogies between theories of generation and theories of knowledge, there are imaginative descriptions of what appear to be a version of it in the review of Herder and in the *Critique of Teleological Judgment*. If the philosophical concern of the passage which includes the epigenesis metaphor in the *Critique of Pure Reason* is to distinguish transcendental idealism as *generatio univoca* from empiricism as *generatio aequivoca*, the concern in these other texts is to distinguish between different kinds of *generatio univoca* – the *generatio univoca homonyma* of Kant’s own generic preformationism and the possibility of *generatio univoca heteronyma* inherent in Herder’s theory. To do so Kant entertains – in order to reject, and indeed to abhor – the possibility of continuity between species. In the review of Herder, Kant grants the possibility of describing nature in terms of ‘the ladder of organizations’ – the hierarchical categorization of species according to their similarities – but denies that this bespeaks any affinity between species:

The smallness of the distinctions, if one places the species one after another in accordance with their *similarities*, is, given so huge a manifoldness, a necessary consequence of this very manifoldness. Only an *affinity* among them, where either one species would have arisen from the other and all from a single procreative maternal womb, would lead to *ideas* which, however, are so monstrous that reason recoils before them.<sup>57</sup>

In the 'Critique of Teleological Judgment' Kant notes that the resemblances between various natural forms reinforces the suspicion 'that they are actually akin, produced by a common original mother', and that the 'archeologist of nature', considering this,

can make mother earth (like a large animal, as it were) emerge from her state of chaos, and make her lap promptly give birth initially to creatures of a less purposive form, with these then giving birth to others that became better adapted to their place of origin and to their relations to one another, until in the end this womb itself rigidified, ossified, and confined itself to bearing definite species that would no longer degenerate, so that the diversity remained as it had turned out when that fertile formative force ceased to operate.<sup>58</sup>

This, as Kant specifies in a footnote, is the idea of *generatio univoca heteronyma* – not absurd (unlike *generatio aequivoca*) but not met with in experience (unlike *generatio univoca homonyma*).

As Christine Battersby remarks, Kant's prose here is 'unusually vivid'.<sup>59</sup> The awful possibility that is being contemplated – effectively, self-forming and active matter – is imaginatively described in terms of a maternal (hence female) generative power, labouring apparently parthenogenically, without any mention of a paternal partner. And this parthenogenic description of a certain understanding of epigenesis is actually much closer to *generatio aequivoca* than Kant's footnote suggests. For the mechanistic epigenesis that Kant rejected was seen by some of those who propounded it as including a theory of spontaneous production. Buffon declared:

My experiences demonstrate quite clearly that there are no pre-existent germs, and at the same time they prove that the generation of animals and vegetables is not univocal. There are perhaps as many beings produced by the fortuitous mingling of organic molecules as there are [those] which can produce by a constant succession of generations.<sup>60</sup>

Thus we should have to say that what Kant is rejecting here is the parthenogenic epigenesis of a vital materialism, the initially unlimited fecundity and generative power of 'a single procreative maternal womb' or 'a common original mother' spilling offspring from her lap: the *naturally* generatively self-sufficient virgin mother, matter giving birth to form. Given that he rejects this, the model of parthenogenesis appropriated for the description of the generation of the categories seems, on the other hand, to be more like that of the *supernatural* virgin birth. But if a supernatural parthenogenesis provides the model for the mono-

parental generation or spontaneous self-production of the categories out of the understanding, the generation of intellectual form itself, this is now a *masculine* parthenogenesis, if we assume – as the quotations lead us to – that the conventional gendering of the matter/form distinction as female/male is at work here.

### The fantasy of pure reason

It is tempting to speculate that Kant's 'generic preformation' is the conjoining of the purposive masculine principle of form with the epigenetic development of feminine matter according to causal laws. In a rare explicit reference to the different contribution of the sexes to generation, in *Religion within the Boundaries of Mere Reason* (1793/4), this gendered distribution seems to be confirmed. In a discussion of the problem of the possibility of the transmission of original sin in the virgin birth Kant writes that

according to the hypothesis of epigenesis, the mother, who descended from her parents through *natural* birth, would still be tainted with this moral blemish [original sin], and would pass it on to her child, at least half of it, even in a supernatural birth. To escape this consequence, therefore, we would have to assume the theory that the seeds [of the descendants] *pre-exist* in the progenitors, not, however, the theory that these seeds develop on the *female* side (for then the consequence is not escaped) but on the *male* side alone (not on the part of the *ova* but of the *spermatozoa*). So, since the male side has no part in a supernatural pregnancy, this mode of representation could be defended as theoretically consistent with the idea [of virginal birth].<sup>61</sup>

