



G.W.F. Hegel

# Hegel's SCIENCE OF PHILOSOPHY

## Philosophy of Nature

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### Hegel's Philosophy of Nature: Overcoming the Division Between Matter and Thought

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Hegel's *Philosophy of Nature* is the most difficult part of his mature system to understand, and he himself attributes this difficulty to nature's "contingency, caprice and lack of order ... [its] inability ... to hold fast to the realisation of the concept" (EN §250R/Vol. 1, p. 215-6). <sup>[1]</sup> Yet the more immediate reason the text poses such difficulty is that its arguments are exceedingly compressed and frequently submerged amidst Hegel's lengthy discussions of now unfamiliar scientific works. This obstructs any attempt to identify the intriguing and elaborate theory of nature presented in this text, a theory that has escaped the notice of secondary commentators almost entirely. <sup>[2]</sup> In this paper I attempt to overcome the textual difficulties and present a schematic reconstruction of this theory, according to which nature progresses in a rationally necessary series of stages from an initial division between its two constituent elements, thought and matter, to their eventual unification. I develop this reconstruction through a rather surprising strategy: an extended comparison between the *Philosophy of Nature* and the theory of consciousness outlined in the *Philosophy of Spirit*. According to Hegel, consciousness suffers from an initial contradiction that impels it to proceed through a variety of forms, each necessarily succeeding its predecessor. Importantly, this initial contradiction within consciousness has the very same structure as the initial state of division that Hegel discerns within nature; this has the result that the entire development within consciousness closely parallels the development within nature. Given this correspondence between the trajectories of nature and consciousness, we can reliably use Hegel's relatively succinct and uncluttered account of consciousness to illuminate his largely submerged account of natural development.

My interpretation of the *Philosophy of Nature* supports the view that Hegel constructed his theory through a priori reasoning, endeavouring to deduce the structure of each

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natural stage by treating it as the rationally necessary solution to a contradiction in the preceding stage (and ultimately within the logical “idea” which immediately pre-exists nature). Having thereby constructed a skeletal picture of natural development, he incorporated those scientific descriptions of natural phenomena that he could interpret as corroborating or elaborating his own accounts of the natural stages. [3] This once-dominant view of Hegel as an a priori theorist of nature is unpopular with recent scholars, who believe that it condemns his theory to irrelevance, since any empirically uninformed theory of nature can comprise only a tissue of fantastic imaginings. [4] These scholars fail to take seriously Hegel’s defence of a priori reasoning as the appropriate method for gaining knowledge of nature, which forms part of the broader argument for his metaphysical outlook presented in his 1807 *Phenomenology of Spirit*. This argument, which I cannot explore in depth here, proceeds by critiquing all rival views of reality for falling foul of the universally held epistemic standard of internal consistency, exposing Hegel’s own metaphysical outlook as the only consistent view. [5] According to this metaphysical outlook, reality consists in thinking activity, developing through a rationally necessary sequence of internally contradictory forms. Hegel’s metaphysical outlook entails the appropriateness of a priori reasoning to generate correct descriptions of reality, given that reality itself *is* self-developing rational thought. Since he thus defends his a priori approach to nature, commentators should not assume that no such approach is worth taking seriously, but should, instead, work to understand and assess his theory of nature and to evaluate his phenomenological defence of its method of construction. I hope to contribute to this work with the following reconstruction of the lineaments of the *Philosophy of Nature*.

## I. Consciousness and nature

In this section I prepare for the more detailed comparisons between individual forms of consciousness and stages of natural development by identifying some general affinities between the trajectories of consciousness and nature. To make these affinities visible, I first explicate Hegel’s general account of consciousness and then his general conception of the natural world, articulated in the infamous remarks on the ‘transition’ to nature that conclude his *Encyclopedia Logic*. [6]

