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THE PHILOSOPHY OF NATURE OF KANT, SCHELLING AND HEGEL

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Introduction

Man, though himself a child of nature, is – in Herder’s words – a *freed man of nature*. Through reason he is able to disentangle himself from natural compulsions and adapt nature to his needs. Admittedly, that also means his *relation to nature* is not thoroughly determined by nature but rather is precariously open. Reason is thus continuously required to clarify and justify anew man’s relation to nature. In other words, it is constitutive of man that he has a concept of nature and hence also a fundamental need for a philosophy of nature. It is no accident that in the Ionian world the philosophy of nature was “the form in which philosophy as such was born” (Wahsner 2002: 9).

In this respect, it is surprising that the present age, which more than any previous era is determined by the results and applications of scientific research, has not developed a thoroughgoing philosophy of nature. Instead, it is the *philosophy of science*, or philosophical reflection on the foundations of natural science, which – prepared already in the second half of the nineteenth century – has attained a truly epochal status during the twentieth century and continues to dominate contemporary philosophy. As the latter has allowed the philosophy of science to supersede the philosophy of nature, it has neglected to develop a concept of nature adequate for our time. Yet the sheer number of popular publications on cosmogony, elementary particle physics, chaos theory, etc., up to theories of biogenesis, evolution, ecology, neurophysiology, and brain science (even including freedom of the will) are all indicative of an immense *epistemic need*. But popular scientific commentary, however interesting and commendable, does not amount to a philosophy nature. It reports and explains the results of scientific research, but it is not a philosophical reflection on the “principle nature.”

In this situation, it is only natural that our gaze turns back so as to inquire of the philosophical tradition and to clarify the extent to which the enormous intellectual

achievements of the past might still be of use. The present investigation brings into view the philosophy of nature of German Idealism, a philosophical movement which emerged around the beginning of the nineteenth century. German Idealism appropriated certain motivations of the Kantian philosophy and developed them further in a “speculative” manner (Engelhardt 1972, 1976, 2002). This powerful philosophical movement, associated above all with the names of Fichte, Schelling and Hegel – and moreover having nothing whatsoever to do with the “subjective idealism” of George Berkeley – was replaced by philosophical positions designated roughly as metaphysics of the will, Marxism, life-philosophy, phenomenology and existentialism, as well as positivism, empiricism, philosophy of science, the linguistic turn, and analytic philosophy. These philosophical positions more or less still shape us today. German Idealism amounts to a virtual intellectual-historical antithesis to these movements and thus presents itself in retrospect as a striking alternative.

The basis of Idealism – in its various respective forms – is *the ideal* <Ideelle>, and thus the opposite of that which is real. It continually takes as its task explaining the real in terms of the ideal, and this is especially true of the Idealists’ philosophy of nature.¹ Is this a hopeless undertaking? Does Idealism not lack an empirical basis? Can one secure any solid ground whatsoever in the ether of the ideal? In what follows, I explain how, more than anyone else, Schelling and Hegel sought to handle this problem and to cope with it. By way of anticipation, a clear preference for the *Hegelian* philosophy of nature will emerge in what follows, a preference which may come as some surprise considering how much controversy has surrounded the significance of that view. The project of renewing a thoroughgoing philosophy of nature can meaningfully begin here.

My presentation begins with *Kant*’s philosophical project, which played a key role in understanding German Idealism, and then considers in detail the philosophical approaches developed by Schelling and Hegel. Without doubt, the true initiator of German Idealism is Fichte. However, following Kant, Fichte’s primary interest concerns exclusively the Transcendental Philosophy. Although within that framework one finds various remarks about nature, Fichte did not develop his own philosophy of nature. For this reason, his work is only mentioned here in passing. Commensurate with his significance, however, are four articles in the present volume which discuss Fichte’s philosophy in detail.

Numerous other thinkers are to be included among the German Idealists – the more or less central being Friedrich Heinrich Jacobi (1743–1819), Karl Leonhard Reinhold (1758–1823), Friedrich Schleiermacher (1768–1834), Friedrich Hölderlin (1770–1843), Novalis (1772–1801) and Friedrich Schlegel (1772–1829). However, in the present context it seems appropriate to restrict the scope of investigation to the central positions.

Kant

As stated earlier, one cannot conceive of German Idealism independently of Kant’s philosophy, and so it is at a minimum necessary to outline the main features of the latter. Here, emphasis is naturally placed on those of Kant’s arguments which are

the most relevant for the philosophy of nature. I begin with the groundwork for the theoretical philosophy as it was developed in the *Critique of Pure Reason* (1781), followed by a few brief remarks on Kant's *Metaphysical Foundations of Natural Science* (1786). Then, and of particular importance, is the *Critique of Judgment* (1790), a work which contains essential insights of enduring significance regarding the essence of life and which was itself extremely important for the development of German Idealism. Finally, I consider Kant's *Opus Postumum*. Though this work was first published in 1936 and thus could not have had any direct influence on German Idealism, it is nevertheless investigated here with respect to the far-reaching philosophical motives contained therein. It is interesting that Kant's thought, as is shown, has in the end already moved in the direction of Idealism.

Critique of Pure Reason

In the *Critique of Pure Reason*, Kant asserts – in opposition to Hume's empiricism – that the *lawfulness* of nature can be explained thoroughly, though not by means of experience alone. Experience “certainly tells us what is there, but it does not tell us what must necessarily be one way and not another” (KVR: A1). In order to explain the possibility of natural laws, Kant performs a revolutionary reinterpretation, a “Copernican Turn,” as it were. Accordingly, knowledge need not simply conform to nature; on the contrary, nature must itself, in a certain sense, conform to knowledge. The object of knowledge is understood not as something already fully determined and available for empirical assimilation; rather, it is only by means of the subject that it is first determined what the object is. Kant is certainly of the opinion, which he carefully outlines, that the subject is “affected” by an external “thing in itself.” However, the still chaotic sense-data which the subject receives in this way are, according to Kant, given order and form by the subject. First, they are ordered through the *forms of intuition*, namely space and time, which already lie in the subject and confer on the sense-data the character of spatial-temporal intuitions. The sense-data are clasped in the *unity of self-consciousness* to the “synthetic unity of apperception” (KVR: B131–9) and then determined further by means of the *categories* of the understanding which similarly already lie within the subject – categories such as “quantity,” “causality,” and “substance.” In this way, the spatial-temporal ordering of intuitions is imprinted with an additional structure. Two successive events, such as “A spark descended into the powder keg” and “An explosion occurs” are linked together by means of the category of causality, and only then can they be understood as linked with respect to a causal law: “*Because* a spark descended into the powder keg, *therefore* an explosion was triggered.” The spark is conceived as the *cause* and the explosion as its *effect*. It is only through such categorial determinations, such as that of causality, that natural being becomes available for knowledge, as for example in the aforementioned case of knowledge of *causal* relations. With that a *principle of pure understanding* is formulated which is constitutive for all experience. Accordingly, the law-like regularity of nature is essentially the result of the formative activity of the subject. This is emphasized in Kant's famous *dictum*: “The understanding does

not draw its laws (*a priori*) from nature, but rather prescribes them to it" (PR: §36; the original text in italics).

With respect to the above example, this means that any natural being which I encounter is in principle causally conditioned. Of this I am certain prior to all experience – "*a priori*." Certainly, *how* the causal principle is realized in concrete natural laws is variable, for example as the law of gravity, as the law of the refraction of light, etc. Thus, with respect to their *specific determinateness* the natural laws cannot originate in the subject.

Kant names the view he develops "*transcendental*." The transcendental philosophy is "the system of all principles of pure reason" (KVR: B27). With that, he wants to distance himself terminologically from a philosophy which accepts any kind of *transcendent* authority lying "beyond," and thus unavailable to, the subject. By contrast, according to the transcendental view the formal elements of nature reside in the *subject* prior to all experience: these are the forms of intuition, namely *space* and *time*, as well as the twelve *categories of the understanding*, which further determine the intuitions. We thus never have knowledge of "*things in themselves*," that is, things "as they in themselves might be." Rather, we have knowledge of *appearances*, i.e. of how things *appear* to us with respect to our forms of intuition and categories – whereby Kant explicitly remarks that "appearance" <*Erscheinung*> should not be equated with "fiction" <*Schein*> (KVR: B69–71). Since, however, the appearances are determined by our own forms (i.e. the forms of intuition and the categories), we can have *a priori* knowledge of the appearances *in advance of all experience*, for example that nature is constituted spatio-temporally and causally. Kant's transcendental approach thus renders valid *a priori* determinations of experience, and without these the scientific experience of law-like regularities of nature would be impossible. The aim of the *Critique of Pure Reason* is to make visible such "transcendental conditions of the possibility of experience" which exist within the subject from the outset.

A fundamental problem with Kant's fascinating proposal is admittedly the concept of the *thing-in-itself*. This must be entirely unrecognizable, since it is in no way liable to any subjective formation. It is nevertheless constitutive of Kant's position, for, as stated earlier, the *thing-in-itself* must "affect" the subject and deliver to it by means of this effect the "raw material of sensible perception." If the spatio-temporal and categorial *forms* which enable knowledge lie in the subject, then, in contrast, the *sensible content* must originate in a *thing-in-itself* which, for its part, must in principle lie beyond the reach of knowledge. Nevertheless Kant argues with this concept. He attributes existence to it, characterizes it as unknowable and yet claims to know that the thing-in-itself affects the subject. That, however, means that it has an effect, and "effect" presupposes the category of causality, which sure enough has no application with respect to things-in-themselves. In short, with regard to the thing-in-itself nothing is compatible. It is thus no surprise that Fichte, who succeeded Kant and was in thorough agreement with the principle of the transcendental, set out to resolve this *aporia*.

Though not aporetic, it is nevertheless a further serious defect that, though Kant certainly provided justifications within the scope of his claim, he unfortunately left

the claim itself unjustified. The unaccounted assumption of a thing-in-itself is but *one* facet of the problem. The assumption of *a priori* “forms of intuition” and categories is no more justified, and this leads directly to such questions as: Why are there spatial and temporal forms of intuition? Why are there forms of intuition at all, and why are there exactly two? Why does the faculty of the understanding possess categories, and why are there exactly twelve? Here, Kant himself recognized the need for an explanation and, at any rate, tried to provide a rationale. He ascribed the categories to the capacity to judge (which itself is admittedly in need of justification) and sought to provide arguments for why there are exactly twelve (on this issue, see Reich 1932).

Of particular significance for the development of German Idealism are those observations which Kant developed under the title of a “*transcendental dialectic*.” With *intuition* attached to space and time, and the *understanding* grounded on the capacity to judge, Kant sees in *reason* the capacity to bring the rules of the understanding under a *principle* (KVR: A302/B359), i.e. to find the *unconditioned* for that which is conditioned in multiple respects (A307/B364) and in this way to think of an ultimate “absolute totality” (A326/B383). Such a concept, generated by reason, is called a “transcendental idea” (A311/B368) and appears concretely in three forms – soul, world and God. Since they exceed the bounds of experience, such ideas have a *transcendent* character and so, Kant explains, can only function regulatively, i.e. they cannot lead to “hard” empirical results but rather can only guide scientific research. If this restriction is not born in mind, then thought inevitably becomes ensnared in dialectical *aporias*, as for example in the question of whether or not the world has a beginning: as Kant demonstrated, the affirmative and the negative response each leads to an antinomy (for critical analysis on this see Wandschneider 1989).

While holding the “hard,” empirically oriented knowledge of the understanding in the highest esteem, Kant clearly also allowed for the concerns of reason and, in particular, the question concerning the *unconditioned*. It is with respect to the latter that Kant substantially influenced the development of the “speculative” philosophy of German Idealism. (Of interest with respect to this point is Hegel’s presentation of Kant’s “critical philosophy” in the context of the “Encyclopedia,” Hegel Werke: 8.§§40–60.)