The model of supernatural parthenogenesis is the only model according to which the generation of the categories – like the immaculate conception – can remain 'pure'. Further, this model *seems* to avoid a problem that would dog the appeal to any theory of *natural* generation as a model for the production or epistemic status of the categories: the problem of *contingency*. To the extent that natural generation is a result of conception it involves contingency at its heart, a fact that, for Kant, opened the way for sceptical questions about the relation between the immaterial immortal soul and the body:

The contingency of conception, which in humans as well as in irrational creatures depends on opportunity, but besides this also on nourishment, on government, on its moods and caprices, even on vices, presents a great difficulty for the opinion of the eternal duration of a creature whose life has first begun under circumstances so trivial and so entirely dependent on our liberty.<sup>62</sup>

Thus any appropriate metaphorical model for the production or epistemic status of the categories *as necessary* must be one that does without conception understood in terms of the contingency of fertilization. It must exclude any reference to an idea of conception that relies on an external fertilizing agent. As even the model of the virgin birth cannot avoid this (and ought by rights to be rejected for the same reason that the preformation model of divine implantation was rejected in the *Critique of Pure Reason*) the spontaneous, immanent generation of the pure concepts from within the understanding (*generatio univoca homonyma*) must be a self-sufficient parthenogenesis of the strictest and purest kind.

In itself, there is nothing especially odd about the metaphorical appeal to parthenogenesis, rather than an appeal to any other theory or mode of generation. But what moves this in the *Critique of Pure Reason* from the level of metaphor to that of fantasy is the imaginative appropriation – via a disavowal – of a form of generation coded as female to represent the intellectual power of the generation of form itself, coded as masculine. Although it is veiled by the prominence of the metaphor of epigenesis, and also by the concentration on the metaphor of epigenesis in the literature on Kant, this fantasy nestles in the lap of transcendental idealism. How can we be sure of the legitimacy of the ‘self-thought’ pure concepts of the understanding? Only if self-fertilizing ‘father’ understanding gives birth to them himself.

However, the fantasy of purity expressed in the idea of intellectual parthenogenesis is at the same time undermined by the ineliminably biological terms of the discourses of generation from which it is drawn. The biological metaphors indicate a stain on the purity of the *a priori* concepts, a blot from Kant’s own hand that seeps through the pages of the *Critique of Pure Reason*. Hamann made this point more generally, pointing out that language, an impure condition of experience ‘with no credentials but traditions and usage’, necessarily remains unthought in the *Critique of Pure Reason*.<sup>63</sup> In fact this is a point about *languages*, rather than language as a general structure. As such, it is a point about the material conditions of thinking. More specifically, however, the biological metaphors in the *Critique of Pure Reason* unwittingly reveal the material conditions of reproduction for the transcendental productions and reproductions of the understanding and the imagination: the human condition, and empirical reproduction, of the transcendental subject.