As I have indicated, in explicating Hegel’s account of the forms of consciousness I shall concentrate only on the account presented in his *Philosophy of Spirit* (at §418–23), [7] although he describes the same forms of consciousness in the better-known opening chapters of the *Phenomenology*. For my purposes there are good reasons to focus on the *Philosophy of Spirit* account. Firstly, Hegel wrote and revised it in conjunction with his *Philosophy of Nature* (both, after all, belong within the same *Encyclopaedia*). This increases the likelihood that he deliberately and systematically integrated the two accounts, and that the parallels between them are non-coincidental. Secondly, Hegel’s *Phenomenology* account is more complicated than that in his *Philosophy of Spirit*, as it intertwines the development of consciousness with the historical development of epistemology and plays a propaedeutic role in elevating the reader to the “scientific”, Hegelian, standpoint. Both complications are lacking in the *Philosophy of Spirit*, which simply describes consciousness

as a stage in the development of spirit. This makes the *Philosophy of Spirit* considerably more useful for cross-referencing developments within consciousness against developments within nature.

Hegel locates consciousness within the first broad phase of spirit's development, in which spirit exists in the form of individual subjectivity. Consciousness supersedes spirit's previous form of existence as the "soul", a kind of subject that remains embroiled with its corporeality, sensations and emotions. The transition to consciousness occurs when the soul projects, or "expels", its contents outside of itself: it "excludes from itself the natural totality of its determinations as an object, a world *external to it*" (PSS §412/Vol. 2, p. 425). The contents that comprised the soul's body somehow become a world of external objects. Hegel does not mean that the soul literally casts its body aside to constitute an exterior world. His point is that spirit begins to *think* that materiality is external to itself: "spirit is determined ... as thinking, and the determinations of consciousness are determinations of thinking" (§415A (G)/Vol. 3, p. 289).<sup>[8]</sup> Spirit's relationship to external reality consists in its thinking of corporeality as a world of exterior objects. Precisely because spirit is henceforth engaged in thinking about such objects, Hegel calls it *consciousness (Bewußtsein)*: that which exists or has being (*Sein*) in that it is "aware" or "knowing" (*bewußt*).<sup>[9]</sup> In defining corporeality as external, then, spirit simultaneously re-defines itself as consciousness. Hegel also refers to consciousness as the "ego" (*Ich*), because in defining its contents as external, spirit concomitantly defines itself as distinct from this external world, as a self with a separate identity.<sup>[10]</sup>

The subject-matter of Hegel's account of consciousness, then, is the ego and its thought concerning external objects. Yet consciousness suffers from a fundamental contradiction: "Consciousness constitutes both, - we have a world which is exterior to us and which is firmly for itself, and at the same time, in that I am consciousness, I know of this object [*Gegenstand*], it is posited as of an ideal nature, and is therefore not independent but sublated" (§414A (G)/Vol. 3, p. 275). Hegel is not mistakenly claiming that because the ego's definitions of its content depend on its defining activity, the content itself depends on that defining activity. Rather, his claim is that the ego thinks of the object as "out there for itself, posited immediately, encountered, as if it were not posited" (§414A (G)/Vol. 3, p. 287). The ego sees the object as something it passively encounters, not something it actively defines. This behaviour is contradictory in the (loose) sense that the ego *is* conceptualising the object, but fails to recognise this. The contradiction can only be resolved, Hegel believes, when the ego becomes aware of itself as the active generator of conceptions of objects. This in turn can only happen when the ego adopts a conception of objects as exhibiting the same internal constitution as the ego itself: in thinking of objects of this type, the ego becomes conscious, at least implicitly, of its own conception-generating constitution. Specifically, the object resembles the ego when it is conceptualised as an immaterial centre that manifests itself within its outward qualities (§423A/Vol. 3, p. 37) - which, for Hegel, amounts to the object's being defined as an organism. The object so conceived provides an inchoate analogue of the ego as that which is manifest within its conceptions insofar as it generates them. The ego is

thereupon positioned to recognise its active role and surmount the basic contradiction of consciousness. Hegel concludes that: "Spirit knows the power of its own inwardness as present and active within the object, only when the object is internalised into the *ego* and *consciousness* has thereby developed itself into *self-consciousness*" (§417A/Vol. 3, p. 17).