Metaphysical foundations of natural science

Published in 1786, Kant’s *Metaphysical Foundations of Natural Science* seeks to work out more clearly the consequences of the transcendental approach with respect to the natural sciences (here in particular see Plaass 1965; Schäfer 1966; Hoppe 1969: esp. Ch. 2; Falkenburg 1987: Ch. 2). One can only speak of a *real science of nature*, according to Kant, “if the natural laws, which it takes as its basis, are known *a priori* and not as mere laws of experience” (MA: 468). What Kant has in mind is a *metaphysics* of nature (469), which consequently “is drawn from the essence of thought itself and is in no way a fictitious invention on account of not being borrowed from experience” (472). With that, Kant is thinking of the “*principles of pure understanding*,” such as the universal principle of causality, which were developed in the *Critique of*

Pure Reason under the guidance of the categories. The system of principles “provides the schema for the metaphysics of nature” (Schäfer 1966: 24) and, with that, forms the general background for the empirical science of nature. For its part, however, this assumes collaterally the empirical *existence* of things and the *intuition* thereof. It thus presupposes space and time and accordingly, as Kant emphasizes, *mathematics* (geometry and arithmetic) as that which is conceptually commensurate to space and time – such that “in every doctrine of nature there is only so much proper science, ... as there is that to which mathematics is applicable” (MA 470). Mathematical physics is thus distinguished from all other natural sciences. Its fundamental concept is a concept of matter, understood as “movable in space.” This general concept, which nevertheless contains an empirical element (i.e. existence), is developed further by Kant in accordance with the categories and in a purely conceptual manner: into a pure doctrine of motion (“phoronomy”), a doctrine of the filling of space by forces (“dynamics”), a doctrine of the interaction of material bodies (“mechanics”), and a doctrine of motion with respect to the perceiving subject (“phenomenology”). With that, the “metaphysical foundations” of natural science are delineated, though admittedly restricted to physics. Kant’s doctrine of forces was repeatedly taken up in German Idealism, whereby the spatial reality of matter was said to be constituted by the opposing forces of attraction and repulsion (MA: Ch. 2).

Critique of Judgment

The *Critique of Judgment*, published in 1790, is devoted to organic nature. It may at first come as a surprise that this work also contains Kant’s philosophy of art. The two themes are connected by the concept of purposiveness, which is central for Kant’s explanation of artistic beauty, as well as for his understanding of organic systems. Both parts became significant for the development of German Idealism. For present purposes, it is only the second part, the “Critique of Teleological Judgment,” which is germane.

Kant here distinguishes between “external” and “internal” purposiveness (KU: §63–7, §82). *External purposiveness* means that the determination of an object as a medium is a determination which is *external* to that object. Thus, either the determination is *accidental* – as sandy soil is certainly “conductive” for forests of spruce trees, though it is certainly not there for the sake of the forests (KU: 280–1); or the determination is bestowed on the object *from without* by means of a conscious intention of *thought* and thus represents in principle a *technical determination of aims* (KU: 285–6, 289–90, 291–2). By contrast, *inner purposiveness* means a coherent functioning which is in itself purposive and whose purposive organization is not even “externally purposive,” i.e. neither accidental nor technical but rather, as it were, consisting “of nature.” Thus, Kant also speaks of an “end of nature” <Naturzweck> (KU: 286). It preserves its final character entirely on its own, independent of accidental factors or technical determinations of aims. The inner purposiveness of an end of nature is thus nothing other than its self-preservation. Thereby, the organs are means for the preservation of the entire organism. Yet the organs themselves also belong to the organism.

Self-preservation thus means that the organism is conversely a means for the preservation of the organs – basically, a familiar matter of fact: on the one hand, heart, lungs, kidneys, etc., are necessary for the functioning of the organism, and, on the other hand, the organism serves to ensure the functioning of these (and all remaining) organs. It is in this sense that Kant comes to the immediately plausible definition of inner purposiveness, according to which everything in an organic system “is an end and reciprocally also a means” (KU: 296, originally italicized). Or, in another formulation, the parts of an organism “relate to one another through the unity of a whole, such that they are interdependently the reciprocal cause and effect of their form” (KU: 291). According to Kant, this thoroughgoing *reciprocal relationship* in the function of an organic totality is to be understood as the characteristic of inner purposiveness.

With regard to *realization conditions* of inner purposiveness, Kant admittedly seems confronted with what appear to be insurmountable difficulties. He considers a *causal explanation* impossible, and that above all for two reasons: the causal relation is *asymmetrical*, i.e. unilaterally directed from cause to effect, whereas the *reciprocity* of cause and effect which is substantial for the structure of inner purposiveness would imply a cause which is likewise an effect and an effect which is likewise a cause (KU: 289). Kant further asserts that causal processes are *blind* (270, 326), i.e. they do not trend in pursuit of a goal, since they alone are determined by factors which lie in the past and not by a goal which is first realized in the future, as is obviously the case for the self-preservation of an organism. One could object that even a causally determined process is goal-directed insofar as a future stage of the process is clearly determined by the past stages of that process (so e.g. Sachsse 1979: 13–18). To this one can respond that causally determined processes are *interrupted* by external influences, i.e. they are sidetracked from their original “goal,” whereas organic behavior seeks to conform to its particular goal even *against external disturbances*.

Kant is, however, also fundamentally skeptical with regard to his own characterization of the organic in terms of the *concept of purposiveness*, since this is not a *category* which is *constitutive of experience* (in the sense of KRV), as is the case with the category of causality. So, according to Kant, we can indeed be *a priori* certain that every object we encounter in experience is an object which is causally determined, whereas there are certainly objects which do not exhibit the inner purposiveness of an organism. Correspondingly, Kant says “purposiveness” should be *merely* a “*subjective principle (maxim) of judgment*” which, as such, guarantees nothing with respect to the qualities of *objects* (KU: xxxiv). It is “a mere idea” (318), a *regulative* and not a constitutive principle (see e.g. 301, 331), which can only serve to “reflect” on nature but not determine its objective being (e.g. xxvi–xxviii, 345).

The reason for the merely subjective-regulative character of the principle of purposiveness can be seen, for Kant, in the involvement of the *concept of an end*. Whoever judges organisms to be purposive ultimately considers them to be the result of an *intentional, thinking* goal-directed activity and thus as analogous to technical creations (269, 309, 333–8, 345–6, 374). And this is akin to the model of *external* purposiveness which, as technical, presupposes a *rational positing of ends*.

So neither the concept of causality nor the concept of an end (which is presupposed

in the principle of purposiveness) is, in Kant's view, sufficient for explaining the *realization conditions* of inner purposiveness. In view of the incontestable facts of physical structures, which nevertheless suggest a compelling purposive explanation, Kant entertains the speculative thought of a *supersensory substratum* of nature, i.e. that of *reason inhering in nature itself* (KU: xx, lvi, 304, 316–17, 352–3, 357–63, 374 – here, see Bartuschat 1972: 215–17, 253–5; Düsing 1968: 108–10, 116–18). The starting-point here is the moral philosophical consideration that the will which is determined by practical reason should also be able to manifest itself in real action and thus ultimately in physical relations. That, however, is only possible, Kant suspects, if nature itself is not ultimately exempt from reason. Consequently, there should be “a ground for the unity of the supersensory which grounds nature with that which is contained in the practical concept of freedom” (xx). Accordingly, *reason* would no longer be a mere subjective instance but rather, as it were, a “supersensory real ground [*Realgrund*] for nature, . . . to which we ourselves belong” (352). It would thus no longer be merely the foundation of thinking but rather the foundation of *all beings*; reason would no longer have merely moral relevance but rather would possess *ontological* relevance in the sense of a *logos* which underlies subject and object alike. From there it would at least be plausible that, on the one hand, natural objects could be organized purposively in the sense of “inner” purposiveness and, on the other hand, the subject's reason could be capable of adequately grasping the purposiveness of nature. With respect to Kant's difficulties with the realization conditions of inner purposiveness, the ontological thought of a rational substratum of nature must have seemed exceptionally attractive. And nowhere is he closer to the thought of German Idealism, in particular the kinds of “objective idealism” advocated by Schelling and Hegel, than here.

With that, Kant admittedly abandoned the transcendental view of the *Critique of Pure Reason*, a view which had deprived reason of an ontological status and accorded it the sole function of regulating knowledge. Kant shied away from this consequence. Commensurate with a concept of knowledge which is restricted to knowledge of nature, Kant is convinced that, with respect to a possible supersensory-rational substratum of nature, we can have “for theoretical purposes not the slightest affirmative determinate concept” (KU: 358). The ontological thought of a *logos* which underlies nature was again withdrawn, and thus the possibility of grasping the inner purposiveness of the organic as a reason which inheres in nature itself was discarded (see Heintel 1966). The only form in which *we* are capable of thinking of organic purposiveness is thus the *teleological* explanation, which remains oriented to a technical model – thus it is as if organisms were constructed by a “highest architect” (354). It is clear that one thus only arrives at an *external* purposiveness, which as such presupposes an ideal anticipation of an end. Kant expressed this *aporia* in terms of the impossibility of a “Newton of the blade of grass” (338, also 353), he thus expresses regret that the principle of inner purposiveness possesses the status of a *merely regulative idea* for human thought, a regulative idea for which no realization conditions are assignable and thus which facilitates *no scientific knowledge* of the organic.

In the *Critique of Pure Reason*, as well as in both the *Metaphysical Foundations* and the *Critique of Judgment*, there remains open a fundamental question which

was clearly articulated in the last of these works: namely, the question touched on earlier concerning empirical laws of nature, such as the law of gravitation. According to Kant, what is determined transcendently is only the *general* character of its law-likeness, not its specific content. The reason for this undoubtedly is Kant's assumption that in the process of experience the subject is first "affected" by a thing-in-itself which delivers empirical content. In doing so, the thing-in-itself remains subjectively *inaccessible* and therewith anyway transcendently inexplicable. In the *Critique of Judgment*, this is in principle addressed in the distinction between *determinant* and *reflective judgment*: "If the universal (i.e. the rule, the principle, the law) is given, then the judgment, which subsumes the particular under it, is . . . *determinant*. If, however, only the particular is given, for which it must find the universal, then the judgment is merely reflective." In other words, reflective judgment can only establish an "as if principle" through which it gives "only a law unto itself and not a law of nature" (xxviii). It is ultimately the previously mentioned thing-in-itself which is problematic for the Kantian system.

Opus Postumum

Kant did not let this problem rest but rather continually circled it and sought to resolve it, as can be seen in the *Opus Postumum*. I have only a few remarks on this point. Certainly, the *Opus Postumum* could not have had a direct influence on German Idealism since it was first published in 1936–8 – aside from Kant's public declarations concerning Fichte's *Wissenschaftslehre*. Nevertheless, it is a document of the historical-intellectual situation within which German Idealism arose, and, as it demonstrates, Kant himself was already *en route* to an idealistic position (instructive here is Mathieu 1989; Tuschling 1995).

Here, reflective judgment no longer appears to have only an "as if principle" through which it can create only a system unto itself. Rather, as Vittorio Mathieu noticed, this "in point of fact is claimed *categorically* as a system which is concerned with reality itself, and the judgment which erects the system gives the law not only 'unto itself' but also 'to nature'" (Mathieu 1989: 44). That which earlier was asserted to be empirically valid has now become an "a priori given matter" which "is not concerned with the senses but rather with reason" (Kant, *Opus Postumum*, cited in Mathieu 1989: 276). The empirical ultimately resolves itself into mere relationships, i.e. the form becomes the "object itself" (Mathieu 1989: 276–7). Burkhard Tuschling notes that in the *Opus postumum* Kant, as it were, reverts to Spinoza and Leibniz. Schelling named Kant "the Leibniz of our epoch" and understood his Transcendental Idealism as Spinozism (Tuschling 1995: 209). This is an astonishing about-face of the once most critical Kant which only illustrates the historical-intellectual trend initiated by Kant himself: namely, that one must think further both with and against Kant, and that the consistent elaboration of his project must lead to German Idealism.

