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Hegel, Naturalism and the Philosophy of Nature

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Abstract

In this article I consider whether Hegel is a naturalist or an anti-naturalist with respect to his philosophy of nature. I adopt a cluster-based approach to naturalism, on which positions are more or less naturalistic depending how many strands of the cluster *naturalism* they exemplify. I focus on two strands: belief that philosophy is continuous with the empirical sciences, and disbelief in supernatural entities. I argue that Hegel regards philosophy of nature as distinct, but not wholly discontinuous, from empirical science and that he believes in the reality of formal and final causes insofar as he is a realist about universal forms that interconnect to comprise a self-organizing whole. Nonetheless, for Hegel, natural particulars never fully realize these universal forms, so that empirical inquiry into these particulars and their efficient-causal interactions is always necessary. In these two respects, I conclude, Hegel's position sits in the middle of the naturalism/anti-naturalism spectrum.

In this article I consider whether Hegel is a naturalist or an anti-naturalist with regard to his philosophy of nature. Rather than approaching Hegel on the assumption that naturalism and anti-naturalism are polar opposites, I suggest that we can make better sense of Hegel's view of nature by adopting a cluster-based approach to naturalism. On this approach, positions are more or less naturalistic depending how many strands of the cluster *naturalism* they exemplify, and how thoroughly they exemplify these strands. Following Finn Spicer, I suggest that the strands of the cluster *naturalism* include belief that philosophy is continuous with the sciences and denial of the existence of any supernatural entities or processes. I assess Hegel's position with respect to these two strands.[1]

As I will explain, methodologically, Hegel maintains that philosophy of nature is continuous with the empirical sciences insofar as philosophers of nature begin by learning from scientists about natural forms. Philosophers of nature then reconstruct scientific accounts of these natural forms on an a priori basis, thereby establishing how these natural forms are organised into a rationally connected chain. In the process, though, philosophers of nature also reinterpret

these natural forms in light of a metaphysics according to which nature is a rational whole. Hegel explicitly says that this metaphysics is distinct from that of empirical science. Even so, Hegel also thinks that this metaphysics only makes explicit a presupposition—that nature is an organised whole admitting of rational comprehension—that scientists implicitly hold all along, and must hold if their inquiries are to have any motivation. Methodologically, then, Hegel regards philosophy of nature and empirical science neither as discontinuous from nor entirely continuous with one another, but somewhere between the two. In terms of his stance on the philosophy-science relation, he belongs in the middle of the spectrum that runs from the most naturalistic to the most anti-naturalistic positions.

Turning to rejection of supernatural entities and processes, we can again identify a spectrum of positions here. At the naturalistic end of the spectrum, mechanistic materialists regard nature as composed entirely of units of matter in efficient-causal relations. Somewhat less naturalistic, Kant maintains that we may legitimately postulate final and formal causes within nature—specifically in the form of the ground-plans that animate purposive wholes—as long as we do not ascribe real, mind-independent existence to these ground-plans or purposes. Less naturalistic again, Schelling maintains that we may legitimately postulate really existing final and formal causes in nature as long as we do so in ways that recognise the pervasiveness of mechanism in nature and that encourage and underwrite, rather than discourage, empirical research into efficient-causal relations in nature. Yet Schelling conceives of nature's dimension of final and formal causality in terms of productive force, a force that remains to a significant extent mysterious. Hegel jettisons this notion of productive force and replaces it with a notion of universal forms that exist throughout nature. With this rejection of productive force, Hegel adopts a position more naturalistic than Schelling's but less naturalistic than Kant's. This, too, places Hegel around the middle of the naturalism/anti-naturalism spectrum.[2]

I. Interpreting Hegel, German idealism and their relations to naturalism

First let us reconsider the debate about naturalism amongst contemporary interpreters of Hegel. Some, notably including Frederick Beiser, see Hegel and the German idealists as naturalists while others, including Sebastian Gardner, see Hegel and the idealists as anti-naturalists. On inspection, the nature of this interpretive division will turn out to be more nuanced than it initially appears. This points us towards a less polarised way of considering how Hegel stands vis-à-vis naturalism.

In numerous works including *German Idealism: The Struggle Against Subjectivism* (2002) and *Hegel* (2005), Beiser numbers Hegel—together with Hölderlin,

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Schlegel, Novalis, and Schelling—amongst the 'absolute idealists', and Beiser identifies absolute idealism, including Hegel's version of it, as a naturalist position (see Beiser 2005: 80). Absolute idealism for Beiser is the view that reality as a whole is organically structured, developing through self-differentiation and self-articulation into the manifold of entities. In that it develops organically, reality takes shape in regular, law-governed ways that are rationally intelligible to us, so that reality as a whole is rational. Within this general position, Beiser maintains, the idealists regard nature as a self-organising whole, and in this they accept the naturalist thesis that 'everything in nature happens according to laws … of necessity', and they also accept that nature is pervaded by mechanism. They merely reject 'a naturalism that claims everything is explicable *only* according to mechanical laws … a radical or narrow mechanism' (Beiser 2005: 69).

That is, the absolute idealists reject the mechanistic materialism championed by such late eighteenth-century thinkers as the Baron d'Holbach, Diderot, and de la Mettrie, for whom: 'The universe, that vast assemblage of every thing that exists, presents only matter and motion: the whole offers to our contemplation nothing but an immense, an uninterrupted succession of causes and effects' (d'Holbach 1835: 15). D'Holbach further maintains that: 'A *cause* is a being which puts another in motion, or which produces some change in it. The *effect* is the change produced in one body by the motion or presence of another' (16)—that all causation is efficient causation involving the mechanical transmission of motion. Thus nature is equated with units of matter in relations of efficient causation. This form of naturalism is 'narrower', for Beiser, than that of the German idealists. In other words, mechanistic materialists are much more restrictive about what counts as natural: specifically, they do not admit formal or final causes. In contrast, the German idealists do admit these forms of causation into nature: they attribute generative, causal power to the non-material wholes or principles that they take to regulate organic processes and the overall development of nature as an organic whole. The idealists nonetheless remain naturalists, for Beiser, insofar as they believe that organic processes unfold in structured, rationally intelligible, necessary ways—governed by the laws peculiar to organic processes, laws of self-differentiation and self-articulation.