However, in Hegel's account this ultimate solution to consciousness' governing contradiction does not occur at once. Instead, the ego initially responds to a different contradiction in its conception of objects. This is the contradiction of "sensuous consciousness" (described in detail in section II below). In conceiving objects simply as external entities the ego finds that it lacks the conceptual resources to distinguish these objects. In response, it adopts the improved view of objects that, uniquely, resolves this problem. But this new view of objects proves contradictory in turn. In fact, the ego has embarked on a process of devising a whole series of conceptions of objects, each redressing the problem inhabiting its predecessor. The series ends with the conception of objects as organisms, heralding the transition from consciousness to self-consciousness.

The series of conceptions of exterior objects is initiated by the soul's act of "expelling" or objectifying its content, and, similarly, nature originates in a creative act on the part of the "absolute idea", the last form of thought delineated in the *Encyclopaedia Logic*.<sup>[11]</sup> The absolute idea is an advanced modification of the "idea", itself defined as the thought of the "unity" of thought (or the concept) with "objectivity": "The idea is what is true *in and for itself, the absolute unity of concept and objectivity* ... its real content is only the presentation that the concept gives itself in the form of external thereness [*Daseins*]" (EL §213/p. 286). The idea thinks of thought as united with another element, which Hegel variously terms "objectivity", "external existence", and (in his *Aesthetics*) "reality";<sup>[12]</sup> this element is that which is *not* conceptual, and we can therefore broadly identify it as matter. Crucially, for Hegel, the precise sense in which the idea regards thought and matter as unified is that thought "presents", or manifests, itself within an exterior material dress. Thought and matter are united not when they are identical but when matter serves as a vehicle for thought's self-disclosure; thus, for Hegel, the unity of terms implies their distinctness (while, paradoxically, their division implies their indistinguishability, as we shall see).

Returning to Hegel's discussion of the "absolute" idea, he defines it as "the concept of the idea, for which the idea as such is the object [*Gegenstand*], and for which the object [*Objekt*] is itself ... This unity, therefore, is ... the idea that thinks itself" (§236/p. 303). Thus thought even comes to recognise itself as thinking of the unity of concept and reality. Hegel claims that the emergence of this self-knowing idea entails the transition to nature: the absolute idea "*resolves to release out of itself* into freedom the moment ... of the initial determining and otherness ... itself as *nature*" (§244/p. 307). The absolute idea does not create nature as a separate entity, but actually becomes nature. Hegel expands on his analysis in the *Science of Logic*: the absolute idea is "still logical, it is enclosed within pure thought, and is the science only of the divine concept ... Because the pure idea ... is so far confined within subjectivity, it is the drive [*Trieb*] to sublimate

this" (WL p. 843). The absolute idea, recognising itself as the mere thought (or "concept") of the unity of concept and matter, is "driven" to overcome its merely intellectual mode of existence, assuming the form of a really existing unity. Hegel does not spell out why the idea acquires this drive, but his implication is that the idea, having recognised its own character as a form of thought, sees that this is a partial, merely intellectual, character. This prompts the idea to transcend its limitation by becoming an objectively existing unity of concept and matter: that is, by becoming nature.

Hegel's overall position, therefore, is that nature originates in the logical idea's act of self-objectification. This strongly recalls the fact that consciousness' conceptions of external objects arise through the soul's initial "objectification" of its content, its definition of that content as a set of external objects. Nevertheless, it is important to remark a crucial difference between nature and the objects of consciousness: consciousness only thinks of (its content as) exteriority, whereas the logical idea actually *creates* (itself as) objective nature. Thus Hegel is not maintaining, in Berkeleian fashion, that the logical idea merely thinks of objective nature (nature featuring as an idea in the mind of logical thought). Despite this difference between the ideal status of the ego's objects and the real status of objective nature, the parallel remains that spirit creates thoughts of an objective reality while the logical idea creates (itself as) objective nature itself.