Schelling

The inclusion of nature

In fact this development began during Kant's lifetime. Johann Gottlieb Fichte (1762–1814) was emphatically persuaded of the fundamental correctness of the Kantian view. Its greatest shortcoming – the assumption of a thing-in-itself – Fichte considered reparable, and his entire system is in effect an attempt to realize Kant's transcendental thought without the ominous thing-in-itself (Fichte Werke: 1:420). Fichte referred to Kant's concept of *transcendental apperception* and from there undertook an *ultimate justification from the I*. For Fichte, the I can in no way be circumvented, because every attempt at a derivation of the I already presupposes the I. In the immediate awareness of the I's self-performing one can find the ground of being which cannot be derived from anywhere else and from which the transcendental philosophy must originate.

This is also true of Fichte's claims about *nature*, for which the perspective of the transcendental philosophy is consistently determinant and, with that, the relation to the I. So, for Fichte there arises from the moral constitution of human beings the *ontological* demand that nature must exist in such a way as to allow for the existence and moral action of the I. It is in this sense that one should understand the famous claim that the world is “nothing more than ... the sensualized material of our duty; this is what is actually real in things, the true elementary material of all appearance” (5:184–5). Significantly, there is from Fichte no monograph on the philosophy of nature. Apparently, there was a plan for such a monograph, but it was never carried out (Widmann 1982: 131). Fichte's “scattered remarks” on nature (Lauth 1984: xvii) were compiled and presented by Reinhard Lauth.

Originally a strong adherent to Fichte's philosophy, Schelling eventually raised fundamental objections against it. Some of these took a polemical form (e.g. Schelling Werke: 7:23), but very soon he emphasized the necessity for a philosophy of nature in its own right and criticized Fichte for having totally failed to provide one.

Chronologically, Schelling (1775–1854) follows Hegel (1770–1831). But from an intellectual-historical standpoint, Schelling is positioned prior to Hegel. The latter's publishing activity begins later, and his writings presupposed Schelling's philosophical perspective.

Above all, Schelling's early work is concerned with nature. The reasons for this are manifold. On the one hand, Kant is a leading figure, and his transcendental interpretation had opened up an entirely new perspective on nature. This is especially true of Kant's “transcendental dialectic” (Jacobs 1998: 69, 77), the *Metaphysical Foundations of Natural Science* (Matsuyama 2000), and the “Critique of Teleological Judgment” (Düsing 1985: 203–7; Franz 1998: 86–8). On the other hand, Fichte's transcendental philosophy was significant for Schelling, though he soon noticed problems with that approach, in particular Fichte's sweeping characterization of nature as a *non-I*: “It is as if Fichte perceived in the external world no differences whatsoever. For him, nature so fades away into the abstract, mere limiting concept <eine bloße Schranke bezeichnenden Begriff> of the non-I, of a completely empty object, ... that he no longer thinks a deduction which extends beyond this concept is necessary” (10:90–1). As can be

seen from Schelling's university notes his path to the transcendental philosophy also proceeded by way of an intensive engagement with Plato's interpretation of nature in the *Timaeus* (1794) (Sandkaulen-Bock: 1990, 19–21; Franz 1998: 60–4; Jantzen 1998: 85–6). Here, what admittedly concerned Schelling was not the thematic of nature but rather the idea of transcendental philosophy: in the “divine understanding” of the demiurge he sees “in nuce already manifest the model of an ‘absolute I,’” and that remarkably “several months before the appearance of Fichte’s programmatic work *On the Concept of a Science of Nature*” (Franz 1998: 63; see also Jantzen 1998: 85–6). Schelling’s philosophical orientation nevertheless went in a completely different direction from that of Fichte. As Wilhelm G. Jacobs has shown, in contrast to Fichte what was of primary interest to Schelling was not Kant’s theory of the transcendental constitution of objects but rather Kant’s problem of the transcendental dialectic: in the product of nature as a conditioned – Spinoza’s *natura naturata* – he saw a reference to the idea of an unconditioned (Wieland 1967: 416), of a divine self-producing nature, thus in the sense of Spinoza’s *natura naturans* (Jacobs 1998: 69, 77), in which nature itself acquires the character of an absolute subject: “Nature considered as a mere product (*natura naturata*) is what we call nature as object (this alone is the object of all empirical investigation). Nature considered as productivity (*natura naturans*) is what we call nature as subject (this alone is the object of all theoretical inquiry)” (3:284) which is, for Fichte, an unthinkable position.

Schelling’s first great work on the philosophy of nature, entitled *Ideas for a Philosophy of Nature*, appeared in 1797 and was followed by additional works on this subject: *On the World-Soul* (1798), *First Draft of a System of the Philosophy of Nature* (1799), *Introduction to the Draft of a System of the Philosophy of Nature* (1799), *Universal Deduction of the Dynamic Processes or of the Categories of Physics* (1800). And even though the philosophy of nature is not implied in the title of Schelling’s *System of Transcendental Idealism* (1800), it is nevertheless a central theme of that work. Additional writings on the philosophy of nature followed, now within the framework of Schelling’s meanwhile conceived “philosophy of identity”: *On the True Concept of the Philosophy of Nature and the Correct Method for Solving its Problems* (1801) and *Presentation of My System of Philosophy* (1801). Additional works which treat extensively of the philosophy of nature include: *Bruno, or On the Divine and Natural Principle of Things* (1802), *Further Presentations from the System of Philosophy* (1802), the essay *On the Relation of Philosophy of Nature to Philosophy, in General* (1802), *System of the Entire Philosophy and of the Philosophy of Nature, in Particular* (1804), *Presentation of the True Relation of the Philosophy of Nature to the Emended Doctrine of Fichte* (1806), *Aphorisms for an Introduction to the Philosophy of Nature* (1806), and *Aphorisms on the Philosophy of Nature* (1806). A subsequent work marks a turning-point, namely, *Philosophical Investigations on the Essence of Human Freedom and its related Objects* (1809), in which Schelling addresses the origin of evil. Nevertheless, the philosophy of nature remains a constitutive part of Schelling’s philosophical framework, as is apparent in the *Private Lectures in Stuttgart* (1810) and in the lectures given in Munich entitled, *On the History of the New Philosophy* (1827).

Admittedly, one cannot speak of a continuity of argument. The dynamic of his

“eruptive thinking” leads Schelling to ever new, “interwoven” schemes (Wieland 1967: 408) to such an extent that it is difficult to claim any one of these works represents the philosophy of nature of Schelling. Thus, it is only in its historical development that an appropriate presentation could be given of Schelling’s philosophy of nature (as is done by Jantzen 1998) – or perhaps not even in this manner (Wieland 1967: 408). Since in the present context describing the historical development is not even remotely possible, another approach must be found. It seems reasonable to orient the presentation in terms of the later statements which Schelling formulated in retrospect of his own development and the continually broadening philosophical horizon, such as those claims advanced in the above mentioned lectures from Stuttgart and Munich. The earlier writings, however, must also be kept in view.

The way out of the absolute

Schelling’s thought systematically takes as its point of departure the question as to *why* nature exists, at all. It is at the same time a question about the *absolute* which preoccupied Schelling throughout his life (Wieland 1967: 419). Birgit Sandkaulen-Bock (1990) has demonstrated in impressive detail how complex and varied the argumentative structure of Schelling’s early thought is. Given the chosen methodological principle, I will instead here consider Schelling’s reflections from the Munich lectures *On the History of the New Philosophy* (1827, published from the hand-written *Nachlass*).

In “complete independence from Fichte” – Schelling is clearly referring to his later positions – it is not the finite, human I which constitutes the original point of departure but rather the “infinite subject” which *qua* infinite “can *never* cease to be subject” (10:99). As *subject*, however, it is “as it were, natural” for it also to “will [itself] as object” (10:99), “for it is only subject *in that* it becomes an object unto itself, since it is assumed there is nothing *external* to it which could become an object for it” (10:101). The subject becomes object for itself and, in so doing, first becomes *something*: this is the *primum Existens*, the first being. It is essential, however, that in its “becoming an object it never ceases to be subject.” For this reason, it must be an “infinite self-positing” (10:101): “Insofar as it is *something*, it is also immediately once more that which goes beyond itself” (10:103). In other words, it posits itself as finite so that, in the continually renewed sublation of the finite, it can grasp itself as *infinite* (10:101–2), so to speak on “a second level or potency” (10:102). Through this *potentizing* <Potenzierung>, it is no longer only subject (A) but rather now *explicitly* determined as *subject*: A *qua* A, or as Schelling characterized it, A² (10:103). The self-finitizing subject posits itself as *something real* in order to know itself in this positing as subject, and this knowledge is itself something *ideal* (10:103–4).

According to Schelling, that “first being” is nothing other than *matter*: “This matter, which itself is only the first existing something, is certainly not *the* matter which we now see before us, the formed, ... already corporeal matter.” On the contrary, it is “the matter of this matter, the matter of that which is already formed and a sensible object of knowledge for us, ... its stuff, its foundation” (10:104) which, as such, can assume a *spatial* form and so is like an “original *filling of space*” (Heckmann 1985: 303). The

ideal which stands opposite this real is fundamentally a “knowing” and is identified by Schelling as *light*, and that apparently because the latter represents the fact that matter can be known. “Compared with matter the light is as nothing and yet it is not nothing; that which, in matter, is as something is, in the light, as nothing; and to that extent it is admittedly also something, yet something different, posited as the pure *ideal*. The light is apparently not matter, to which earlier hypotheses had reduced it.” On the contrary, as ideal the light is “the objectively self-positing” “*concept* of matter” (10:105).

That the infinite subject thus realizes itself in original matter and light is, for Schelling, the rationale for the existence of *nature*. I use this formulation for the time being in order to first characterize Schelling’s line of thought in its context. It is essential for “this philosophy” that it “begins from nature” (10:106–7). The philosophy of nature is accordingly its “first part, or the foundation of the whole.” What also arises from this is the quasi-ambivalent character of nature: more objective in the form of original matter, more subjective in the form of light. Directed against Fichte, the claim is that nature is not merely a non-I, something merely objective, but rather something – such as light – which always also has an ideal, subjective character. “Nowhere, in no sphere is there a merely subjective or a merely objective but rather always the unity of both. . . . Only against a still higher ideal, e.g. against human knowledge, and thus in general only relative, does the light belong respectively to the real world” (10:106). To this extent, this philosophy can be characterized neither as idealism nor as realism but only properly as “real-idealism” (10:107). Both the real and the ideal arise from an *identical* root, namely from that “single ultimate subject” (10:107). So understood, the philosophy of nature, as Schelling himself presents it, evidently amounts to a *philosophy of identity* (10:107).

This position was initially set out in Schelling’s *System of Transcendental Idealism* (1800). The title suggests a proximity to Fichte. However, that absolute subject presented by Schelling is no longer the pure self-consciousness from which Fichte had started but rather an absolute which underlies every conditioned. In this, Schelling’s affinity to Spinoza becomes visible – with the qualification, however, that this absolute is no longer thought Spinozistically as a highest *being* but rather as a *subject*. As finite subjects, we can only have knowledge of this by means of *intellectual intuition*, that is, through an immediate, non-sensible, holistic apprehension of the absolute (of the kind which is imparted paradigmatically by works of *art* (3:625); on the problematic of intellectual intuition, see Wieland 1967: 417–20). And this must take the form of a single *identity* which encompasses the ideal and the real and which lies ahead of each; an identity which Schelling also characterizes as *indifference* because it is neither the one nor the other. For this reason, according to Schelling, the subject never has only an ideal character, but also always has a real character. Similarly, the object never has only a real but also an ideal character: “neither is ever separate, rather they are originally together (also in nature) (4:87; 6:204–10). Conditioned through the identity realized in the absolute, everything is both subject and object, *subject–object*, as it were – though with a preponderance of the subjective in the subjects and a preponderance of the objective in the objects: the subject as subjective subject–object and the object

as objective subject–object. Correspondingly, philosophy must necessarily pursue two opposed directions: as *transcendental philosophy* it commences from the ideal in order to explain the real in terms of it – this is essentially still Fichte’s program. As *philosophy of nature* it commences from the real in order to explain the ideal in terms of it – this is new and contrary to Fichte, who could only shake his head disapprovingly: “Nature is the product of intelligence, so how can it be, without entering an obvious circle, that intelligence is the product of nature?” (Fichte GA: II/5:421–2). Within the framework of the *system of identity* which Schelling developed in the period from 1801 to 1806, both philosophies belong constitutively together. However, in the justificatory essay *On the True Concept of the Philosophy of Nature and the Correct Method for Solving its Problems* (1801) Schelling emphasized the “priority” of the philosophy of nature: “because this first allows for the *standpoint* of idealism to arise and by means of this creates a secure, *pure* theoretical foundation for idealism” (4:92), so that “knowledge ... only proceeds through the gates of the knowledge of nature to the knowledge of the divine principle” (4:424). The philosophy of nature provides something like “a *physical explanation of idealism*. ... Come here to physics and recognize what is true!” (4:76; 3:378) – by “physics” Schelling here means that which he also refers to as “*speculative physics*,” thus philosophy of nature (3:274–82; Wieland 1967: 435–6; Krings 1985; Meyer 1985), or the “depth grammar of nature,” as it were (Kanitschneider 1985: 246). And the system of philosophy should prove “that without the philosophy of nature no philosophy, i.e. knowledge and science of the absolute, obtains at all, and that the former is a necessary and essential part of the latter” (4:424). This is “the only thinkable idealism” which is namely “simultaneously a complete realism” (4:148). Birgit Sandkaulen-Bock has made clear the implicit *aporias* of this position (1990: 95–8).