Thus, for Beiser, the absolute idealists subscribe to a form of naturalism broader than that which came to prevail later in the nineteenth century, when scientific materialists and empiricists came to pursue a programme that directly continued that of the eighteenth-century mechanistic materialists. This programme drew support from nineteenth-century scientific advances in accounting for life and evolution in mechanistic terms. Nonetheless, for Beiser, the materialist programme that came to prominence in the mid-nineteenth century is merely one, narrowly mechanistic and reductive, form of naturalism, which should not be equated with naturalism *tout court*.

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In apparent contrast to Beiser, Sebastian Gardner describes the idealist position as anti-naturalist. He traces its development to Kant's opposition between freedom and nature, the 'immense gulf … fixed between the domain of the concept of nature, the sensible, and the domain of the concept of freedom, as the supersensible' (Kant [1790] 1987: 14). If we take it, as the idealists did, that this opposition must be resolved, and freedom and nature reconceived as parts of a unified reality, then this can be done in two main ways—either by deriving human freedom from (and perhaps reducing it to) the operations of nature, or, conversely, by deriving the organisation of nature from human freedom. For Gardner, the scientific materialist currents that became prominent in the later nineteenth century took the former route, the idealists the latter. The idealists thought that 'subjectivity … supplies the grounds, if not ontological then at least conceptual, of Nature' (Gardner 2011: 90). That is, for the idealists, nature must be understood on the model of free human subjectivity, hence as a self-organising whole.

This, though, is the *same* view of nature that Beiser attributed to the absolute idealists. Yet Beiser counted that position as naturalist, whereas Gardner identifies the same position as anti-naturalist. Gardner explains that while the idealists saw themselves as pursuing a naturalist project—taking naturalism in a broad and non-mechanistic sense (as Beiser also does)—their position was 'historically revealed to be not "genuinely naturalistic" after all', but to be supernaturalistic by later standards (Gardner 2007: 46). In the later nineteenth century the meaning of 'naturalism' contracted, so that majority opinion came to be that broad naturalism such as that of the idealists was not truly naturalistic.[3] When Gardner describes idealist organicism as anti-naturalistic or even super-naturalistic (46), then, he means that this position diverges from the narrower form of naturalism that has come to be generally accepted.

Despite their apparent disagreement, actually Beiser and Gardner agree that the idealists did espouse a form of naturalism, but an organicist form broader than what we typically understand by naturalism today. So we can advance beyond the assumption that Hegel and other idealists must be either naturalistic *or* anti-naturalistic and instead say that their views *are* naturalistic in a broad, organicist sense but not in a narrow, mechanistic materialist, sense. The substantive philosophical question remains: *is* broad naturalism genuinely naturalistic? Has our historical understanding shifted towards a *correct* recognition that idealist organicism is not truly naturalistic and is on the contrary supernaturalistic—or is this a mistaken restriction of what can count as naturalism?

I will suggest that it is mistaken, and that the difference between broad and narrow naturalism is one of degree and not kind. The organicist conception of nature held by the German idealists may be *less* naturalistic than more narrowly naturalist views such as mechanistic materialism, but this does not mean that the

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idealist view ceases to be naturalistic altogether and degenerates into supernaturalism. To support these claims, I suggest that we should understand naturalism as a cluster concept, as Finn Spicer (2011) has proposed with respect to contemporary philosophical naturalism. That is: naturalism has various strands, so that any particular philosopher might incline towards naturalism along one or several strands of the cluster but not others. Spicer includes the following strands, amongst others: 1. Rejection of the idea of first philosophy; 2. Belief that philosophy is continuous with the sciences; 3. Disbelief in supernatural entities/processes; 4. Physicalism about the mind; 5. Opposition to non-naturalism about ethics/values; 6. Rejection of a priorism. If a philosopher can incline towards naturalism along some strands of the cluster but not others, then how naturalistic or anti-naturalistic a philosophy is is not an absolute matter but one of degree. Having said that, some strands of the cluster may well support one another so that they tend to occur together. But naturalism is also a matter of degree in that, for each strand of the cluster *naturalism* that a philosophy exhibits, it will exhibit that strand to greater or lesser degrees: for instance, one might uphold the continuity of science and philosophy in stronger and weaker forms. So, rather than a sharp divide between naturalism and anti-naturalism, there is a spectrum of more and less naturalistic positions, with supernaturalism (whatever that is—I will address this later) at one extreme, mechanistic materialism at the other, and idealist forms of organicism around the middle, so that their being less naturalistic than mechanistic materialism does not automatically place them at the extreme of supernaturalism.

However, one might object, the idealists do not belong in the middle but are actually quite far along towards the supernaturalistic end of the spectrum. To support this suggestion that German idealist views of nature, and specifically that of Hegel, do belong in or at least near the middle of this spectrum, I want to consider two particular strands of the cluster *naturalism*. First we must ask where Hegel stood with respect to a priorism and the continuity of philosophy and science (section II), since there has been such long-standing controversy over the place of a priori reasoning in his approach to nature. Then we should ask where Hegel stands on belief in supernatural entities and processes (section III). I hope that my discussion of these issues will substantiate my suggestion that his view of nature, while broader than mechanistic materialism in what it includes within nature, nevertheless differs clearly from supernaturalism—enough so to place this view around the middle of the spectrum. It might still be objected that, if Hegel's view of nature indeed belongs midway between the extremes of naturalism and anti-naturalism, then that view may be categorised as broadly naturalist but might equally well be categorised as moderately anti- or supernaturalist. Later I will provide reasons why 'broad naturalism' remains the best description.