## Notes

1. Immanuel Kant, *Critique of Pure Reason*, trans. Paul Guyer and Allen W. Wood, Cambridge University Press, Cambridge, 1998, B167–8, pp. 264–5. (*Kritik der Reinen Vernunft*, Band 1, Suhrkamp, Frankfurt am Main, 1956.)
2. See, for example, Timothy Lenoir, ‘Kant, Blumenbach, and Vital Materialism in German Biology’, *ISIS*, vol. 71, no. 256, 1980, pp. 77–108.
3. Kant, *Critique of Pure Reason*, A651–2/B679–80, pp. 594–5. Immanuel Kant, ‘Of the Different Races of Human Beings’ (1775–77), trans. Holly Wilson and Günter Zöller (‘Von der Verschiedenen Rassen der Menschen’, *Werke*, Band VI: *Schriften zur Anthropologie, Geschichtsphilosophie, Politik und Pädagogik*, Insel-Verlag, Frankfurt am Main, 1964); ‘Determination of the Concept of a Human Race’ (1785), trans. Holly Wilson and Günter Zöller; ‘On the Use of Teleological Principles in Philosophy’ (1788), trans. Günter Zöller, all in Kant, *Anthropology, History and Education*, ed. Günter Zöller and Robert B. Loudon, Cambridge University Press, Cambridge, 2007. See also Robert Bernasconi, ‘Who Invented the Concept of Race? Kant’s Role in the Enlightenment Construction of Race’, in Bernasconi, ed., *Race*, Blackwell, Oxford and Malden MA, 2001.
4. See, for example, Kant, *Critique of Pure Reason*, A13/B27, p. 134; A81/B107, p. 213.
5. Johann Georg Hamann, *Metacritique on the Purism of Reason*, in Hamann, *Writings on Philosophy and Language*, ed. and trans. Kenneth Haynes, Cambridge University Press, Cambridge, 2007.
6. Kant, *Critique of Pure Reason*, A14/B28, p. 134; B2–3, p. 137.
7. *Ibid.*, A14, p. 100; A86–7/B118–9, pp. 220–21.
8. *Ibid.*, B166–7, p. 264.
9. *Ibid.*, B167–8, pp. 264–5.
10. Shirley A. Roe, *Matter, Life and Generation: Eighteenth-Century Embryology and the Haller–Wolff Debate*, Cambridge University Press, Cambridge, 1981, p. 1.
11. Phillip R. Sloan, ‘Preforming the Categories: Eighteenth-Century Generation Theory and the Biological Roots of Kant’s A Priori’, *Journal of the History of Philosophy*, vol. 40, no. 2, April 2002, p. 232. In this Sloan follows Jacques Roger (*Les Science de la vie dans la pensée française du XVIIIe siècle*, Armand Colin, Paris, 1963). On preformationism, see Roe, *Matter, Life and Generation*, pp. 3–5.
12. Albrecht von Haller, *Sur la formation du cœur dans le poulet* (1758), cited in Sloan, ‘Preforming the Categories’, p. 236.
13. See Helmut Müller-Sievers, *Self-Generation: Biology, Philosophy and Literature Around 1800*, Stanford University Press, Stanford CA, 1997, pp. 28–9; Günter Zöller, ‘Kant on the Generation of Metaphysical Knowledge’, in Hariolf Oberer und Gerhard Seel, eds, *Kant: Analysen–Probleme–Kritik*, Königshausen & Neumann, Würzburg, 1988, pp. 76–7.
14. On the sexual politics of the various versions of preformationism, see Eve Keller, *Generating Bodies and Gendered Selves: The Rhetoric of Reproduction in Early Modern England*, University of Washington Press, Seattle and London, 2007, esp. pp. 149, 154.
15. Roe, *Matter, Life and Generation*, p. 151.
16. Blumenbach (*Über den Bildungstrieb und das Zeugungsgeschäfte*, 1781), quoted in Müller-Sievers, *Self-Generation*, p. 43; Müller-Sievers’s interjection. While it was true that Blumenbach’s ‘formative drive’ was in