The fundamental structures of nature

Fichte’s “complete manslaughter of nature” (7:445) is, for Schelling, a philosophically unacceptable defect which the *philosophy of nature* shall now remedy. In his writings, Schelling offers various arguments to explain the *concrete structures* of nature. The aforementioned *doctrine of potency* is, however, a relatively consistent methodological approach. I focus here on the detailed statement offered in the 1801 published work *Presentation of My System of Philosophy* (Werke: Vol. 4.), in which Schelling also continually refers to arguments advanced in the earlier published *System of Transcendental Idealism* (Werke: Vol. 3). A modified version of the potency doctrine can also be found in the *Stuttgart Private Lectures* (1810) (Werke: Vol. 7) and in the *Munich Lectures from 1827* (Werke: Vol. 10).

As already expounded, Schelling argues that the pure subject, symbolized by A, must become objective for itself, symbolized by B, thus in sum $A=B$, though not in the sense of a mathematical equation but rather as the self-objectification of A: “It *wills* itself, and so becomes another, unlike itself” (10:102). Therewith exists a first, original being, an original matter, a subject–object $A=B$, through which A and B appear as *polar forces*: B as an “infinite expansive force,” A as “an opposed, negative impeding force” corresponding to the “limiting activity of the I” (3:441; 4:145–8). These forces

are said to *constitute* matter and thus are not merely properties of matter (Jantzen 1998: 91). The synthesis of both forces should – in contrast to Kant (Matsuyama 2000: 59–62) – be a third, force constitutively combined with matter, namely the *gravitational force* (3:444; 4:145–8), “which expresses nothing other than the infinite striving of nature to return to that absolute identity out of which nature, through the initial rupture, was torn” (4:7). From the threefold nature of these forces Schelling believes he is able to derive the *three-dimensional nature* of matter (3:444–9; modified in 7:447; Ziche 2004).

Schelling explains (4:149–51) that A is first determined as A, as *subjective*, through its opposition to B, and this is symbolized as A^2 . But this subjective being exists on the (A=B)-level of the original matter, as a “subjective-material,” so to speak. This is a (relatively) immaterial being which, as stated earlier, Schelling identifies with *light*. It is, as it were, the representative of absolute identity in reality (“In light, the absolute identity itself arises and in reality,” Werke: 4:163) – or more generally as *form* which as such has an immaterial character. Therewith emerges a new polarity between subjective and objective, namely that of light/form (A^2), on the one hand, and of materiality (A=B), on the other. This new polarity is symbolized by $A^2=(A=B)$; again, this should not be understood as a mathematical equation but rather in terms of the described subject–object-schema. This new subject–object thus represents the combination of materiality and immaterial form, and, according to Schelling, this is – in contrast to the still formless original matter – the formed, different matter. The formation processes of matter thus operate at the level which is determined by $A^2=(A=B)$, which Schelling refers to as the level of *dynamic processes*. Differentiated matter appears at this level and, with that, novel polarities: the inseparable polarity of *magnetism*, the separable polarity of *electrical charges*, and the combination of both – as Schelling suggests – in the *chemical process*. He explains these as polarities in the determination of identity, duplicity and totality. The magnetic, the electrical, and the chemical are thus said to be the three fundamental categories of differentiated, formed matter (10:109) whose dynamic results from the striving for the sublimation of the polar difference: “Nature strives necessarily in dynamic processes toward the absolute indifference” (4:181, italicized in original).

All of this is scarcely comprehensible in the way of argument. Empirically, however, it is not necessarily absurd. In Jena, Schelling had made the acquaintance of the physicist Johann Wilhelm Ritter (1776–1810) and became interested in the latter’s research. Additionally, Schelling’s “dynamic” conception of natural phenomena (Jantzen 1998: 91–2; Matsuyama 2000) received an essential impulse from his studies of the mechanical-atomistic physics of the Swiss natural scientist Georges-Luis Le Sage (1724–1803) (Küppers 1992: 68–73). Beyond that, Schelling was familiar with contemporary empirical research (Wieland 1967: 436; Engelhardt 1985: 40–6). However, Schelling’s attempts to ground this systematically and to interpret it in natural philosophical terms nevertheless come across as improvised and *ad-hoc*.

It is through the relation $A^2=(A=B)$, which is determinant at the dynamic level, that, in Schelling’s terminology, the subjective instance again *as such* becomes concrete in the higher potency A^3 (4:200). This is said to be the *organism* (4:202;

10:110; Frank 1998). The level of *animate nature* is characterized accordingly in the formula $A^3=(A^2=(A=B))$ (4:205). With that, the life-process presupposes the level of the dynamic process ($A^2=(A=B)$) but surpasses it through the efficacy of the organismic principle A^3 , by means of which the organism is essentially *subject*. The pronounced subjective moment prevents the difference which preserves the life process from becoming indifference and thus from coming to rest, as is the case with a dynamic process (such as a chemical reaction) (2:500, 3:150, 322–5). “Matter is thus no longer considered as substance; in fact, the organism does not exist as such through material substance, which continually changes, but rather only through the type or form of its material being – is it an organism. ... For life, it is the *form* which has become essential ..., the preservation of substance in this form, in which it is even the form of existence of a higher potency (A^3)” (10:110; 7:451). Stated in contemporary terms, the organism is a self-preserving and self-organizing system. Indeed, like a stone or a machine, it consists of “normal” matter. However, what is characteristic of an organism is not the elementary lawfulness of matter but rather the *lawfulness of the system*; building on the elementary laws which first become visible at the level of the system, at which point it “emerges.” To this extent, Schelling here has already caught sight of an *emergence-theoretical* perspective. The organism is “the higher potency of the category of interaction” (3:495). Drawing on Kant’s notion of teleological judgment, Schelling thus attributes to the organism *inner* purposiveness (a product in which “everything is reciprocally means and end,” Werke: 3:186). The categories of magnetism, electricity, and the chemical have been determinant for the dynamic process with respect to identity, duplicity, and totality. Now – drawing on the analyses of Albrecht von Haller and Carl Friedrich Kielmeyer (Jantzen 1998: 98) – *sensibility* (organization of the senses), *irritability* (an organism-specific reaction) and *power of reproduction* (self-preservation in a dynamic process) are the analogous determinations for the life-process (e.g. 3:155–240, 3:325, 7:452; Engelhardt 1985: 48–9). Accordingly, “organic nature [is] nothing other than the inorganic repeating itself at a higher potency” (4:4). For Schelling, the plant represents a preliminary stage of life, whereas the animal represents that of a true organism (2:495).

Finally, in the life-process which is characterized by $A^3=(A^2=(A=B))$, the subjective instance A^3 again becomes concrete *as such* and thus appears as a yet higher potency A^4 , which Schelling also characterized as the “absolute A^2 .” The reason for this is that, by comparison, the organic and the inorganic opposed to A^4 have again thereby assumed the fundamental position of B (7:455). This, according to Schelling, is “the point of transfiguration of nature” (7:454): A^4 “is external or *above* nature, but it is nevertheless efficacious *within* nature; it is not cut-off from nature but rather stands in contrast to it as the universal stimulus <Erregende> of nature” (7:455). This is said to be “the birth of man, with which *nature* as such is complete, and a new world – a completely new series of developments – begins,” namely, in the medium of “*knowledge*” (10:112, for more on this see the following subsection, “Potentizing as the Ground for the Gradual Structure of Nature”). At the same time, it is clear that this highest level of subjective potency presupposes all of the lower levels, “for the subsequent moment must always retain the preceding moment as its immediate basis”

(10:113). While knowledge is related to all of its preceding levels, it is at the same time assigned the task of apprehending these and therewith of providing an *explanation* on the basis of transcendental principles. This process of cognition is thus “parallel” to the progressive gradation process of nature: “But the difference is that everything which there is real here proceeds only in the ideal” (10:114).

Corresponding to the trio of polarity, duplicity and totality there is at the spiritual level, and thus for humans, a series of henceforth spiritual potencies. For the *mind*, Schelling mentions: *longing, desire, feeling*; for the *spirit* (in the narrow, personal sense): *egoism, understanding, will*; and for the *soul*, which is understood to be supra-personal and divine: *art, philosophy* (later: *religion*), *morality* (later: *philosophy* – the later structuring is thus equivalent to that of the *absolute spirit* in Hegel). Here, it is worth mentioning that on the basis of these topics Schelling also developed a theory of illnesses and, in particular, of mental illnesses (e.g. “melancholy”) (Engelhardt 1984a).

Schelling’s conception of an original *identity* which both precedes the real and the ideal, alike, and underlies the potency doctrine also implies that *the whole of nature* possesses not only the character of an object but *also the character of a subject*. It is not only *natura naturata*, or nature as product, but also – in opposition to the Cartesian concept of nature – essentially animate, creating nature, *natura naturans*. Schelling took as the title of his 1798 published work on the philosophy of nature a concept from ancient philosophy, namely, that of the *world-soul*. The finite and the infinite are accordingly “united” such that they “constitute only one and the same irresolvable absolute” (2:370, 46–7). The protagonist of the *romantic* philosophy formulated the matter in complete conformity with “*hen kai pan*” (oneness of all), the motto of the three friends – Schelling, Hegel, Hölderlin – studying in the Tübingen Stift: “the whole of nature [is] connected to a universal organism,” and in “that being, which the most ancient philosophy [had considered] the *common soul of nature*” (2:569) Schelling saw the “world-soul” (2:369). Nature is thus also an appearance of the absolute; matter is “nothing other than the unconscious part of God” (7:435), “the *extinguished spirit*,” as it were (3:182; 453), “the embodiment of divine forces and the first image of the universe” (7:210); nature in its entirety is “the visible spirit,” and spirit conversely is “the invisible nature” (2:56). It is clear that in this idealistically turned Spinozism – Leibniz is also repeatedly mentioned in this context (e.g. at 2:20; see also Holz 1984; Matsuyama 2000: 65–8) – there lies the decisive difference between Schelling’s and Fichte’s understanding of the absolute as I (instructive on this point is Sandkaulen-Bock 1990).

Spirit at last arrives at the knowledge that the entirety of nature is the work of that self-recognizing “one subjectivity” which precedes everything. It comes to realize that it therefore only understands nature as something *external* to itself because nature – although a product of subjectivity – is produced *unconsciously*, not consciously and deliberately: *that* would be an absurd “subjective idealism” à la Fichte, for even “the most thoroughgoing idealist cannot avoid thinking of the I, concerning its ideas of the external world, as something *dependent*” (10:92; 7:445). Thus, the productive activity of the I can only “be a blind productive activity which is grounded not in the *will* but rather in the *nature* of the I.” Philosophy must therefore “assume a region beyond

that of the *now existing* consciousness and an activity which itself no longer comes directly to consciousness but rather only through its result." This then "is just the external world of which the I can become conscious, not as something which it has itself produced but rather as something which exists simultaneous with it." It is in this sense that Schelling speaks of "the history of self-consciousness" (4:78) and of "the *transcendental past* (*italics added*) which precedes *real*, or empirical, consciousness" (10:93). Thus understood, nature is, "as it were, a fossilized intelligence" (4:77) which is then reconstructed in the consciousness of the philosopher (Wieland 1967: 421–6; Krings 1985: 116).