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II. Hegel, the a priori, and empirical science

Reading Hegel's introduction to his encyclopaedia *Philosophy of Nature* (1817, 1827, 1830), he might at first seem to regard philosophy of nature and empirical science as discontinuous. He maintains that:

> … to determine what the Philosophy of Nature is, it is best that we *separate* [*abscheiden*] it from the subject-matter *against* which it is determined [*bestimmt*]; for all determining requires two terms. In the first place we find it in a peculiar relationship to natural science [*Naturwissenschaft*] in general, that is, to physics, natural history, physiology; it is itself physics, but *rational physics*. It is at this point in particular that we have to grasp it, and in particular to clarify its relationship to physics. (EN 1: 193)

It sounds as if Hegel believes that philosophy of nature and natural science (which he often simply calls 'physics', *Physik*) approach nature using contrasting or even separate methods. He notes, though, that their separation (*Trennung*) has occurred only in the early modern period; both methods co-existed in, for instance, Aristotle's *Physics* and other works of pre-modern 'natural philosophy'. Hegel also clarifies that both methods are primarily theoretical and not practical methods of studying nature. What, then, does separate them?

> Physics and natural history are said to be the eminently empirical sciences, and they profess to belong exclusively to perception [*Wahrnehmung*] and experience [*Erfahrung*], and in this way to be opposed [*entgegengesetzt*] to the philosophy of nature, the knowledge of nature by thought. (EN 1: 193)

Crucially, however, Hegel is not saying here that physics and the natural sciences in general *are* purely empirical, but he is reporting that many scientists and non-scientists regard them as such. That is, the scientific method was widely thought to consist in observation and experiment and in collating, comparing and tabulating data about what has been observed. But, Hegel objects, 'empirical physics … has in it much more thought than it admits or knows'. In reality, natural scientific inquiry is not purely empirical and does not remain with the collection of endless empirical facts. Rather, Hegel says, scientists draw general conclusions from their data, generalising from repeated occurrences to universal laws and classifying particulars under natural kinds. So, Hegel concludes, 'Physics and the philosophy of nature therefore distinguish themselves [*unterscheiden sich*] not as perception and thought, but only *by the kind and manner of their thought*; they are both a thinking knowledge of nature'. Physics involves thought insofar as

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scientists *ascend* from empirical observations to generalisations—presumably by induction and/or inference to the laws that best explain the observed data. So:

> *physics* … is a *theoretical* and *thinking* observation of nature … [which] aim[s] at comprehending that which is *universal* [*Allgemeinen*] in nature, a universal which is also *determined* within itself … [as] forces [*Kräfte*], laws [*Gesetze*] and genera [*Gattungen*]. (EN §246/1: 196-7)

In saying this, Hegel seems to accept that the scientific method is to make observations then to generalise from them by induction. Yet scientists never make pure observations that are not already informed by theory. Rather, scientists set out to make observations that will confirm or tell against particular theories and hypotheses. These theories inform and guide, all along, how scientists perceive and classify what they observe, how they construct experiments, and therefore what observations they obtain. Elsewhere Hegel agrees that theoretical understanding always precedes observation. In the chapter on 'sense-certainty' in his *Phenomenology of Spirit*, Hegel famously argues that sense-perception is always informed by categories of thought. In his *Philosophy of Nature*, then, Hegel should have said that science involves thought in that theories and theoretical categories always inform the observations that scientists make and the experiments they conduct. Nonetheless (he should have said), science remains empirical because it tests these theories and categories against observations and experimental results.

However exactly we characterize it, though, it is the empirical dimension of science that for Hegel distinguishes science from philosophy of nature. He thus elaborates on their distinction as follows: Whereas scientists identify and discuss universals within nature on an empirical basis, philosophers of nature take each universal already identified and conceptualised by scientists, and reconstruct on a priori grounds how each universal derives from the others and fits with them into an organised whole. Hegel therefore says that in its *origin and formation (Entstehung* and *Bildung*) philosophy of nature depends on empirical scientific findings, but its method is to reconstruct these findings on a new basis, that of 'the necessity of the concept' (EN §246R/1: 197).

> The material prepared out of experience by physics is taken by the philosophy of nature at the point to which physics has brought it and reconstituted without any further reference to experience as the final justification [*Bewährung*]. Physics must therefore work into the hands of philosophy, so that the abstract universal [*verständige Allgemeine*] which it provides can be translated into the concept by showing how the universal, as an intrinsically necessary whole, proceeds out of the concept. (EN §246A/1: 201)

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At this a priori level, philosophers reconstruct the complete set of connections amongst natural universals, in doing so comprehending nature as an organised and ordered whole.

As Hegel actually understands the distinction between physics and philosophy of nature, then, this is less sharp than it initially appeared. Hegel does not draw a sharp line between empirical and a priori approaches. Rather, for him, scientific method has a more empirical element—gathering observations and data—*and* a mixed empirical-and-conceptual element in which general hypotheses and theories are formed. For its part, the method of philosophy of nature is both a priori *and* has a more empirical element in which the philosopher learns from scientists—learns *both* about observed data *and* about universals, laws, etc. The philosopher then reconstructs on a priori grounds the links between these universals identified by scientists, to varying degrees reinterpreting the nature of those universals in the process. Sometimes, too, this leads the philosopher to reinterpret empirical data—to conceive them from a new perspective.

This means that for Hegel there is continuity between philosophy and science: philosophy of nature draws out, extends and realises the dimension of ordering thought that is already operative in empirical science. By doing so, philosophy of nature imparts a new level of organisation to scientific hypotheses and theories and thereby rises to understand nature as an ordered whole. Hegel conceives this as a continuation and extension, not a rejection, of the scientific programme of understanding nature on an empirical basis (EN §246A/1: 201).