- itself inexplicable, so was Newton's force of gravity, and that had been no obstacle to its scientific acceptability and success. See Müller-Sievers, *Self-Generation*, p. 31.
17. Recent work, in particular that of John Zammito and Phillip Sloan, has demonstrated this complexity beyond doubt. See Sloan, 'Performing the Categories'; John Zammito, 'Kant's Early Views on Epigenesis: The Role of Maupertuis', in Justin E.H. Smith, ed., *The Problem of Generation in Early Modern Philosophy*, Cambridge University Press, Cambridge, 2006; John Zammito, "'This Inscrutable Principle of an Original Organization': Epigenesis and "Looseness of Fit" in Kant's Philosophy of Science', *Studies in History and Philosophy of Science* 34, 2003.
  18. Immanuel Kant, 'The Only Possible Argument in Support of a Demonstration of the Existence of God', in Immanuel Kant, *Theoretical Philosophy 1755–1770*, ed. and trans. David Walford with Ralf Meerbote, Cambridge University Press, Cambridge, 1992, p. 155.
  19. Kant, 'The Only Possible Argument', p. 156. See also p. 157: 'the following alternatives seen unavoidable: either the formation of the fruit is to be attributed immediately to a divine action, which is preformed at every mating, or, alternatively, there must be granted to the initial divine organisation of plants and animals a capacity, not merely to develop [*entwickeln*] their kind thereafter in accordance with a natural law, but truly to generate [*erzeugen*] their kind.'
  20. Ibid., 'The Only Possible Argument', p. 157. For a detailed discussion of interpretations of Kant's view in 'The Only Possible Argument', see Zammito, 'Kant's Early Views on Epigenesis', pp. 337–46.
  21. See Sloan, 'Performing the Categories', *passim*.
  22. Kant, 'Of the Different Races of Human Beings', p. 90; see also p. 89.
  23. Ibid., p. 90.
  24. Kant, *Critique of Pure Reason*, A66/B91, p. 202-3.
  25. See Sloan, 'Performing the Categories', p. 232.
  26. Immanuel Kant, 'Review of J.G. Herder's *Ideas for the Philosophy of the History of Humanity*', trans. Allan W. Wood, in Immanuel Kant, *Anthropology, History and Education*, ed. Robert B. Loudon and Günter Zöllner, Cambridge University Press, Cambridge, 2007, pp. 139–40 ('Rezension zu Johann Gottfried Herders *Ideen*', *Werke*, vol. VI).
  27. Zammito, "'This Inscrutable Principle'", p. 88. See also Sloan, 'Performing the Categories', p. 244.
  28. Immanuel Kant, *Critique of Judgment*, trans. Werner S. Pluhar, Hackett, Indianapolis, 1987, §81, p. 305 n5 (*Kritik der Urteilskraft*, Suhrkamp, Frankfurt am Main, 1974).
  29. Ibid., §81, p. 309.
  30. Kant, *Lectures on Metaphysics*, trans. and ed. Karl Ameriks and Steve Naragon, Cambridge University Press, Cambridge, 1997, p. 385 (AK 28:684). On the distinction between educt and product, see Zammito, 'This Inscrutable Principle', pp. 90–91.
  31. Kant, *Critique of Judgment*, §81, p. 309. See also Kant, *Lectures on Metaphysics*, p. 385 (AK 28:684): in the first case, of 'involution (of encasement)' – that is, preformationism – 'the human being is educt, in the second [case, epigenesis], product; if we have cause to assume the system of epigenesis, then we assume the human being as product', that is 'human beings are produced wholly new'.
  32. Kant, *Critique of Judgment*, §81, p. 309.
  33. Ibid., §81, p. 311.
  34. Ibid., §81, p. 309.
  35. See Alix Cohen, 'Kant on Epigenesis, Monogenesis and Human Nature: The Biological Premises of Anthropology', *Studies in History and Philosophy of Biological and Biomedical Sciences* 37, 2006.
  36. See, for example, Kant, 'On the Use of Teleological Principles in Philosophy', p. 202.
  37. Phillip Sloan claims that the preformationist basis is the crucial point, even in the B edition reference to epigenesis, as the relevant background is Kant's rejection of 'strong preformationism' or *individual* pre-existence theories, including the individual pre-existence of germs and predispositions. Sloan claims that Kant's use of the preformationist terms was not 'casual or non-technical, or only employed as loose analogies', and that the categories are to be understood as 'biological properties' (Sloan, 'Performing the Categories', pp. 252, 245; see also pp. 250, 251–2.) But this interpretation leaves us unable to distinguish between the generic preformationism of transcendental idealism and the Lockean 'physiological' position that the passage at B167 explicitly rejects. Sloan does not accept this problem, arguing that although the categories are 'biological properties' they are not, however, 'merely preformed subjective biological characteristics that would be individually specific and implanted at the creation' (pp. 242, 245). But it is very hard to see how Sloan's claim that the categories are to be understood as 'biologically pre-existent within us' is consistent with the claim at B167 that the categories are 'self-thought *a priori* first principles of our cognition'; that is, Sloan's argument does not so much explain the epigenesis metaphor in the *Critique of Pure Reason* as deny it in favour of the preformationist element.
- Günter Zöllner interprets the epigenesis metaphor as a reference to the production of metaphysical knowledge or *a priori* cognitions rather than a reference to the production of the categories themselves. What is at issue is the production of synthetic *a priori* propositions – 'products of the spontaneity of the intellect' – rather than the reproduction, *a posteriori*, of a pre-existing order (Zöllner, 'Kant on the Generation of Metaphysical Knowledge', pp. 79, 74). Zöllner thus stresses the analogy between the *spontaneity* of the intellect and the self-forming aspect of epigenesis (or the analogy between metaphysical knowledge and organisms as true products, the generation of something genuinely new). However, he acknowledges what is in fact most idiosyncratic in Kant's version of epigenesis at that time, namely the postulation of the germs and natural dispositions as 'a virtual preformation underlying actual epigenesis', and effectively identifies this aspect of the theory with the – albeit non-empirical – *a priori* facticity of the categories (pp. 89, 90).
- John Zammito emphasizes the oddity of Kant's appeal to epigenesis in the *Critique of Pure Reason*, given that Kant did not ever accept an unqualified version of epigenesis and was highly critical of what he saw as its dominant tendency towards – or even identification with – vital materialism. Zammito speculates that it must have been the idea of an 'innate force' in epigenesis that attracted Kant: 'The categories themselves should not be seen as preformed, but only as produced spontaneously by an innate *capacity* or *power* – a "faculty" of the mind, whose own origin was utterly inscrutable' (Zammito, "'This Inscrutable Principle'", p. 92; see also