Potentizing as the ground for the gradual structure of nature

In the potency doctrine, the fundamental ideas of Schelling's philosophy of nature are contained, as it were, *in nuce*. The "potentizing" is supposed to ground the gradual construction of nature – though admittedly not as an evolutionary process (Jantzen 1998: 101). Its principle is as follows: "that which was posited subjectively on a previous level itself always becomes objective on the subsequent level" (10:108).

The elementary contrast between subject and object thereby forms the *original duality*, i.e. the original identity experiences a rupture which strives for a sublation and a return to identity. Duality is accordingly "*the condition of all formation*" (3:299), the ground of all activity (3:325), its goal is the return to identity. Thus, identity and duality form the basic structure of natural phenomena. With this, Schelling has in mind a kind of *dialectic of nature* which results from the potency doctrine and which makes comprehensible the gradual structure of nature. Every level arises from the opposition between the subjective and the objective. However, in this opposition the subject is again posited *as such*, i.e. it is reflected in itself and, through this "potentizing," again generates a higher level.

The potentizing thus appears as a *heightening*, mediated by the objectification of the subjective moment of a level which in this way becomes increasingly explicit. It is the process of the self-objectification of the subjective which generates these levels and repeats itself at each one. At the lowest level of matter, the subjective is still obscure. At the level of the dynamic process, it appears as light. In the organism, it is the active, self-preserving universal of its species. And as spirit it is the subjective itself as such, admittedly also here in its opposition to the objective world – from this perspective, it is nature. Accordingly, spirit and nature belong substantially together. Nature appears as de-potentized spirit, and spirit as potentized nature. Moreover, for spirit as the highest level, all of the preceding lower levels remain presupposed.

With what right can Schelling claim that the spirit (A⁴) which follows upon the organic level is the *highest*? How does this form the *conclusion* of the process of potentizing? Why is the *process of nature* completed in this way? Schelling explains it is brought to conclusion in that "intelligence is compelled [here] to intuit itself as identical with itself" (3:497), and thus the subject in potency A⁴ to material being has "still only an *ideal* relation" (10:112; 7:455), "thus [is] *pure* knowing, i.e. pure spirit, ... *because* it already has the entire being outside of itself, for *in itself* it is not another but

is rather the same subject which in its first and immediate activity became matter, and then in a higher potency appears as light, and in a still higher one as the principle of life" (10:113). The goal and culmination of this movement is thus "the most perfect object." Its perfection arises from the fact that the subject has finally become wholly objective: the "subject posited as such" is "that which is no longer *able* to become objective (because all forms are realized)." "The subject has the necessary tendency toward the objective, and in this it exhausts itself" (10:108).

Admittedly, this argument that already "all forms are realized" (10:108) actually explains nothing, for it is only the repeating of the claim in a different form. Now, the potentizing of the organic process means that the active, animate principle of the organism, and thus its subjectivity *as such*, becomes objective. Assuming that this is an *ideal*, the sphere of materiality is in fact left behind. Here, one can think of the emerging dominance of the principle of form, biologically of the universal of species, and thus of the system-lawfulness as such which Schelling has in view when he emphasizes the independence of constantly changing matter (10:110; 7:451). However, that is conceived more *intuitively* through the *experience* of the organism and is not actually "deduced."

Criticism

This is in general characteristic of Schelling's procedure. He draws upon a powerful intuition. Providing a thorough and systematic explanation of this intuition, however, is not one of Schelling's proper strengths. Rather, Schelling too easily succumbs to the tendency to rashly appropriate the empirical data of contemporary natural scientific research for philosophical purposes (Meyer 1985: 136–7; Mutschler 1990: 93–108), and this occasionally leads him to adventurous interpretations. That "electricity never becomes active without having been created through either rubbing or some other cause of asymmetrical heating" (2:476); that "the general tendency of chemical processes" is "to transform all matter into water" (4:196; italicized in the original); that "water [is] *completely de-potentized iron*" (4:197); that plants and animals are opposing poles among which gravitational force appears (4:202): these are but a few of the various examples of nonsense in Schelling's writings on the philosophy of nature.

In contrast to this, his great achievement lies in his overcoming of Fichte's *subjective* idealism. The philosophy of nature confronts the transcendental philosophy on equal footing. Nature is recognized as existing in its own right, and, with that, Fichte's absurd asymmetry between the I and nature is rectified. Correspondingly, for Schelling, nature and spirit are ultimately "not two distinct worlds but rather only *one* and the same" (4:102; 6:204–8). This is intuitively much more plausible than the pre-eminence which Fichte accords to the I.

Philosophically, however, *reasons* are also required. Schelling seeks to develop a concept of nature which has as its ground the absolute. This he determines as an original *identity* – or also as an indifference – of subject and object which externalizes itself into the duality of subject and object, though only insofar as both are *likewise* subject and object, thus *subject-object*, with a mere excess of either the subjective

or the objective. The fundamental problem with this construction is this: why does absolute identity *externalize* itself, at all? Why does it not simply remain as identity? (Küppers 1992: 50).

Now, as Hegel stated in his early essay *On the Difference Between the Systems of Philosophy of Fichte and Schelling* (1801), the whole is “represented as a self-construction of the absolute” (Hegel Werke: 2.111). The process of self-externalization must accordingly proceed from the absolute itself. Schelling takes this into account when, as we saw earlier, he retrospectively presents his own argument in the Munich lectures (1827): the absolute is essentially *subject*. In order to grasp itself as *subject*, however, it is “as it were natural” that it also “will itself as object” (10:381), “for only *in this* is it subject, that it becomes an object unto itself, since it is presupposed that there is nothing *external* to it which could become an object for it” (10:383). Schelling thus seeks to explain the externalization of the absolute by attributing to it a *subjective character*.

This admittedly raises questions: the pretended absolute *identity* of subject and object ultimately appears again as *subject*. On the one hand, this is so because the absolute – in true Fichtean form – can only be thought as *self-positing*. This is a constitutive condition of its absoluteness, and in this manner Spinoza’s error of a dogmatically claimed absolute *being* is avoided. On the other hand, it is *qua* subjective character that the movement of the absolute out of itself becomes conceivable. This recourse to subjectivity means that difference is always already implicitly put into the purported identity (Lauth 1984: 224) and thus that the basic approach of the philosophy of identity cannot be maintained. Instead, it again veers off in a Fichtean direction whereby the subject is understood Spinozistically as a divine unconditioned. The evidence of self-certainty is only available to the individual I, which, as Schelling is convinced, is an instance of the absolute, and so does not come into question, anyway. A supra-individual, truly absolute subject, however, has a *hypothetical* character and thus needs its own justification. Schelling does not provide this but rather, as Hegel criticizes in the *Phenomenology of Spirit* (though admittedly without mentioning Schelling’s name), “begins with absolute knowing like the shot out of a pistol” (Hegel Werke: 3.31).

With regard to the status of the absolute, Schelling waives till the end. Insofar as in his later philosophy he considered it discursively incomprehensible (Burbidge 1984), Schelling approaches the “critique of reason” endorsed by his contemporary, Friedrich Heinrich Jacobi (1743–1819) (Sandkaulen-Bock 1990: e.g. 34–7, 40–3, 178–9). Schelling’s construction of the absolute, which is supposed to underwrite the entire approach of the philosophy of nature, is very much up in the air with regard to its theoretical justification. What Schelling has provided is a wealth of ingeniously conceived ideas; inspiring, often even plausible, visions on which natural philosophical reflection and systematic philosophical thinking can work further.

Schelling’s reflections in *On the Essence of Human Freedom* (1809) are interesting with regard to the increasingly problematic relation between humans and nature. This work, which does not have the philosophy of nature as its object in a narrow sense, thematizes the *self-empowerment* of the human being, which accompanies his coming to conscious awareness and thus also his emancipation from nature. Although itself a

child of nature, a human being can disentangle itself from, oppose, and deform nature (see Wandschneider 2005a: 206–12). Schelling sees that human freedom inevitably brings with it the possibility of *evil* in the world (Schulz 1975b: 333–5). One could take Schelling to have in mind the arrogance of technologies hostile to nature when he speaks of “the hunger of egoism” in which “it renounces the whole and the unity” (7:390) and which “denies the bonds characteristic of finite creatures, and on account of pride in being everything plunges into nothingness” (7:391). With that, the eco-ethical side of the human relation to nature is in principle already addressed (Schmied-Kowarzik 1985).

The fact that Schelling was obviously not pleased with the recourse to an absolute *subject* is evident in, on the one hand, the admittedly ineffectual recourse to an “identity” which underlies subject and object and, on the other hand, the incidental reference to *reason* as absolute instance. This is evident in the text *System of the Entire Philosophy and of the Philosophy of Nature, In Particular* (1804): “Reason, as reason, . . . is the absolute identity of all the effects of God, just as the absolute universe itself” (6:207; italicized in the original). And: “Incidentally, by no means do I here understand reason as that which merely expresses itself in human beings but rather reason, insofar as it is universally distributed, as the true essence, which is the substance of everything and which inhabits the entire universe” (6:208) – a reprise, as it were, of the Kantian hypothesis of a *supersensory substratum of nature*. It was not until his *later philosophy* that Schelling tried to thematize the problem of reason in a fundamental way, to solve it by means of the dual conception of “negative” and “positive” philosophy, and, as it were, to think above and beyond reason (instructive on this point is Schulz 1954a: 242–50; 1954b: 344–7; 1975a: Chs 3–4; Burbidge 1984). It is precisely this which *Hegel* considered to be impossible. For him, reason alone can be the true essence of the universe and simultaneously the uncircumventable foundation on which a philosophical system can be established.

Hegel

Georg Wilhelm Friedrich Hegel (1770–1831), a colleague of Schelling’s from the *Tübingen Stift*, initially considered himself a comrade of Schelling. In his first great philosophical publication, *On the Difference between Fichte’s and Schelling’s Systems of Philosophy* (1801), Hegel followed Schelling’s philosophical project, which he opposed to Fichte’s philosophy. However, during their subsequent years together in Jena, Hegel gradually developed his own position. The culmination of this development was the *Phenomenology of Spirit* (1807), which led to a separation from, and ultimately a break with, Schelling. The philosophical approach advanced in the *Phenomenology* was developed further and presented systematically in Hegel’s *Encyclopedia of the Philosophical Sciences* (1817). In what follows, I take the completed version of the “Encyclopedia” from 1830 as the basis for my exposition.

After Hegel’s death in 1831, and in view of the triumphant ascendancy of the empirical sciences and their related technologies, the fascination with Hegel’s

philosophy subsided. It was not until eighty years later, at the beginning of the twentieth century, that Hegel's philosophy was, as it were, rediscovered – sure enough with the exception of Hegel's philosophy of nature. The “Hegel renaissance” of that day was primarily oriented toward the humanities and thus appeared to confirm a common preconception according to which Hegel was not only far removed from the natural sciences but actually usurping them on account of “systematic constraints.” The number of damning verdicts is legion. Even such a sympathetic interpreter of Hegel as Heinrich Scholz could ultimately find in Hegel's philosophy of nature reason to believe that “a great mind, when it errs, is not content with small errors.” “The Hegelian philosophy of nature is an experiment, which, instead of advancing the philosophy of nature, set it back by hundreds of years and reduced it to the level it possessed during the time of Paracelsus . . . Hegel's philosophy of nature merely plays with concepts and will never again be taken seriously” (Scholz 1921: 38). Ernst Cassirer reached a similar conclusion (III: 374–7). And in Charles Taylor's enormous monograph on Hegel (1983) barely 17 of the total 749 pages are devoted to the philosophy of nature.

Hegel's philosophy of nature has thus fallen almost entirely out of view. Michael John Petry noted that “until 1970 . . . there was hardly anyone among the Hegelians, let alone among the philosophers of science, who was prepared to recognize Hegel's philosophy of nature as an area of research worth taking seriously” (Petry 1981: 618).