A further point of convergence between nature and consciousness' conceptions of external objects is that the former, like the latter, passes through a necessary succession of stages. This happens because, for Hegel, the idea initially creates itself as a natural sphere in which matter, far from being united with the concept, exists with no conceptual accompaniment (see section II). He does not explain why the idea assumes this partial form, but his underlying assumption seems to be that the unity of concept and matter can arise only through the overcoming of a prior state of *disunity* between these elements. He then takes the most extreme form of such disunity to be the existence of matter quite unconnected to thought. The Hegelian philosopher of nature therefore faces the task of documenting how nature overcomes its initial disunity, an overcoming which "is not simple, but a series of stages consisting of many moments, the presentation of which makes up the philosophy of nature" (PSS §381A/Vol. 1, p. 45). More precisely, Hegel proceeds by diagnosing an internal contradiction within nature's original bifurcated state, such that nature necessarily assumes the fresh form that uniquely redresses this contradiction. But since, he insists, this new form proves contradictory as well, a progression is initiated which continues until nature attains its final, unified, condition, in which matter manifests thought.<sup>[13]</sup> The motor of this progression is the idea incarnated as nature – as a form of rational thought, the idea cannot endure existence in a contradictory form. So, just as the rational ego successively ameliorates its conceptions of objects, likewise the idea successively alters its natural form. Consciousness and nature, then, both undergo graduated courses of development, and both of these courses terminate at structurally identical points. The trajectory of consciousness, as we saw, concludes when the ego devises the conception of a kind of object that replicates its own constitution; likewise, nature's evolution ceases when it comes to replicate the harmonious structure of the logical idea, by embodying the union of

concept and matter. In both trajectories, the objective sphere – whether as naturally existing or as conceived – must come to resemble the agent – idea or ego – that creates it.

Crucially, nature and consciousness are not only alike in their origin, conclusion, and passage through a rationally necessary sequence of stages. Most importantly, the first stages of consciousness and nature are internally contradictory in precisely the same respect. This entails that in each case the succeeding stages exhibit an essentially identical structure, since they emerge to resolve identically structured contradictions. Consequently, the whole series of stages in nature and consciousness run in tandem with one another. This, above all, justifies the use of Hegel's accounts of individual forms of consciousness to illuminate his submerged accounts of natural developmental stages.

## II. Sensuous consciousness and the spatio-temporal sphere

While Hegel identifies only three main stages within nature – “Mechanics”, “Physics”, and “Organic Physics” – he finds four forms of consciousness - sensuous consciousness (*sinnliche Bewußtsein*), perception (*Wahrnehmung*), understanding (*Verstand*), and consciousness of life. <sup>[14]</sup> This is because sensuous consciousness and perception correlate with distinct sub-stages *within* nature's first, mechanical, phase. Sensuous consciousness corresponds to space and time, with which the “Mechanics” begins, <sup>[15]</sup> while perception corresponds to its two ensuing sub-stages, “finite” (terrestrial) and “absolute” (celestial) mechanics. To see how this correspondence obtains, we must now compare these opening stages in greater detail.

Hegel claims that, in sensuous consciousness, the ego simply defines its content as a world of external objects; this form of consciousness therefore ensues directly from spirit's initial “expulsion” of content. According to Hegel, the ego also conceptualises its objects as “singular” (*einzel*), by which he means that they are regarded as individual, unitary entities. <sup>[16]</sup> Sensuous consciousness, then, consists in the ego's thinking of its content as a set of singular objects, *not* in its passive reception of sensory impressions. <sup>[17]</sup> Sensuous consciousness is a definite way of conceptualising objects: not as possessing a profusion of sensible qualities (colours, sounds, etc.) but as having only the property of singularity, unitary individual identity. <sup>[18]</sup>

The problem for the sensuously conscious ego, though, is that it cannot differentiate *between* objects, since they all possess the identical feature of singularity; the ego cannot pick out one such object in contrast to others. “The content of sensuous consciousness ... is supposed to be *the* singular, but in that it is, it is not one singular, but all singularity” (PSS §419A/Vol. 3, p. 25). <sup>[19]</sup> This deficiency plainly arises from the impoverished way that sensuous consciousness has conceptualised its content in the first place, leaving itself no room to conceive objects as qualified by distinct sets of properties: objects, for it, are just simple singularities, lacking differentiated content. The sensuously conscious ego has defined the singular object so emptily that it cannot distinguish that object from other singular objects.