Nonetheless, Hegel understands this continuity in a less narrowly naturalistic way than some other possible understandings. For he not only reorganises but also reinterprets the natural forms identified by scientists in light of the metaphysics by which, he says, philosophy of nature *distinguishes* itself from (*sich unterscheidet von*) science (EN §246A/1: 202). What is this metaphysics? Taking up the accounts of natural universals provided by science, Hegel tries to show how each natural universal derives from another by resolving an internal contradiction within it (or by advancing towards a resolution of that contradiction). He also describes philosophy of nature as 'rational physics', so we may infer that he takes as the core of this distinguishing metaphysics the idea that nature *is rational*—not merely that nature is susceptible of rational comprehension by us, but that nature in itself conforms to rational norms (insofar as it is so structured as to resolve a succession of internal contradictions within natural forms).

Having said this, for Hegel this 'rational metaphysics' merely makes explicit the presuppositions that scientists already make, often unknowingly—insofar as scientific enquiry is conducted on the presupposition that nature is an organised and intelligible whole, not merely admitting of being organised by us but really having organisation in itself. Hegel takes himself merely to have elaborated this

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presupposition of ordinary scientific consciousness in full and explicitly. So, while Hegel's approach to the philosophy-science relation is less naturalistic than some other possible approaches, his approach is not wholly non-naturalistic, for he is not positing a complete discontinuity between philosophy and science. While he thinks that its metaphysics *distinguishes* the philosophy of nature from science, he also thinks that this metaphysics does not rest upon a break from science but rather *realises* presuppositions that are already implicit in science all along. Philosophy of nature takes the assumptions about natural order that underlie science and develops those assumptions into what they always implicitly were—yet this requires that these assumptions be transformed out of their initial, implicit, intra-scientific shape. As such, philosophy of nature and science are neither completely discontinuous nor completely continuous, but somewhere between the two.

III. Supernatural nature?

The next strand of the cluster *naturalism* to which I turn is rejection of belief in supernatural entities and processes. On this point, naturalism is typically set against various modes of pre-modern belief in supernatural entities—God, the devil, angels, demons, spirits of the forest; elements and humours; relations of sympathy and communication between ostensibly very different natural things, such as diseased bodily organs and particular plants; Platonic or Aristotelian forms or essences that particular empirical things instantiate. Yet perhaps pre-modern people regarded all these kinds of entities as not supernatural but natural: after all, pre-moderns took these entities to organise, populate, and pervade the *natural* world. Even so, pre-moderns thus viewed nature itself as a supernatural realm, one structured internally by supernatural forces and powers. In what sense, though, are these various forces and powers supernatural?

Charles Taylor discusses this issue in his recent book *A Secular Age*. He maintains that in the modern disenchanted world, the 'only locus of thoughts, feelings, spiritual *élan* is what we call minds [and] the only minds in the cosmos are those of humans' (2007: 30). In contrast, people experienced the enchanted pre-modern world to be populated by 'spirits, demons, and moral forces' (26). Forces were felt to reside directly in things—for example, the curative agency attributed to relics of the saints, or the sacramental power of the Host. Meanings, too, were taken to reside in things, independent of and exterior to our minds. These objectively existing meanings could be communicated across things or imposed on us, as could the sacred power that transmits itself if we touch a saint's garment. Taylor infers that no sharp line was drawn between 'personal agency and impersonal force' (32). He further claims that the kind of influence that an

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item such as a saint's relic was thought able to exercise was not efficient causation. Taylor claims, for example, that in the medical theory of four humours black bile was not seen as the efficient cause of melancholy but rather as *embodying* melancholy, where this relation of embodiment, he says, was not a causal relation.

However, perhaps the relation *was* causal if we admit other kinds of causation beyond efficient causation. Perhaps black bile and psychical melancholy both instantiate a higher-level form or meaning common to them both: melancholy in a general, not exclusively physical or psychical, form. Or perhaps black bile realises, at a more concrete bodily level, melancholia in the psyche. On either view there are *forms* in nature which different things instantiate, embody, and realise to varying degrees. These forms include meanings that are sometimes common to superficially different things, so that (for example) the flower lungwort can cure diseased lungs because both participate in a common field of lung-related meaning. Underlying this pre-modern way of thinking is acceptance of *final* and *formal* causes. The cause of something's being as it is (the spleen over-full of black bile) is the form (melancholia) that the spleen instantiates. Here the form of any natural thing is the *telos* guiding its development so that it realises this form as fully as possible, and this remains true even for the disordered spleen, which is disordered because it is realising a disturbed form.

What makes this mode of thought supernaturalistic? For some, such as the mechanistic materialists (d'Holbach *et al*), it is supernaturalistic to believe in formal or final causes at all, because forms and purposes are not material. Kant does not straightforwardly take that view, but he does say that if one believes in real non-material concepts or plans that really affect and regulate material processes then one is postulating a special kind of supernatural cause (*übernatürliche Ursache*; Kant 1987: 68).[4] However, even if (as I will suggest) belief in real forms need not just as such be supernaturalistic, the medieval worldview is arguably still supernaturalistic in several ways. First, in this worldview, final and formal causation pervade nature and are its dominant forms of causation. Second, as a result, there is relatively little interest in investigating empirically into relations of efficient causation. Third, as a result again, a myriad of particular formal and final causal relations are invoked to explain events usually with no account (or no credible, empirically warranted account) of any efficient causal relations that support these final and formal relations and enable them to take place. For example, we have had no account of any efficient-causal mechanisms by which lungwort leaves might have curative effects on diseased lungs. In the absence of support from efficient-causal mechanisms, the supposed formal and final causal relations become mysterious and magical, and in that sense supernatural, even if they would necessarily not be so if we knew of efficient-causal mechanisms supporting and enabling them. On these three counts, we can place the medieval worldview at the supernaturalistic end of the spectrum.