- Zammito, 'Kant's Early Views on Epigenesis', p. 347). Zammito's interpretation successfully picks out a specific feature of Kant's own epigenetic theory of generation – the postulation of a self-forming faculty or power, akin to Blumenbach's *Bildungstrieb* or Herder's genetic force – and identifies this with the spontaneity of the faculty or power of the understanding. But his point is ultimately that the metaphor is strained and unilluminating (Zammito, "'This Inscrutable Principle'", pp. 92–3).
38. Zöllner, 'Kant on the Generation of Metaphysical Knowledge', p. 87. Zöllner (p. 84) criticizes A.C. Genova's interpretation of Kant's use of the epigenesis metaphor in terms of an anachronistic understanding of epigenesis as genetic constitution according to a Darwinian idea of evolution. See A.C. Genova, 'Kant's Epigenesis of Pure Reason', *Kant-Studien*, vol. 65, no. 3, 1974.
  39. Kant, *Critique of Pure Reason*, B145–6, p. 254. It is Locke's 'physiology of the human understanding' that is said to be concerned with 'the explanation of the possession of pure concepts', in contrast to Kant's transcendental critique (Aix, p. 100; A86–7/B118–9, pp. 220–21.)
  40. Kant, *Critique of Judgment*, §71, p. 269, my emphasis.
  41. Kant, 'On the Use of Teleological Principles in Philosophy', p. 50.
  42. Roe, *Matter, Life and Generation*, p. 151.
  43. Frederick C. Beiser, *German Idealism: The Struggle Against Subjectivism 1781–1801*, Harvard University Press, Cambridge MA and London, 2002, p. 173.
  44. Kant, *Notes and Fragments*, ed. Paul Guyer, trans. Curtis Bowman, Paul Guyer and Frederick Rauscher, Cambridge University Press, Cambridge, 2005, notes 4851, (p. 195); 4866 (p. 197); 4893 (p. 198) (all 1776–78).
  45. *Ibid.*, note 4851 (1776–78), p. 194.
  46. In the *Notes and Fragments* Kant refers to Locke's position as 'influxionism', the postulation of 'the outer causality (of influx)', or '*influxo physico*'. See notes 4893 (p. 198), 5988 (p. 323) (both 1783–84); and 4275 (p. 124) (1770–71), respectively.
  47. Zöllner ('Kant on the Generation of Metaphysical Knowledge', p. 83, referring to note 4859) points us to the idea of *epigenesis intellectualis* in Kant's *Notes*. In Zöllner's words: 'Epigenesis as a concept pertaining to the epistemology of metaphysical knowledge is now characterised as "*epigenesis intellectualis*" thereby indicating the metaphorical use of the term with regard to a type of knowledge that originates in the intellect alone.' (This note is not translated in the Cambridge edition of Kant's *Notes and Fragments*.) I disagree that the issue in B167 concerns the production of *a priori* knowledge. It seems to me that the contrast with *generatio aequivoca* and Locke's empirical derivation of concepts suggests strongly that the issue concerns the production of the categories themselves.
  48. Kant, *Critique of Pure Reason*, A51/B75, p. 193.
  49. For example, at A57/B81, p. 196; A62/B87, p. 199.
  50. *Ibid.*, A67/B92, p. 204; A86/B119, p. 221.
  51. For example, at A13/B27, p. 134; A81/B107, p. 213. 'Ancestral concepts' are contrasted with 'derivative concepts'.
  52. *Ibid.*, B111, p. 215.
  53. *Ibid.*, A765/B793, p. 656. Kant's 'so to speak' (*so zu sagen*) legitimates Allen and Wood's translation of *die Selbstgebärung* as 'parthenogenesis' (when Kant does not say, for example, *der Jungfernzeugung*). Kemp Smith (Immanuel Kant, *Critique of Pure Reason*, trans. Norman Kemp Smith, Macmillan, London, 1933) translates *die Selbstgebärung* as 'spontaneous generation'; Müller-Sievers (*Self-Generation*, p. 49) translates it as 'self-delivery'. Note also that *Vermehrung* in this passage has as well the sense of 'breeding' or 'reproduction'.