The contradiction of sensuous consciousness recurs in structurally identical form at the start of the *Philosophy of Nature*, where Hegel deals with space, the natural entity that ensues directly from the idea's self-expulsion as nature (just as sensuous consciousness ensued directly from spirit's objectification of content). As we have seen, nature must initially exist as the division of concept and matter, and Hegel takes the most extreme form of this division to be a state in which matter exists with no conceptual accompaniment at all, quite isolated. This isolated matter, according to him, is space. So, as he summarises, "the [first] form of its [the idea's] determinateness is ... the externality of space ... existing absolutely on its own account without the moment of subjectivity [i.e. of the concept]" (WL p. 843). According to Hegel, this independently existing spatial matter is subdivided into a plethora of individual components, which are not internally related but exist independently of one another, in a condition of *Außereinandersein* (being-outside-one-another) and *Nebeneinander* (being-next-to-one-another). These spatial units, he argues, have no differentiating characteristics to separate or distinguish them from one another, and hence, after all, space proves *undifferentiated*: "on account of its lack of difference, space is merely the possibility ... of juxtaposition ... and is therefore simply continuous" (EN §254R/Vol. 1, p. 223). We observed how the ego failed to distinguish the objects of its sensuous consciousness, having defined them all as possessing the sole feature of singularity; likewise, naturally existing space proves unable to contain internal differentiation, since all its parts share the sole feature of singularity too.

From the unsatisfactory nature of space, Hegel deduces the necessary emergence of time: "The truth of space is time, so that space becomes time" (§257A/Vol. 1, p. 229). Spatial parts attempt to differentiate themselves from other parts by negating them, thereby acquiring the new property of negativity: they therefore become temporal moments or "nows", beings which "are in that they are not" (to paraphrase Hegel's formulation at §258/Vol. 1, p. 229-30). Yet like spatial parts before them, temporal moments fail to differ from one another, since they share the sole property of negativity, and therein prove identical: "Time is as *continuous* as space is, for it is abstract negativity ... and in this abstraction there is as yet no difference of a real nature" (§258R/Vol. 1, p. 230). Time is plagued by the same inadequacy that beset space: its supposed internal differentiation proves to be no differentiation at all but utter homogeneity.

This comparison between sensuous consciousness and the first natural stage has revealed that each is afflicted by a structurally identical problem: consciousness, at this juncture, identifies objects as sheer singular entities, an identification that proves unworkable as these objects cannot be distinguished from one another. Correspondingly, space and time attempt to contain a plethora of singular constituents, but prove homogeneous as these constituents do not differ from one another.

This failure of internal differentiation within space and time points to a deeper problem: for Hegel, in that space and time prove self-identical and unitary they are "abstract universalities" (§254/Vol. 1, p. 223; §258A/Vol. 1, p. 232), and, as universals, are forms of the *concept*.<sup>[20]</sup> Paradoxically, space and time, the forms of pure matter, have turned out to be forms of the concept. In fact, then, they are

indistinguishably *both* material and conceptual: after all, they are forms of the concept only to the extent that they are forms of matter. Through this analysis Hegel takes his first step towards depicting the overcoming of the natural division of thought from matter, by showing that just when matter seems to exist quite unaccompanied by thought, it proves to be fused together with thought.

### III. Perception and material bodies

Hegel has ascertained that the ego cannot conceive its objects as singular, distinct, entities unless it understands them as having certain differentiating properties. Consequently, the ego re-defines its object as a “*thing*, which has *many* properties” (PSS §419/Vol. 3, p. 25): this move inaugurates “perception”. Hegel claims that these properties, which are universal, are devised (or “posited”) by the thinking ego itself, which conceptualises these properties precisely to provide its objects with the appropriate differentiated content. The ego generates its conceptions of properties by categorising its given content (§420R, A/Vol. 3, p. 27-9).

Yet Hegel judges perception defective in that it simply “mixes” properties with singular objects: “This linking of singular and universal is a mixture, for what is singular remains the *basic* being, firmly opposed to the universal, to which it is at the same time related” (§421/Vol. 3, p. 29). That is, the ego regards the singularity of the object as more fundamental than its possession of properties – the singular object, so the ego believes, can subsist whether or not it possesses properties. Evidently, the ego adopts this view of the object despite the fact that the object does require individuating properties. This requirement that singular objects possess properties drives the ego to categorise and assign these properties, but the ego seems not to recognise that the object requires these properties and retains its earlier view of the object as a simple singular entity (misunderstanding the properties that it has assigned to the object as belonging to it only contingently). The problem with the perceptive ego, then, is one of unselfconsciousness: the ego acts on the necessity for the singular object to possess properties without recognising that this necessity exists.