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Now, in Hegel's time, many biologists were reintroducing belief in final and formal causes, and they saw this as fully consistent with—indeed, required by—their inquiries into efficient causation. Kant provided a justification for this practice in his Third Critique, on condition that belief in final and formal causes remain regulative. For Kant, we cannot understand organisms in exclusively mechanical terms (1987: 236). We must understand organisms with reference to their purposes, because the parts of organisms are reciprocally means and ends for each other—each supporting the others in its functioning—so that the whole system of means and ends must be regarded as having come about so as to realise these functions. Thus, organisms must be seen as purposive wholes, where the internal concept (or the plan or purpose) of the whole explains why all its parts arise and interrelate as they do. But for Kant these are merely regulative judgements that we are obliged to make about organisms. That is, we are obliged to think of organisms *as if* they had purposes—and, more generally, to regard the whole of nature *as if* it were suitable for our intellects: as if nature were organised on a plan such that we can understand it through our classificatory and ordering schemes and, thus as if nature were an ordered whole.

For Kant, though, we cannot know whether organisms or nature as a whole are really purposively organised in these ways. This is because, in the nature of the scientific project, we also have to study nature and organisms on the assumption that their component interactions are entirely mechanical—for 'without mechanism', Kant says, 'we cannot gain insight into the nature of things' (1987: 295). If nature and organisms really were entirely mechanical, though, *and* were really purposively organised, then we would have a contradiction. The solution (to this 'antinomy of teleological judgement') is that both assumptions—that nature and organisms are purposive wholes and that their processes are entirely mechanical—must be made in a merely regulative, non-realist spirit. As Daniel Dahlstrom sums up, for Kant:

> There is nothing contradictory about attempting to explain natural phenomena 'according to mechanical laws alone', insofar as that can be done, and at the same time allowing … that for some combinations of things in nature 'a causality distinct from mechanism …' must be entertained. (1998: 170)

For Kant, then, to be legitimate, our assumption that organisms behave as if they had guiding purposes must be made in a merely methodological and heuristic way, so that it does not contradict but works together with the converse assumption of mechanism, and therefore does not impede but advances empirical inquiry into efficient-causal mechanisms.

Moreover, for Kant, we are ultimately obliged to make this assumption about organisms as a reflection of the needs of our mental apparatus. For the aim of our understanding is to synthesise, to rise in steps to grasp things as a whole.

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It therefore suits our understanding to approach organisms as items whose parts flow out of their concepts holistically. More broadly, it suits us to regard nature as a whole that is so organised that in principle we can completely understand it through science as an ordered system. Again, then, the regulative assumption that there is order in nature motivates empirical inquiry—for we would find it pointless to investigate nature if we did not assume that we can understand it and that our investigations are going to add up.

As a whole, Kant is arguing that we should (re)introduce assumptions about organic relations and natural order because, made in a purely regulative way, these assumptions *further* empirical scientific inquiry. In their content, the assumptions are not naturalistic, because they make reference to *non*-natural concepts or ground-plans within organisms and within nature as a whole (and because these assumptions reflect the requirements of our intellect, which Kant also construes non-naturalistically). But as long as these assumptions remain regulative, they do not mark a damaging return to medieval supernaturalism.

Many scientists of the period immediately following Kant, though, treated the *Lebenskräfte* or *Gestaltungskräfte* of which they spoke not merely as heuristic postulates (although they sometimes did just that) but as real causes of the organisation of organisms and species (see Lenoir 1982: 159; his examples include Kielmeyer and Johannes Müller). Were these unfortunate throwbacks to belief in really existing supernatural forces? Not necessarily. Schelling provided a theoretical justification for the further step to reintroduce belief in real forces (as a realist, not merely regulative, kind of belief).

Across all the stages in his thought, Schelling starts from the question: How is knowledge possible? He answers that we can know only what is mind-like, what conforms in its structure (at least to some extent) to the structure of our own minds.[5] Moreover, he argues that insofar as natural scientists are advancing our knowledge, this must be because nature really is mind-like, 'the visible organism of our understanding' (IFO 194). It is not merely that we must assume that nature is suited to our understanding. Nature must really *be* suited to our understanding in virtue of having a mind-like organisation in itself. 'It is *not* … that WE KNOW *Nature* as *a priori*, but *Nature* IS *a priori*; that is, everything individual in it is predetermined by the whole' (IFO 198). Unless nature really were thus organised and suited to our comprehension, modern scientists would not have been able to make the strides in understanding that they have.[6] Thus, we have grounds to claim that nature really is objectively ordered and, this admitted for nature as a whole, it would be incongruous to deny that organisms too are objectively organised by their inner forms or plans. Organisms, then, really exhibit final and formal as well as efficient causation, as does nature as a whole. This is in the sense that organisms really are purposive wholes and that nature really is a large-scale purposive whole (it has a 'world-soul').

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For Schelling, recognising these realities need not preclude or deter empirical inquiry. On the contrary, their recognition *motivates* empirical inquiry, in several ways. (1) It gives researchers confidence that nature really is an ordered whole such that they can know about this whole and can build up a complete system of knowledge of it. (2) It directs empirical researchers to look for the efficient-causal mechanisms within organisms that enable their purposive functionings to occur. (3) It directs empirical researchers to look for the efficient-causal relations that obtain in non-organic nature, in the confidence that these have an ordered place within the larger whole. Effectively, Schelling takes Kant's arguments in defence of regulative assumptions about purposiveness and adapts those arguments in a realist direction. Thus in *On the World-Soul* of 1798, Schelling declares that:

> It is an old illusion that organisation and life cannot be explained from natural principles. [That is, that they are supernatural and external to nature conceived as an exclusively mechanical realm.]—If it were thus to be said: the *first* origins of organic nature are *physically* inscrutable, then this *unproven* assertion serves only to discourage investigators. (WS 348)

That is: if we abandon life and organisation as 'inscrutable' and if we therefore conceive nature as purely mechanical, then this actually discourages scientific inquiry, because researchers need to believe that nature is an organised whole to give their inquiries a point. Researchers may try to meet that need by merely adopting the heuristic assumption that nature is a whole, but if they cannot have confidence that this assumption has the status of real knowledge, then they are bound to become discouraged.