This decidedly negative evaluation gradually began to change with the appearance of Petry's English translation of the Hegelian *Philosophy of Nature* in 1970, together with a detailed commentary which elucidated the significance of this part of Hegel's system for an understanding of his entire philosophy (Petry 1970). With that the ice was broken, and the way was cleared for an intense reception of Hegel's philosophy of nature (documented in Neuser 1987b; Petry 1988). After the rediscovery of Hegel's philosophy of spirit at the beginning of the century, his philosophy of nature was – with half-a-century's delay – similarly received (e.g. Buchdahl 1973). Decisive for this were the detailed scientific-historical investigations by Dietrich von Engelhardt on the intellectual context around 1800 (Engelhardt 1972, 1976), as well as the continuing efforts of Michael J. Petry (e.g. 1981, 1987, 1993b, 2004) and many others after him. A further important contribution in this area was the publication of various discovered transcripts of Hegel's lectures on the philosophy of nature (e.g. Hegel 1980, 2000). The transcripts made possible a comparison of variants such that the meanings of opaque passages – of which there is in the *Philosophy of Nature* no shortage – could often be deciphered more easily.

Thanks to such intensive efforts in research on the primary sources, the negative image of Hegel as a philosopher of spirit, removed from the natural sciences and subordinating empirical facts to the constraints of his own system, must today be recognized as wholly inappropriate. Hegel was continually occupied with physics, chemistry, geology, biology and mathematics, as is evidenced, among other things, by the numerous relevant works utilized by him and retained in his library (Bronger 1993; Mense 1993; Neuser 1987a, 2000: 199–205; Petry 1993a). Vittorio Hösle remarked that Hegel is “surely the last thinker who surveyed all of the sciences of his day which

fell outside the purview of philosophy – certainly and especially the natural sciences” (Hösle 1987b: 279). On the other hand, there is without doubt in Hegel a certain carelessness in his engagement with the already exuberant empiricism of his day, whereby he succumbed not infrequently to attempts at hasty systematizations.

Nevertheless, Hegel’s philosophy of nature is, in my eyes, of paramount importance. His version of an *objective idealism* – the philosophical counterpart to Cartesianism, so to speak – leads to a formidable and explanatorily powerful concept of nature. In order to explain this, it is first necessary to sketch briefly the place of nature in the Hegelian system (here, see Hösle 1987b: Ch. 5; Wandschneider 1985, 1987b, 1990).

The place of nature in Hegel’s overall system

In contrast to Schelling’s continual reformulation of his philosophy, Hegel’s philosophical conception forms a consistent, reasoned system, at least with respect to its construction. It is divided into *Logic*, *Philosophy of Nature* and *Philosophy of Spirit*. These parts are related essentially to one another and so constitute a systematic unity. *Logic* – understood as a *fundamental* logic and not as a special calculus construct – forms the uncircumventable foundation. Stated briefly, logic is incircumventable because the refutation of such a fundamental logic would itself require an appeal to *logic*, and thus appeal precisely to that whose refutation is sought. Every such attempt thus ends in a sublation of itself. This argument is familiar from recent discussions concerning “ultimate justification” and, since antiquity, has occupied a place in the repertoire of responses to skepticism. It is in this sense – briefly explained – that Hegel conceives of logic as *absolute*, as an ideal with absolute character, or, in Hegel’s idiom, as the *absolute idea*. By this is meant the *totality* of the logical, which, since it encompasses the entirety of logic, must also include its justification and so must be conceived as *self-justifying*. Self-justification means that a *cyclical* structure of justification is operative (Rockmore 1993). Normally, a circular justification is to be avoided, on the grounds that circular reasoning cannot serve as an explanation. However, with regard to the borderline case of logic *in its entirety* this circle cannot be avoided. It is a *necessary circle* to which *qua* circle admittedly belongs not a *justifying* but rather an *explicative* character, in the sense that traversing this circle makes the internal structure of logic visible and rationally comprehensible (Wandschneider 2005b).

In the consummation of logic in the absolute idea, says Hegel, *nature* is represented as having been posited therewith, such that the idea which is consummated in itself “*decides* itself in the absolute truth of itself, ... the *immediate idea* as its reflection, freely *discharging* itself out of itself as *nature*” (8.393). Hegel’s statements on this point could not be more meager. It is therefore no surprise that Hegel’s purported transition from logic to nature has been a subject of controversy from Schelling to the present (e.g. Volkmann-Schluck 1964; Brinkmann 1976; Falkenburg 1987: Ch. 1, §2; Wandschneider 1990b; Drees 1993) – even more so since the transition is accorded a key role in Hegel’s overall project. What is decisive here is the extent to which nature is still capable of being established on the basis of logic and, in this sense, *idealistically*.

Here, I would like to make do with an argument from plausibility: insofar as logic ultimately determines itself as *absolute* idea and thus, as it were, as the *self-supporting, self-justifying* system of the logically ideal in its entirety, it is thereby implied that logic is *not* determined through something which is not ideal. In other words, in the determining of an unconditioned ideal there is simultaneously a negative referring back to a *non-ideal*. In this respect, ideal and non-ideal belong logically together. Insofar as the system of logic completes itself, insofar as it determines itself as absolute and thus as ideal, it simultaneously reveals itself as non-ideal, as non-absolute. With this interpretation, that obscure dictum of Hegel concerning the self-externalization of the absolute idea into nature acquires – in the form of a *dialectic of consummation*, as one might call it – a comprehensible meaning (Wandschneider 1985, 1990a, 1992).

But what is the *non-ideal*? If the principal feature of the *ideal*, understood as the “absolute idea,” is to be seen in continuous logical mediation, i.e. in a logical-conceptual coherence (e.g. 6.572, 8.§237, and *zusatz* 8.§§242–3), then the non-ideal must be characterized through a “sublation of the mediation” (6.572), i.e. through individuation, or as Hegel also said, *being-apart* < *Außereinandersein* > or *externality*, as it appears empirically in the spatial-temporal structure of *nature*. Insofar as the logical realizes and consummates itself as absolute idea, it must – just as much for logical reasons – come out of itself and posit itself as *externality*, as nature. The unavoidable question which essentially remains open in Spinoza and Leibniz, and as seen earlier, also in Fichte and Schelling, is *why* an absolute should go out of itself, at all, and externalize itself into the finitude of nature. Within the framework of the Hegelian system, this question finds an answer which is derived from the concept of the absolute itself: it is, as it were, the philosophical “proof . . . that nature exists necessarily,” as Hegel himself formulated it (9.10 *zusatz*). As far as I can see, Hegel’s philosophy is the only one which undertakes a *rational justification* for the existence of nature. It is therefore of particular interest for those interested in appropriating the available intellectual efforts of the past for the project of renewing the philosophy of nature. Those concrete consequences which arise from Hegel’s concept of nature must now be considered in greater detail.

Hegel’s objective-idealistic concept of nature

The logical justification which Hegel asserts is *logic itself*. With that – and in contrast to Cartesian self-certainty – Hegel utilizes not only a subjective, private authority but the objectively binding validity of logic. The Hegelian form of idealism is accordingly an *objective idealism* which differs fundamentally from other types of idealistic systems which take as their justificatory basis either self-certainty (Descartes), individual perception (Berkeley), the subject (Kant), the I (Fichte), or a hypothetical “absolute identity” (Schelling) (see also Solomon 1974; cf. Maker 1998). As seen earlier, the defect of these approaches consists in the fact that the underlying principle either is only asserted but not demonstrated; or it has ultimately a subjectively certain character and is thus not objectively binding: the typical deficiency of every *subjective idealism*. In contrast, only that which itself has a *logical* status can be capable of being

justified – and this is a condition which, because it takes logic as its basis, Hegel's *objective idealism* fulfills.

As described, Hegel's concept of nature permits an answer to the question of the *existence* of nature: in the absoluteness of the logical ideal, the *non-ideal*, nature, is simultaneously posited therewith. Here, "posited therewith" means that what is attributed to nature is *not unconditioned* but rather derived existence: the non-ideal presupposes the ideal, and, admittedly, the ideal conversely does not exist without the non-ideal. With Hegel, it becomes possible to develop the view according to which nature is understood as the, as it were, *eternally attending phenomenon* of the ideal. Leibniz designated as the fundamental problem of metaphysics the question: "Why is there something rather than nothing?" Hegel's reply is: to the ideal, because it is unconditioned, belongs necessary existence and, with that, then also to the non-ideal, nature, as the eternally attending phenomenon of the ideal.

From the concept of nature characterized above there arises a fundamental *ambivalence* in the existence of nature: it is a non-ideal which however, as non-ideal, remains tied to the ideal. In other words, in its appearance nature is a non-ideal which nevertheless takes as its essential basis the ideal. What Kant in the *Critique of Judgment* tentatively assumed and then admittedly discarded, namely, the idea of a *supersensory substratum* of nature as its underlying reason, is here declared as the *essence* of nature. Hegel formulates this point as follows: nature is "the idea in the form of *other-being*" (9.24). It is certainly "in itself the idea" (9.25), i.e. its *essence* is the "inner idea which constitutes the ground of nature" (9.31); however, it *appears* as a not-ideal (Wahsner 1996: Ch. 1, §1; Neuser 2004). In nature, essence and appearance fall apart.

The thought of an ideal underlying nature may at first appear outlandish. There is, however, good reason for this idea in view of the *law-like* character of nature. For the natural law which governs a stone is, for its part, not a stone. The law of electromagnetism is not itself electromagnetic. The law-like regularity of nature is, for its part, not a real natural object or a natural process but rather something akin to a *logic* underlying natural being. One cannot abut against a law-like regularity, as if against a stone, but one can conceive of such a regularity and formulate it mathematically. Science aims at nothing other than the acquisition of this logic of nature (Wahsner and Borzeszkowski 2004; critically, Wetzel 2004: 18). To this extent, science, though admittedly without reflecting on it, has fundamentally an objective-idealistic concept of nature. In fact, it is this which uniquely allows one to explain how natural phenomena are determined by natural laws which serve as their underlying logic; how natural reality "is in itself law-like" (3.121–2).

This being the case, it then becomes understandable how it is that nature is *knowable*: if thought and existence – in roughly Descartes' sense – belonged to separate worlds; if nature was thus utterly foreign to thought; then nature would not be accessible to thought, and knowledge of nature would be impossible. If, however, the existence of nature in its *essence* is logical, then the logical no longer belongs exclusively to thought; rather, there is from the outset an affinity between thought and nature. Thus the question as to how natural being can be known, i.e. can be taken

up into thought, contains no *aporia* for such an account (critically, Onnasch 2004). Ultimately, the foundation for a consistent epistemology can only be an idealistic ontology of nature.

Furthermore, if the ideal is characterized in terms of its conceptual coherence, then nature, as the non-ideal, is determined as *being-apart*, as *externality* and, with that – and in contrast to the logical necessity of the conceptual – through something which is in principle *contingent* (Webb 1980). Externality is the way in which the existence of nature *appears*; however, its underlying *essence* is the logical-ideal through which it remains implicitly determined. This *discrepancy* between appearance and essence is, according to Hegel, characteristic of the existence of nature.

The *tension* which is thus contained in the existence of nature is said, following Hegel, to express itself in the tendency to overcome the discrepancy, i.e. to assimilate the appearance to the underlying ideal essence. Nature exhibits, as it were, a trend towards coherence, towards the sublation of *being-apart*, right up to the *ideality* of its underlying logic: as a *telos* which is immanent to nature and yet admittedly never obtainable for it.

Here and in what follows it is important to bear in mind that Hegel certainly does not understand this “trend” in the sense of a real *natural process* but rather as something “*categorical*,” i.e. as a main feature of the *conceptual* development, not of nature but rather of the *categories* of nature. Thus, what is meant is *natural philosophical reasoning* and not a spatial-temporal evolutionary process, the assumption of which Hegel repudiates (although there are good – and thoroughly Hegelian – reasons for the latter; see “The Philosophy of the Organic,” in this section, below).