Once again, we find a structurally identical phase within the *Philosophy of Nature*: the “finite mechanics”, which directly succeeds the domain of space and time. Within it Hegel describes a type of entity that avoids the lack of differentiation that bedevilled spatial units and temporal moments, by possessing a particular, differentiating, quantity of spatial units (as “mass”) (EN §263/Vol. 1, p. 244). By possessing a set of spatial parts, this entity achieves individuation and exists as a “body” (*Körper*) or as “matter” (*Materie*). Hegel designates bodies “material” precisely because, unlike spatial parts or temporal moments, they retain individual identity and hence do not prove as much conceptual as material.

There is a clear structural isomorphism between the thing with properties and the material body. Both achieve individuation by possessing specifying parts - although we should remember that the ego *conceives* of the thing as individuated by attributing properties to it, while the material body *really* achieves individuation by seizing hold of mass. Furthermore, like the property-owning thing, the material body is only “mixed” together with its mass, which, in Hegel’s



terminology, remains “external” to it (§252A/Vol. 1, p. 219). Again, it seems that the material body attempts to exist independently of the possession of mass that has actually proved necessary to it, treating this mass as something “external” to it, rather than as something “internal” or constitutive. <sup>[21]</sup> This recalls the ego’s habit of regarding its object as existing independently of the properties that it actually needs to possess.

Insofar as material bodies attempt to exist without possessing mass, they lose their individuation, this having been conditional on the possession of mass. Bodies manifest this lack of difference by drawing together to co-constitute a single body, this process being named “attraction” (§262A/Vol. 1, p. 243). <sup>[22]</sup> Yet the attractive unity cannot persist without differences to absorb, so bodies differentiate themselves again in a complementary process of repulsion. Hegel concludes that bodies are necessarily subject to both attraction and repulsion, this dual subjection being just what he understands by gravity:

Matter possesses gravity in so far as the drive towards a middle point is in it; it is essentially composite, and consists entirely of sheerly singular parts which all strive for the middle point...[it] seeks its unity; so it endeavours to sublimate itself...If it were to succeed, it would no longer be matter...for in its unity it is ideal. <sup>[23]</sup>

The nature of the body’s subjection to gravity is brought out more concretely, Hegel believes, in the planets’ relationship to the sun, discussed in the concluding section of the “Mechanics”, the “Absolute Mechanics”. The sun represents the unitary centre towards which the planets are drawn, and yet from which they are simultaneously repelled, this dual relationship being expressed in their circling around the sun: held apart from it, yet straining to fuse within it (EN §269R/Vol. 1, p. 260-1).

Significantly for the overall trajectory of the *Philosophy of Nature*, bodies consistently lose the material status that they seem – unlike space and time – to attain. By forsaking their individuating quantities of mass, bodies lapse into that equivocal mode of distinctionless material being that is equally a mode of conceptual being. Hegel’s account of material bodies therefore continues the task of depicting the overcoming of nature’s primal division, by restaging, in a more complicated context, his earlier argument that when material entities lack any relationship to thought they cannot be exclusively material after all.

#### **IV. Understanding and the “Physics”**

The next phase of consciousness is the understanding, in which the ego takes the unavoidable step of re-conceiving its object as necessarily possessing its properties. This has further ramifications, as Hegel comments: “The proximate *truth* of perception is that the object is ... an *appearance* and its reflectedness-into-itself is ... an *internality* which is for itself and a universal [*Allgemeines*]” (PSS §422/Vol. 3, p. 31). Having re-defined the object as an entity that inherently possesses properties, the ego is led to see this object as something common to, or shared between, these properties. As such the object is literally a universal, something *all-*