However, if nature is an organic order, the parts of which flow from the whole, then why can we not deduce the parts from the concept of the whole without needing to study nature empirically? Moreover, if all the regions of nature are organised by its overall concept (thus, organically), then how is it that there *is* any non-organic nature—indeed, how is it that the majority of natural processes are mechanical rather than organic? Schelling needs to answer these questions to differentiate his philosophy of nature from medieval supernaturalism.[7] He addresses both questions together.

Most of nature is inorganic (*anorganisch*), Schelling maintains in his 1799 *Outline of a System of the Philosophy of Nature*, because nature alienates itself, in an act of 'original diremption [*ursprüngliche Entzweiung*] in nature itself' (FO 205). Nature is at base organic, but it divides within itself so that whole regions of nature become mechanical, as do subordinate aspects of the region of nature that remains properly organic. Consequently, we cannot deduce nature's parts from its whole, because these parts (to varying degrees in different regions of nature) have really become independent of and not directly organised by the whole. The parts

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remain ultimately derivative of the whole, since it is through its self-alienation that they arise. But because they arise through the whole's self-*alienation*, the parts fall outside that whole and must be grasped in their own terms, namely those of mechanism; they must therefore be studied empirically.

How does organic nature alienate itself? Crucially, Schelling provides an account of this act of self-alienation by reconceiving organic purposiveness in terms of productive force. Originally, he maintains, there exists a pure productive, active, generative force—Schelling's equivalent of the vital force or *Bildungskraft* (formative force) postulated by various biologists of the period. After all, in any organism a concept—something non-material—generates material organisation. This generative yet non-material power Schelling reconceives as productive force. Yet productive force cannot generate anything determinate unless it is constrained by a second, 'retarding' force (FO 187), otherwise natural productivity would squander itself in a process of infinitely fast creation-and-destruction. Productive force must divide, into itself in its original productiveness and a second force of inhibition (*Hemmung*) that constrains this force in its original shape. This division is the self-alienation of productive force, and thus at the same time of nature as originally organic. While the interaction of both forces is necessary for any production, the forces can combine in different proportions, out of which various combinations the gamut of particular natural entities results (FO 35). The more inhibiting force prevails, the more mechanical the product—the less it is organised into a whole by the productive force. Conversely, the more the productive force predominates, the more organic the product.

By reintroducing real polar forces, has Schelling returned to medieval supernaturalism? He would see matters differently. In his view, belief in real organism and real natural order enable and stimulate empirical inquiry. Indeed, if we rightly understand the way in which nature is really an organism, then we grasp the necessity of empirical inquiry into its constituent efficient-causal relations. For nature cannot exist as an organic realm, organised by productive force, unless that force limits itself such that all of nature must be to varying degrees mechanical, and therefore such that the parts of nature cannot be deduced from nature's concept but must be studied, and their connections pieced together, empirically. So Schelling does not intend to return to the old supernaturalism that postulated final causes throughout nature that were unsupported by efficient-causal mechanisms. Rather, for Schelling, nature is a pervasively mechanical realm and must be studied in the ways appropriate to that—which means that every aspect of nature must be studied empirically (IFO 195. There nevertheless remains a key role for a priori reasoning in reconstructing how the various empirical products of nature derive from productive force; see IFO 197). Moreover, for Schelling *every* aspect of nature must be studied empirically in this way: even the organic part of nature is necessarily full of

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mechanical interactions, because productive force is invariably coupled with a degree of inhibiting force.

Having said all this, Schelling grasps *how* nature is pervaded by mechanism with reference to the polarity of productive and retarding forces. And the worry remains that these polar forces are really rather mysterious. Productive force is simply pure, brute creativity; it is not something we can rationally understand. Not surprisingly therefore, for Schelling in his 1800 *System of Transcendental Idealism*, the highest realisation of productive force is in human creative artistry, which likewise transcends rational understanding (Schelling 1978: 217). Even though Schelling has departed considerably from medieval supernaturalism, he takes a significant step back towards supernaturalism with his appeal to productive force. For he explicitly conceives this force as lying beyond rational comprehension and as being the prior condition of any operation of natural laws—a force that transcends these laws just as it makes them possible.

The same problem does not arise for Hegel, because the idea of productive and retarding forces plays no role in his philosophy of nature. He agrees with Schelling that nature is an ordered, organised whole and that the kind of organisation that nature exhibits is most fully realised in the self-organisation of organic beings. But Hegel understands these matters without reference to polar forces. Instead Hegel regards living beings as organised by their concepts, the universal forms within them. These forms are really within these beings, not merely thought by us—he likens these forms to Platonic forms (EN §246A/1: 200)—and the unitary nature of these forms is such that they manifest themselves throughout and bind together the manifold material parts of these beings so that they become holistically organised and, thus, living.