Space and time – motion and mass

The first determination of nature in Hegel’s sense is the pure, still fully undetermined *being-apart*. Here, one can already see the immanent tendency of nature to sublimate itself and to form coherent structures, i.e. the category of *being-apart* requires further categories for its implementation, which includes an increase in structure. Hegel’s reasoning for the development of the categories of *being-apart* is admittedly barely conceivable and thus, to a considerable extent, in need of clarification. I have provided an interpretation of these issues elsewhere (Wandschneider 1982, 2009: Ch. 4, §1). Here, I restrict myself to the task of making visible Hegel’s intention with regard to this matter.

In accordance with the law of dialectic, there belongs to the category of *being-apart* also that of the *not-being-apart*, the latter understood as the determinate negation of *being-apart*. This is the category of the point. The unfolding of this dialectic proceeds via the determinations of lines and surfaces, and ultimately to those of a spatial element, i.e. a space which is limited by surfaces. Hegel sees in this three-tiered development a consequence of logic which underlies nature, in particular the three “conceptual moments” of singularity, particularity, and universality. Therein lies simultaneously an argument for the three-dimensional nature of space, which would thus provide an *a priori* explanation. Philosophically, this claim is certainly inevitable. For

all *empirical* arguments for the three-dimensional nature of space ultimately amount to a *petitio principii*, insofar as an empirical natural being is always already structured three-dimensionally. An example for many is Peter Janich's idea that grinding real bodies shows "that only three planes can be cut pair-wise rectangularly" (Janich 1989: 219). Kant, on the other hand, assumes that an *a priori* spatial structure is *given a priori* (KVR: A25, B40–1) without accounting for this argumentatively. To this extent, Hegel's conceptual development – which admittedly remains to be worked out in detail (Halper 1998) – represents, from the standpoint of theoretical justification, a significant *novum* with respect to the philosophy of nature.

Hegel's reasoning leads further to the category of *time* and its characteristic structure of past, present, and future: the spatial element is determined by boundaries. Now, the boundary itself is nothing other than the point of *transition* from one space to another, thus the ending and new beginning of space. It is without extension but is yet not nothing: something *occurs*, namely the *passing* from the one into the other, and that is only possible in the temporal ordering of *succession* and not in spatial juxtaposition. Correctly understood, the boundary is not only a spatial position but more properly also an *event*: a process having a *temporal* sense (discussed in detail in Wandschneider 1982: Ch. 3). "The existence of this continuous self-sublation" is, according to Hegel, time (9.48 *zusatz*; Richli 2002).

Already, this line of reasoning makes clear how *relations of coherence*, in the sense of the spatial-temporal structure of natural beings, are derivable from the assumption of a completely amorphous *being-apart*. This affects, first, the dimensional relations of space and time and, second, the essential togetherness of space and time (Inwood 1987).

Involved with the categories of space and time are, according to Hegel, the categories of *motion*, *rest* and – at first perhaps somewhat surprisingly – *mass*. Here I also provide only a brief summary of Hegel's reasoning (see 9.§261), or more precisely a reconstructive interpretation of it (Wandschneider 1982: Ch. 6; also 1987, 1990a).

The *explication* of the – at first only inner – togetherness of space and time necessitates, according to Hegel, the introduction of the category of *motion*. Now, motion is only meaningful relative to something which is not in motion, i.e. the category of motion always implies the category of *rest* (on Hegel's concept of motion, see Wandschneider 1982: Ch. 4; Ihmig 1989: Ch. 4; on the *dialectic* of this concept, see De Laurentiis 2004). Only that can be at rest whose identity is preserved in motion and which defines through this a *determinate, single place* as the instance of reference of the motion. According to Hegel, such a *singular* thing whose *identity* is *preserved* in motion is *mass* (9.§261). However, insofar as mass is singular, there can be in principle many instances of mass (Wandschneider 1982: 210; Février 2000: 156), which are *distinct* from one another and yet as individuals are *also similar*. This tension, which is contained intrinsically in matter, is said to express itself as *gravitational force*, i.e. as the striving of instances of mass to each other; that is, as the tendency to sublimate their heterogeneity (9.§262; Winfield 1998).

The category of mass is thus implied through the "logic" of the concept of motion: that is, as an identity-preserving individual through which first and foremost "place"

is realized, in the sense of an instance of reference which is necessary for motion and which as such represents non-motion, or “rest.” One mass can itself naturally also be moved relative to another mass. In this case, the relation of motion is symmetrical: each of the two masses can equally be considered as either at rest or in motion (Hegel JEN: 258–9, 361). In fact, Hegel thereby formulates a *principle of relativity of motion*, which in this form implies: *motion of mass is equivalent with relative motion*.

Relative motion and the absoluteness of the motion of light

This relationship has – independently of Hegel – the notable consequence that the movement of a *non-mass* is a *non-relative movement*: *qua* movement it is certainly related to a mass, but *qua* non-relative it is independent of the particular instance of reference and so is related to *every* mass in the *same* way. In other words: a non-relative motion has the *same* velocity in relation to *all* masses. Moreover, such a non-mass – in accordance with its concept – cannot be in a state of rest but rather can *only be in motion* – a very peculiar phenomenon which in point of fact has been realized empirically in the form of the motion of light.

But how should one understand the concept of a non-mass? Hegel asserted that in nature there must be something which is identified with *light* and to which is attributed the *absolute* (and thus non-relative) character of the movement of light (9.111–12 *zusatz*). As mentioned, empirically, this applies to light, a fact which led Einstein to the development of the (“special”) theory of relativity. Naturally, it would be absurd to say that Hegel had anticipated Einstein’s theory, for the latter is above all a complex *mathematical* theory whose real value consists in its demonstration of the compatibility of relative and non-relative motion. Nevertheless, following Hegel, the elementary idea is in point of fact derivable from the “logic of the concept of motion.” In this regard, John N. Findlay was not wrong when he claimed there is “a flavour of relativity-physics in some of the things Hegel says about Light” (Findlay 1964: 279). In point of fact, the interpretation of Hegel developed here admits the possibility of a *natural philosophical explanation* of the relation between relative and absolute motion: *the relativity of bodily motion and the non-relativity of non-bodily motion are accordingly expressions of two strictly opposed forms of matter – body and light – which, according to Hegel, are derivable from the “logic” of the concepts of motion and matter*. The philosophical interpretation of the principle of relativity offered here yields a necessary and non-trivial consequence: namely, that not only does a non-relative motion not contradict the principle of the relativity of motion, it is actually implicated in that principle. This may be conceived as a fundamental natural philosophical insight (discussed in detail in Wandschneider 2009: Ch. 4, §9).

Here, striking *possibilities for the updating* of an Hegelian natural philosophical line of reasoning become visible in the sense of a *philosophy of modern physics*: the thought developed here should be understood as a contribution to the philosophical exploration of the theory of relativity, the likes of which was not achieved in the exceedingly sophisticated investigations of Ernst Cassirer (1972) and Hans Reichenbach (1924, 1928).

Light already belongs under the second heading in the Hegelian *Philosophy of Nature*. The first part, entitled “Mechanics,” takes as its object the material existence of nature and does so without further qualification. The second part, which Hegel designates as “Physics,” thematizes the different qualitative determinations of matter and begins with light (9.§275; Falkenburg 1993) – whereby Hegel’s interpretation is manifestly tied to the thoughts of the early Schelling (see Schelling Werke: 4:162–6, 169, 174; vol. 7, 358). Additional consideration is given also to other physical issues, such as the (classical) elements of cohesion, caloric, electricity, magnetism, and chemical phenomena (on Hegel’s account of chemistry, see Engelhardt 1976, 1984b, 1993; Burbidge 1993, 1996, 2001). The assertions of this chapter – being to a certain extent empirically oriented and thus related to the state of the just emerging natural science of that time – are often reflective of an earlier period and consequently have been surpassed to a considerable extent. Polemics against Hegel’s *Philosophy of Nature* were drawn significantly from this second part. For the philosophy of nature, however, the fundamental idea underlying this chapter is still of significance: namely, that the qualitative material determinations – e.g. from acid and base in chemistry – are mutually related to one another and in their qualitative existence consist only in this intrinsic *relationality* (9.§112, §274 *zusatz*).

Philosophy of the organic

Deserving of particular interest is the *third part* of the Hegelian *Naturphilosophie*, the subject of which is the philosophy of the *organic* (Ilting 1987; Brinkmann 1996; Neuser 2000b; Frigo 2001; Bach 2004; Breidbach 2004). What is characteristic of organisms, according to Hegel, is that they possess *subject character* <Subjektcharakter> (9.337, 339–42 *zusatz*), and for Hegel that means: the structure of a *concept* (339 *zusatz*). The earthworm is, so to speak, a concept which works its way through the soil! Decisive for this view is the fact that the organism shows itself to be *self-preserving* in the sense that it automatically seeks to preserve itself in its specific nature, i.e. in the *universality of its species*. The life process of a fly is at the same time a continuous striving towards the preservation of the “fly-like characteristics” which it realizes, simply because the organism, according to Hegel, is intrinsically a universal which strives to preserve its identity in its specifications – and this, for Hegel, is clear evidence of a *teleologically* structured nature (Dahlstrom 1998). Therewith, the fly is in point of fact something like a concept which has become acting, hence a *subject*. The concept, which according to the objective-idealistic view underlies the entirety of nature, itself appears in the organism in, as it were, a physical form: “What heretofore was only our cognition has now entered into existence” (340 *zusatz*). “Here, nature has thus achieved the existence of a concept” (336 *zusatz*); “life is the concept which has come to its manifestation” (37 *zusatz*).

Here, one must ask to what extent this “speculative” view admits of *empirical conditions of realization*. Today, a categorical answer is possible within the framework of *systems theory*. According to W. Ross Ashby, one of the early protagonists of cybernetics, an organism can only be a self-preserving system insofar as it, howsoever,

contains a control agent which controls and regulates the system's functioning in terms of self-preservation. It is, as it were, a representation of itself, a *self-agent-instance*. Accordingly, organic self-preservation should in principle be understood in the sense that the self-regulation of the system is steered by the *set points of the system existence itself*, and thus by the constitutive physiological parameters of the system: such a system strives to preserve its own existence (Ashby 1966: esp. Chs 7 and 9). In this way, Hegel's account of the organism as an existing concept can be reconstrued in terms of systems theory.

With regard to the claimed tendency towards coherence and idealization which Hegel attributes to nature, the organism is evidently the most advanced. Now, can this be understood as the result of an *evolution of nature*? According to Hegel, nature in general is "to be considered as a *system of levels*, wherein one necessarily proceeds out of another." However, one should "not think that these levels would be generated *naturally*" (9.31). Hegel rejects the idea of a *real evolution* of forms of nature (Breidbach 1987; Drees 1992) about which there is for us today no doubt. The reason for Hegel's verdict is the earlier discussed "categorical" view of development which attributes *development* to the "concept," alone (8.308–9 *zusatz*). Elsewhere I have shown that precisely within the framework of the Hegelian ontology of nature one can also argue for a temporally real *layering process* <Aufstufungsprozess> of nature, without requiring for that argument Hegel's concept of development (in the sense of a *conceptual* development) (Wandschneider 2001).

Higher levels mean an *increase in complexity* and thus, in principle, require more complex organisms. Plants, for example, are *autotrophic*, i.e. they are in the position to produce organic substance *itself* out of the materials dissolved in the ground at their locations by converting these into system-like organismic substances. By contrast, animals are *heterotrophic*, i.e. they require organic substance which is produced by *other* living organisms, e.g. plants. This at first seemingly inessential fact nevertheless has decisive consequences for the organization of animals, a point to which Hegel also alluded (9.430–1): not only must an animal be equipped with an appropriate set of teeth and digestive system for the intake and processing of nourishment; it must above all and from the outset be able to find such nourishment. To this end, the animal must be able to move about and orient itself in its environment. And this requires an *organization of the senses*, a *nervous system* and – in principle – a central agent for guiding and controlling, a *brain*; both for the processing of sense data, as well as for coordinating and monitoring vital external action. This is in contrast to the plant whose internal functions are merely a matter of biochemical regulation. The organization of an animal is necessarily more complex than that of plants. Thus in the course of biological evolution *something new* continuously arises – how should that be understood with respect to the *ontology of nature*?