*gemein* (common-to-all). Thus the understanding ego finally succeeds in individuating its objects, by defining them as possessing their properties necessarily – but in so doing it also re-defines these objects as universals. Furthermore, the ego re-defines the object's properties as its appearance (*Erscheinung*), as that through which the shared universal manifests itself: "In the initial resolution of the contradiction [of perception] ... the multiple determinations of the sensuous, which are independent of one another and of the inner unity of each single thing, are reduced to the *appearance* of an *internality* which is for itself" (§422A/Vol. 3, p. 31). Presumably the ego re-defines the properties as appearance just because it has re-defined the object as a universal, lying behind all these properties, discernible within them. Still, for Hegel, the understanding's central contradiction is that it regards appearance not only as the manifestation of the universal but also as something "immediate", existing independently of any relationship to the universal (§422A (G)/Vol. 3, p. 309). The ego seems to be retaining its previous conception of properties, which made no reference to their identity as appearance, alongside its new conception of properties as appearance (entailed by the re-definition of the object as universal).

The *Philosophy of Nature* documents a natural stage broadly analogous to the conscious stage of understanding: the "Physics", nature's second main phase, which traces the developments undergone by a kind of natural entity that manifests itself within its exterior appearance. In Hegel's own phrase, the subject-matter of the "Physics" is the "manifestation of essence" (EN §272A/Vol. 2, p. 9) - the body becomes an essence or "form" which displays itself within its parts. Like the universal object of understanding, the body becomes this self-revealing "essence" because it unambiguously possesses its parts, these serving as the necessary means of its individuation. (As Hegel puts it, the body "only consists of these determinations, [and so] it manifests itself within them" (§274A/Vol. 2, p. 11).)

For Hegel the self-manifesting character of the essential body already introduces the first sub-stage of physical development, called the "Physics of Universal Individuality", which reconsiders the celestial bodies insofar as they now appear within their parts. For instance, the sun's parts assume the form of light, which Hegel identifies as "pure manifestation, and nothing but manifestation" (§276R/Vol. 2, p. 17), the kind of matter that simply serves to make entities apparent. However, a contradiction lurks within this first physical sub-stage: "matter is determined by the immanent form, and according to the nature of space" (§290/Vol. 2, p. 55). Hegel's claim is that the body's parts exhibit two inconsistent characteristics: on the one hand, these parts manifest the indwelling form, but on the other hand, they are spatial (see e.g. §275A/Vol. 2, p. 14), which prevents them from manifesting the body after all. To understand why spatial parts cannot reveal their inner "form", we must anticipate Hegel's later discussion of the organic natural sphere. For him, the body's material parts can manifest it only to the extent that they exhibit interdependence – this condition being met within the organic stage. When the body is organic, its parts exist as a set of functionally differentiated and interlocking members (*Glieder*), so that "reality no longer has an immediate and independent mode of being as a plurality of properties *existing apart from one another*" (§337A/Vol. 3, p. 11). The organism's "members

are ... perpetually negating their independence, and withdrawing into a unity which is the reality of the concept" (§350A/Vol. 3, p. 103). Hegel's view, then, is that organic members' interrelatedness makes them suitable vehicles to express the universality of the organism, its identity as that which pervades them all. In contrast, the kind of material part that is intrinsically separate from others can only manifest the body as underlying *it*; it cannot reveal the body as universal, common to it and other parts, because it makes no reference to these others. This is precisely the deficiency of spatial parts, which, by definition for Hegel, just are independently existing units, evincing *Außereinandersein*. It follows that the parts can only display the indwelling body if they shed their spatial character, a result not achieved at this point in natural development. The contradiction that arises here, then, is that the parts both disclose the body and exist in a spatial guise that prevents them from doing so. This plainly recalls the contradiction that Hegel diagnosed within the understanding. There, the ego conceived of the object's individuating properties both as manifesting that object and as existing independently of it, without reference to it; likewise, here, the body's parts both manifest it and fail to manifest it (because of their spatiality).