Moreover, Hegel construes the relations *between* all the natural universals as organic, in that each universal is a fuller realisation of the one that precedes it. For instance, time advances towards a successful resolution of the contradiction within space and, by doing so, time realises more fully than space the ontological structure (that of differentiation into multiple units) that was already immanent in space.[8] As a whole, therefore, nature's organising structure is organic, and nature is *'in itself* a living whole' (EN §251/1: 216), although philosophers can only reconstruct this organisation by first learning from scientists about natural universals (e.g. about the structure of time) *then* reconstructing a priori how one given universal realises more fully the structure of some other universal. Once again, we can understand this organic structure of nature without needing to make reference to productive and retarding forces. We understand this structure on *rational* grounds, using reason, rather than postulating these essentially mysterious forces. Furthermore, because nature is organic in structure, organisms must be situated on a priori grounds as the highest-level realisation *of* nature as a whole. Thus Hegel organises the forms theorised by scientists into a hierarchy, with the organic forms at the summit and the

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most mechanical, the most devoid of organic structure—including space and time as *partes extra partes*—at the base.

Hegel's departure from Schelling over productive and retarding forces leads Hegel to reconceive the way in which nature is the idea outside itself. While Schelling, too, saw mechanism as the self-alienated form of organism, he grasped this self-alienation in terms of original productive force dividing into two. Hegel again jettisons the reference to productive force. Instead, for Hegel, nature is the idea outside itself simply in the sense that, within nature, no particulars ever completely realise their universals (EN §247/1: 205). Constitutively, nature is divided between matter and universal form. This is the ultimate reason why philosophers of nature cannot begin with natural universals and deduce particular details from them—because the particulars invariably go their own way (EN §248/1: 208). These particulars must therefore first be investigated empirically, and the starting-point for the formation of philosophy of nature must be empirical science. Moreover, most of nature is non-organic, so that most natural universals are the universal forms *of* certain sets of mechanically related particulars. Time and space, for instance, are the forms of particulars—spatial parts, temporal moments—that stand to one another (albeit imperfectly) in relations of external difference. As such, it is only possible to gain an initial understanding of these universals by examining the particulars empirically and discerning how a universal form is operating, imperfectly, within them. Here too, the formation of philosophy of nature must be conditioned by science.

This remains true even for the study of organic beings. On the one hand, within these beings mechanical causal relations are incorporated into final causal relations to become the conditions that enable organisms to achieve their purposive functions. But organic beings never perfectly succeed in subordinating their parts and their efficient-causal relations to the whole. This, Hegel submits, is why organisms are subject to illness, accident, violence, and ultimately are destined to die when the unstable dominance of their whole over their parts breaks down (EN §375/3: 209). Thus, although organisms are really organised by their purposes, we cannot derive the operations of the parts from the purposes because the purposes have not completely mastered those parts. Philosophers therefore cannot understand organisms properly without first learning about organisms from empirical researchers.

We can now return to Hegel's relation to naturalism and specifically to the naturalist rejection of supernatural entities and processes. Here one of the most (narrowly) naturalistic positions possible is that of mechanistic materialists such as la Mettrie, who repugn any final or formal causes and regard nature as entirely composed of matter in efficient-causal relations. A less naturalistic position is Kant's; for him, reference to (non-material) final causes—organic purposes—can be legitimate as long as these purposes are not treated as real existents. Still less naturalistic is Schelling's view that we may legitimately claim that final causes

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really exist, as long as we elaborate this claim in ways that (1) recognise the pervasiveness of mechanism in nature and thereby also (2) encourage empirical research into efficient causal relations in nature and (3) identify efficient-causal mechanisms that enable organic relations to unfold. Hegel agrees with Schelling on these points, but he adds (4) that nature's dimension of final and formal causality must be conceived in ways that make it rationally intelligible, without recourse to any mysterious productive force.

Compared to Schelling, Hegel's rejection of productive force marks a step back away from the supernaturalist end of the spectrum. At the same time, Hegel is closer to supernaturalism than Kant or the mechanistic materialists because he admits the real existence of conceptual, non-material forms throughout nature. Yet this does not make Hegel a supernaturalist *tout court*. For his position stands at several specifiable removes—specified in points 1 through 4 above—from the most supernaturalistic position that we have identified, that of medieval cosmology. Since Hegel is removed on these several counts from the most supernaturalistic position, he is rightly located in, or at least towards, the middle of the spectrum from naturalism to supernaturalism. As such we can characterise Hegel's position on nature as broadly naturalistic—broader than what is generally understood by naturalism today, but not simply supernaturalist.

It might be objected that if Hegel is a broad naturalist in this sense then he is equally a moderate supernaturalist—one who affirms the objective reality of organising, universal, non-material forms within nature, something that more resolutely naturalistic positions deny. Yet my examination of Schelling's and Hegel's differences over nature suggests that it is Schelling who is appropriately described as a moderate supernaturalist, in that he rejects the medieval worldview but nonetheless affirms the reality of mysterious productive force. Since Hegel denies the reality of this same force, it is most helpful to mark his difference from Schelling on this point by not calling Hegel a moderate supernaturalist. 'Broad naturalism' remains the best description of Hegel's position on nature.

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Notes

Abbreviations: FO: Schelling (2004a). IFO: Schelling (2004b). WS: Schelling (1856). EN: Hegel (1970a). Translations from EN are sometimes modified without special notice following Hegel (1970b).

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[1] I am grateful to Rachel Cooper for reading an earlier draft, and to Sebastian Gardner for his very helpful and detailed comments on that draft.

[2] I understand the concepts of formal and final causation to be generic concepts that can be interpreted in a range of ways. Kant interprets them in terms of purposive wholes; Schelling reinterprets them in terms of productive force; Hegel reinterprets them again in terms of universal forms. Some scientists of the German idealist period interpreted these concepts in terms of vital or formative force (see below).

[3] Gardner refers to Alexander-Gode von Äsch's *Natural Science in German Romanticism*. For Äsch, the Early German Romantic view is that 'science and poetry [are] integral parts of [a] higher entity which current usage would call neither science nor poetry yet which embraces both' (Äsch 1941: 21). That is, the Romantics aspired and contributed to the creation of a form of science that was simultaneously poetic and aesthetic—as Robert Richards (2002: 12) has more recently argued, where aesthetic intuition into the wholeness of nature can motivate, inform and aid rather than obstruct scientific enquiry. But, Äsch stresses, this enterprise does not count as scientific by the more recent standards that became established during the nineteenth century. From this later perspective, science investigates nature merely with a view to instrumental control over natural phenomena, therefore understanding nature mechanistically through the 'elaborat[ion] of unfailing rules of prediction for the behavior of natural phenomena' (Äsch 1941: 24).