  54. Hamann, *Metacritique on the Purism of Reason*, pp. 212, 215.
  55. See John R. Betz, *After Enlightenment: The Post-Secular Vision of J.G. Hamann*, Wiley-Blackwell, Chichester, 2009, p. 240.
  56. See Müller-Sievers, *Self-Generation*, p. 29.
  57. Kant, 'Review of Herder', p. 132. For a discussion of the context of this passage, see Zammito, *The Genesis of Kant's Critique of Judgment*, Chicago University Press, Chicago and London, 1992, pp. 109–206. In his response to Reinhold's comments on his review, Kant specifies ('Review of Herder', p. 135), in relation to this precise passage, that this recoil is 'the horror vacui of universal human reason ... where one runs up against an idea in which *nothing at all can be thought*'. Are we any the wiser for that clarification?
  58. Kant, *Critique of Judgment*, §80, pp. 304, 305. Kant is not the 'archeologist of nature' who thinks this; he merely reports the possible view of such an archeologist.
  59. Christine Battersby, *The Phenomenal Woman: Feminist Metaphysics and the Patterns of Identity*, Polity Press, Cambridge, 1998, p. 75. Zammito (*Kant, Herder and the Birth of Anthropology*, University of Chicago Press, Chicago and London, 2002, p. 306) writes, in relation to passages such as these, that '[t]he very idea of emergence of evolution in our sense frightened [Kant].'
  60. Buffon, *Histoire naturelle, générale et particulière* (1749), quoted in John Farley, *The Spontaneous Generation Controversy: From Descartes to Operin*, Johns Hopkins University Press, Baltimore MD and London, 1977, p. 24. Farley's account of the epigenetic theories of the eighteenth century as, essentially, theories of spontaneous generation speaks against Zöllner's claim that 'the theory of spontaneous generation had become obsolete well before Kant', (Zöllner, 'Kant on the Generation of Metaphysical Knowledge', p. 75).
  61. Immanuel Kant, *Religion Within the Boundaries of Mere Reason and Other Writings*, ed. Allen Wood and George di Giovanni, Cambridge University Press, Cambridge, 1998, p. 83. It is notable that Kant appeals here to pre-existent seeds, as in the theory of race, when such seeds played no part in the theory of 'generic preformation'. Once again, the appeal to seeds seems to occur when the theory needs to affirm a cultural, or this time moral, as opposed to purely biological, difference. As Alix Cohen has argued (in 'Kant on Epigenesis, Monogenesis and Human Nature'), both racial difference and sexual difference (which is here not conceptually distinct from gender difference) are for Kant teleologically determined according to Nature's intentions for the human species. Eduardo Mendieta has also shown how gender differences (again, not yet conceptually distinguished from sex differences) are assigned by Kant to anthropology in the same way as racial differences (Eduardo Mendieta, 'Geography is to History as Woman is to Man: Kant on Sex, Race and Geography', in Stuart Elden and Eduardo Mendieta, eds, *Reading Kant's Geography*, SUNY Press, Albany NY, 2011). The conjunction of sex, race and preformed seeds in Kant's work ought to be investigated further.
  62. Kant, *Critique of Pure Reason*, A779/B807, p. 663.
  63. Hamann, *Metacritique on the Purism of Reason*, p. 208.