Let us first consider the question of novelty from an *empirical-scientific* standpoint. Modern systems theory invokes the concept of *emergence*. This explains the occurrence of qualitatively new characteristics on the basis of the formation of the system, i.e. as a *holistic phenomenon*. Emergent qualities are qualities of the system which relate to it in its entirety and for that reason can be completely novel with respect to the qualities

of the subsystems. At the same time, that which arises through emergence is always already contained within the existence of nature as a *possibility*. This is latent in the elementary matter, but it is in the system's formation that the possibilities which lie within the system become manifest. This is an immediate consequence of the fact that matter underlies the *laws of nature*. System formation is nothing other than an interconnection of elementary natural laws into a more complex form of lawfulness, even system laws which can thus lead to the emergence of qualitatively new phenomena. In other words, the existence of nature is not limited to its primitive phenotype but rather contains intrinsically *possibility* which, for its part, stems from the natural laws and becomes apparent in emerging phenomena. So this *dimension of possibility* which is tied to the natural being is of decisive significance for an understanding of system formation, evolution, and, of course, technology. Their basis is to be recognized in laws of nature.

Here, one can again see the fruitfulness of the Hegelian concept of nature. According to the objective-idealistic explanation, the laws of nature are an expression of the logic underlying nature. This being the case, the central assumption of every theory of evolution can now be substantiated, in that nature does not run out in its actual state but rather contains *possibility* which increasingly becomes manifest, or "emerges," in the process of evolution. A persuasive ontological foundation for the theory of evolution is only possible within the framework of an objective-idealistic ontology of nature, even when, as mentioned earlier, Hegel himself denies the possibility of a real evolutionary process. Despite this untimely repudiation of evolutionary thought, Hegel's approach has an eminent explanatory value with respect to an *ontology of nature concerning evolution*. It is in this sense that Findlay explains, "If any philosopher is a philosopher of evolution, that philosopher is Hegel ... Had the Darwinian and later data been available, he would almost certainly have acknowledged the historical trends in nature that he admits in the realm of spirit" (1964: 272; similarly, see Harris 1998: 206).

Emergence of the psychic from nature

However great the full range of possibility inherent in nature might be, it ultimately reveals itself in the emergence of the *psychic*. To clarify this, I will first pursue the line of argument from the *system-theoretical* interpretation I have developed and then show that, from that vantage point, Hegel's explanation of feeling can be reconstructed. This is related both to what was presented earlier, as well as to some of my other work (Wandschneider 1987b, 1999, 2009: Ch. 7). I first briefly present again that line of argument.

As explained earlier, organisms have a subject-character in the sense of an actively self-preserving universal in the life process. Considered system-theoretically, this means, as already indicated, that there is a kind of agent which controls and regulates the self-preservation of the organism. In terms of the traditional concept, there is a self-instance, or a *self*. This is structured differently in the case of plants and animals. For the autotrophic plant, it is a matter of the self-regulation of biochemical functions,

and it is in this sense that I will speak of a *function-self*. Over and above that, the heterotrophic animal has – on the basis of the earlier mentioned organization of nerves and senses – the capacity to control and coordinate actions and, correspondingly, possesses not only a function-self but also an *action-self*, as I will call it. Thus, from a system-theoretical perspective, what is characteristic of the animal subject is a *double structure* of the function-self and the action-self.

Now, such a “doubled self” is also asserted by Hegel: in contrast to plants, it is characteristic of animals that they possess a “doubling of subjectivity” in their “unity” (9.430 *zusatz*), quasi a “self–self” (432 *zusatz*), i.e. a “self which is for the self” (430 *zusatz*, also 432 *zusatz*, 465 *zusatz*). In other words, the self has “itself as an object” (432 *zusatz*). This “*finding itself in itself*” of the subject is, according to Hegel, “*feeling*” (342 *zusatz*, my italics; see also 432 *zusatz*).

Hegel does not explain in greater detail the subjective double-structure which underlies feeling. This concept is, however, immediately evident in the *system-theoretical reconstruction* provided above. Similarly, the structure of feeling is comprehensible in system-theoretical terms: what is obviously essential for the characteristic duality of the function-self and action-self is that both *cooperate* for the organism’s self-preservation. The function-self represents the physiological needs of the organism which then prescribes a norm to the steering activity of the action-self. This is especially the case for the action-self’s *perception* which is always *two-sidedly* oriented. On the one hand, it is external perception, on the other hand it is also internal perception, i.e. perception of the physiological situation of the organism. For example, the perception of temperature contains at the same time information about the extent to which the perceived temperature is *conducive* for the organism itself; or insofar as I have a tactile impression of an object, I at once have a tactile impression of myself (see 9.466 *zusatz*). Thus, in principle, animal perception includes – namely, increasingly with the stage of development – a subjective element. In the perception of what is external, the perception of what is internal is, as it were, superimposed. The subjective affectivity is thus not merely an organic state but rather also appears additionally in *perception*. This *subjectivized perception* is, in Hegel’s formulation, the subject’s *finding-itself-in-itself*, or *feeling*.

In this elementary form of the psychic in nature, I think one can see a concrete starting-point for a further clarification of the body–soul-problem. To some extent, contemporary discussion of the “mind–body relation” begins at too “high” a level. In the abstract opposing of body and mind, the contrast is so crass that it scarcely seems surmountable (for an interpretation of the psychic within the framework of the Hegelian philosophy of *mind*, see Wolff 1992).

Similarly, those characteristics of the psychic to which Hegel refers, such as *non-localness* (9.431 *zusatz*), *inwardness* (9.377 *zusatz*, also 10.20 *zusatz*) and *self-identity* (9.430 *zusatz*, 10.97 *zusatz*), find within the framework of the developed *system-theoretical model* an explanation. Insofar as the psychic is constituted in the fusion of external and internal perception, as was shown earlier, it is *not localizable* in some particular place in the body. Rather, the psychic is present equally in *all feelings*.

Moreover, this means that in the occurrence of feelings a *subjective, inner horizon* extends itself at once in perception; it is a private sphere of “inwardness” which is only accessible to the subject itself. Finally, it is in this inwardness that the subject is continuously with itself in the diversity of feelings. Not only does the subject preserve its identity amid the continually changing feelings, but it has moreover a *perception* of this identity and thus an identity for itself, or a *self-identity*.

I think it is in this manner that a system-theoretical reconstruction of Hegel’s account of feeling is possible and thus also an empirical-scientific concretizing of Hegel’s approach (presented in detail in Wandschneider 1999, 2009: Ch. 7). It is as an emergent phenomenon that the psychic becomes explicable, and the tendency for idealizing nature emphasized by Hegel likewise manifests itself with the utmost clarity: in the non-localness, the inwardness, the self-identity, and therewith also the ideality of psychic existence it becomes apparent that the existence of nature realizes itself not in dull materiality but rather always already contains the possibility of *ideality* (9.465 *zusatz*). “The progress of nature itself consists in bringing to light what is internal; to go into itself and to become subjective, and to do this by overcoming its externality and positing it as ideal” (Hegel 1980: 11).

With the appearance of subjectivity, perception and feeling, a natural evolutionary tendency toward cognition and self-perception becomes visible. Ultimately, this culminates in the appearance of *spirit* and, with that, *culture* (Burbidge 1996: 210–11; Wandschneider 2005a: 206–12; on the organic and psychic dimension of illness in Hegel’s account, see Engelhardt 1984c). Hegel’s *philosophy of nature* also ends with the transition to spirit: “[With that], nature’s last *externality* is sublated, and the Concept which in nature is only *in itself* thus becomes *for itself*” (9.537), i.e. the Concept *recognizes itself* in nature.

Also, from an *evolutionary perspective*, nature has developed in the form of spirit a kind of organ, as it were, which now can turn back on nature and recognize it: in this manner, so to speak, “nature is realized in spirit” (Breibach 2004: 226). In the knowledge of nature, spirit adds something to it which is not realized within its own horizon, namely the knowledge of its own underlying ideality. Hegel’s dictum – “Nature presupposes spirit; spirit is nature’s end. The result of the *philosophy of nature* is: reconciliation of spirit with nature, by knowing in nature the idea which spirit itself is in the form of self-consciousness” (Hegel 1980: 145) – this dictum can also be interpreted evolutionary-theoretically: the ideal essence of nature sets in motion an evolutionary process which ultimately manifests this ideal. It is by means of evolution that the ideal, as it were, carries out its own self-revelation. This, ultimately, must be the answer to the question of the direction and goal of evolution – spirit, as “the goal to which nature itself aims” (Quante 2002: 119).

The relevance of the Hegelian philosophy of nature

In the *reconstructive interpretation* offered here, Hegel’s philosophy of nature provides an impressive comprehensive view of nature (Schmied-Kowarzik 1998; Fulda 2006):

a *continuous relation* of natural phenomena in the form of a sequence of levels which exhibits a tendency towards increasing coherence and ideality – from elementary being-apart to the quasi-ideality of the psychic. Accordingly, the existence of nature is not taken up with the facticity of the material but rather contains essentially *possibility*, and in particular the possibility of the *psychic*, which thus no longer appears as some remote realm cut off from the physical.

Such a unified view of nature is contained in *materialism*, or, from a scientific perspective, *physicalism*. Certainly, here a fundamental difference becomes clear: these positions are of limited import for the philosophy of nature because they are not equipped with a sufficient ontology of nature; they are not in a position to explain the law-like character of nature which they nevertheless presuppose. It is only within the framework of an objective-idealistic ontology of nature – for which there are good reasons, as shown earlier – that this can be achieved.

On the other side, this line of reasoning must also be supplemented by arguments concerning the *conditions for the realization* of natural phenomena. Insofar as these belong to the real world, considerations of realizability cannot be ignored, and in this sense the integration of *empirical-scientific* arguments becomes unavoidable. The system-theoretical connections raised here are an example of this. Hegel explains feeling in terms of the self–self-structure of animal subjectivity, admittedly without providing a justification for this peculiar double structure. At the same time, he also points to *empirical* conditions for the kind of existence which animals exhibit (self-motion, interrupted intake of food, nervous systems, etc., see 9.430–1). The system-theoretical considerations developed here assimilate essentially this line of argument and simply pursue its consequences.

In point of fact, it is also of *philosophical* interest to clarify whether, to what extent, and in what way the “self–self-structure” is *really possible*, and what *consequences* follow from that. Among these consequences is the ability to reconstruct feeling in terms of systems theory. In this regard, one can say that Hegel’s line of reasoning not only *allows for* an actualization, in the sense of empirical conditions of realization, but also *requires* such an actualization; that the natural philosophical argumentation not only can accommodate empirical-scientific considerations but moreover must do so.

Conversely, the emergence of the psychic can be explained only within the framework of an ontology of nature of the Hegelian type, whereby the *ideal* is the essence which underlies physical existence and which can manifest itself through emergence. It is by means of this that the empirical system-theoretical line of argument first gains an *ontological foundation*.

In essence, Hegel’s philosophy of nature proves itself to be of amazing contemporary relevance – even despite some mistakes and misinterpretations reflective of its historical period. It aims at an integrated view of nature *via* its conception of an intrinsic *unity of nature*, which offers a persuasive alternative to both Cartesian reductionism and Kantian dualism. In my view, it is in Hegel’s philosophy of nature that we have the most sophisticated concept of nature in philosophy (similarly, Rinaldi 2002: 248). Now it is our turn to utilize this enormous philosophical labor, sedimented in Hegel’s project. On the one hand, it is as an *empirical-scientific concretization* of

Hegelian arguments with respect to the conditions for the realization of that which constrains the integration of empirical-scientific issues. On the other hand, conversely, it provides an *ontological foundation* for empirical-scientific lines of argument on the basis of an objective-idealistic ontology of nature. In this reciprocal interweaving and illumination of natural scientific and idealistic approaches, the opportunity for a contemporary concept of nature and, with that, a renewal of an autonomous philosophy of nature, becomes visible.

Note

1 Angle brackets (< >) distinguish the translators interpolations.

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