[4] Final causation has at times been accused of being supernaturalistic on the grounds that it entails acceptance of backwards causation, but I take it that it need not do so.

[5] Thus, in his 1804 *System of Philosophy in General and of the Philosophy of Nature in Particular*, Schelling states: '*The first presupposition of all knowledge is that the knower and that which is known are the same*' (Schelling 1994: 141). Or, in his 1797 *Ideas for a Philosophy of Nature*: 'As long as I am myself identical with nature, then I can understand what living nature is as easily as I can understand my own life itself' (1988: 36).

[6] Kant on occasion seems to anticipate Schelling, saying in the First Critique that to give point to empirical inquiry we must proceed not merely by treating nature *as if* it had order but by assuming that *there is* order in nature (Kant [1787] 1929: B679).

[7] As Schelling seeks to do: he condemns as 'meaningless' 'the old teleological modes of explanation, and the introduction of a universal reference to final causes into the science of nature, which was adulterated as a result' (IFO 195).

[8] To explain, Hegel identifies a contradiction within the structure of space: Space is divisible into a manifold of points. As such space is *partes extra partes*—it consists of parts outside other parts. Yet these parts of space have no qualities by which they can be individuated from one another. There is nothing to differentiate these parts from one another, and so they prove after all to be identical with each other. Thus, after all, space is pure, distinctionless homogeneity (EN §254/1: 223). Space is self-contradictory: it is pure difference *and* pure lack of difference. For Hegel, time embodies a step towards resolving this contradiction. Time consists of a series of moments—an unending stream of 'nows', each existing only momentarily. As each 'now' momentarily stands out into existence, it divides the past from the future. Yet each moment

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disappears immediately it has come into existence. It exists so fleetingly that it has no positive existence at all. Hegel concludes that temporal moments are nothing more than a manifestation of negating force. Once that negation is done, there is nothing more to the moment and it disappears. Nonetheless, in virtue of their negating force, moments differ from one another more fully than spatial points do. For moments at least set themselves *against* everything else, even if only momentarily. For Hegel, then, difference is more firmly realized in temporal moments than in spatial parts. In this way, time embodies an advance towards resolution of the contradiction within space.

Bibliography

von Äsch, A-G. (1941), *Natural Science in German Romanticism*. New York: Columbia University Press.
Beiser, F. (2002), *German Idealism: The Struggle Against Subjectivism 1781-1801*. Cambridge, MA: Harvard University Press.
Beiser, F. (2005), *Hegel*. London: Routledge.
Dahlstrom, D. (1998), 'Hegel's Appropriation of Kant's Account of Teleology in Nature', in S. Houlgate (ed.), *Hegel and the Philosophy of Nature*. Albany: SUNY Press.
d'Holbach, P.-H. T. (1835), *System of Nature*, trans. H. D. Robinson. 2 vols. New York: Matsell.
Gardner, S. (2007), 'The Limits of Naturalism and the Metaphysics of German Idealism', in E. Hammer (ed.), *German Idealism: Contemporary Perspectives*. London: Routledge.
Gardner, S. (2011), 'Idealism and Naturalism in the Nineteenth Century', in A. Stone (ed.), *The Edinburgh Critical History of Nineteenth-Century Philosophy*. Edinburgh: Edinburgh University Press.
Hegel, G. W. F. (1970a), *Philosophy of Nature*, trans. M. J. Petry. 3 vols. London: Allen & Unwin.
Hegel, G. W. F. (1970b), *Enzyklopädie der philosophischen Wissenschaften, Zweiter Teil: Die Naturphilosophie*, ed. E. Moldenhauer and K. M. Michel. Frankfurt: Suhrkamp.
Kant, I. (1929), *Critique of Pure Reason*, trans. N. Kemp Smith. Basingstoke: Macmillan.
Kant, I. (1987), *Critique of Judgment*, trans. W. Pluhar. Indianapolis: Hackett.
Lenoir, T. (1982), *The Strategy of Life: Teleology and Mechanics in Nineteenth-Century German Biology*. Chicago, IL: University of Chicago Press.
Richards, R. J. (2002), *The Romantic Conception of Life*. Chicago, IL: University of Chicago Press.
Schelling, F. W. J. (1856), *Von der Weltseele*, in *Sämmtliche Werke* vol. II: 345-583.
Schelling, F. W. J. (1978), *System of Transcendental Idealism*, trans. P. Heath. Charlottesville: University of Virginia Press.

https://doi.org/10.1017/hgl.2013.2 Published online by Cambridge University Press

Schelling, F. W. J. (1988), *Ideas for a Philosophy of Nature*, trans. P. Heath and E. Harris. Cambridge: Cambridge University Press.
Schelling, F. W. J. (1994), *Idealism and the Endgame of Theory*, ed. D. Snow. Albany, NY: SUNY Press.
Schelling, F. W. J. (2004a), *First Outline of a System of the Philosophy of Nature*, trans. K. Peterson. Albany: SUNY Press.
Schelling, F. W. J. (2004b), 'Introduction to the Outline of a System of the Philosophy of Nature', in Schelling 2004a: 193-231.
Spicer, F. (2011), 'Intuitions in Naturalistic Philosophy', unpublished paper presented at Lancaster Philosophy research seminar.
Taylor, C. (2007), *A Secular Age*. Cambridge, MA: Harvard University Press.

https://doi.org/10.1017/hgl.2013.2 Published online by Cambridge University Press