The body's attempts to resolve this contradiction occupy the ensuing physical sub-stage, the "Physics of Particular Individuality" (in which Hegel resumes the examination of terrestrial bodies). Initially, bodies cause their parts to acquire "specific gravity" or "density", thereby endeavouring to interconnect them. But these parts remain essentially independent of one another (§294/Vol. 2, p. 61) - which exposes density as nothing more than cohesion, the way in which the parts are held together. Next, the body attempts more actively to destroy spatial mass, becoming "sound", which negates space. Yet as sound, the central body remains paradoxically dependent on the existence of spatial mass, requiring the presence of that mass in order to negate it (§299/Vol. 2, p. 69). As a result, the body finally becomes heat, herewith acquiring a form in which it explicitly and straightforwardly annihilates its spatial mass (§303/Vol. 2, p. 82). This is still unsatisfactory, as the body has become something altogether without material parts: it needs to appear within these parts, not eradicate them. Hegel now advances into the concluding physical sub-stage, the "Physics of Total Individuality".

At this stage, the body succeeds in making itself apparent: "form is now a totality which is immanent within material being which offers it no resistance ... selfhood ... maintains itself in the externality which is subject to it" (§307/Vol. 2, p. 92). Nonetheless, a global defect afflicts the various self-manifesting kinds of body considered here: they "contain ... relationship to *another*, and it is only in process that the externality and conditionedness ... are posited as self-sublating" (§308/Vol. 2, p. 94). The body can manifest itself within its parts only when prompted to do so in reaction against a tendency to fuse with another body. Hegel discerns this structure within a huge range of natural phenomena, including, importantly, electricity and chemistry. The chemically altered body, for example, can only manifest itself materially when reacting against other juxtaposed constituents of the chemical process (§329/Vol. 2, p. 188). But bodies must become capable of appearing irrespective of the occurrence of these conditions, of engaging in an "infinite *self-stimulating and self-sustaining process*" (§336/Vol. 2, p.

220). This paves the way for the transition into nature's third, final, stage, that of organic life.

As a whole, the "Physics" contains a series of especially complex negotiations between the essential bodily centre and its parts. At first these parts contradictorily manifest and fail to manifest the centre, and the remainder of the "Physics" documents the body's repeated efforts to overcome this contradiction by causing its parts to adopt an appropriately non-spatial, interconnected, form. Even in the culminating chemical phase, in which the body succeeds in becoming fully apparent, its success is marred by its dependence on the occurrence of chemical processes.

Despite its convoluted structure, the "Physics" remains broadly analogous to the conscious stage of understanding. Both involve entities that necessarily possess their parts and so manifest themselves within these, but in both cases these entities simultaneously fail to manifest themselves because their parts retain an unsuitable, non-revelatory, form. This is either because the ego persists in defining these parts as mere properties, or because the parts remain spatial. Although the two later sub-stages of physical development go beyond the understanding in their attempts to resolve this basic contradiction, the contradiction itself evidently has the same structure in both nature and consciousness.

In terms of Hegel's encompassing project of depicting the gradual reconciliation of concept and matter, what progress do we observe within the "Physics"? Recall that the "Mechanics" introduced kinds of matter existing independently of any conceptual element, as space, time, and material bodies. These forms of matter, Hegel argued, were internally contradictory, for their lack of inner differentiation revealed them to be as much conceptual as material. In the physical stage, we now witness the emergence of new forms of the *concept* within nature: in the guise of essential, self-manifesting bodies, which Hegel describes as conceptual (e.g. §308/Vol. 2, p. 94; §324R/Vol. 2, p. 167; §335-6/Vol. 2, p. 219-20).<sup>[24]</sup> He regards these bodies as conceptual because they are universal entities: although he does not explicitly define them as universal, they clearly instantiate his category of the universal as that which pervades its multiple parts. This provides us with a fresh way to characterise the ongoing "physical" tension between the revelatory and non-revelatory, spatial, character of the body's parts. On the one hand, these material parts relate to the concept by disclosing it; on the other hand, they attempt to preserve their initial mode of existence, in which they bore no relationship to thought. The "Physics", then, depicts a natural phase in which thought and matter are, simultaneously, both united and divided: the division of matter from thought that characterised nature's mechanical stage is retained, but added to it is a union of matter with the concept. It is this unstable conjuncture that defines the "Physics".

## V. Life and the achievement of unity

Hegel maintains that the conflict within the understanding, which consisted in the ego's conceptualising the object's parts as both appearance and properties, motivates the ego to advance into the ensuing, final, form of consciousness: consciousness of a living object. In devising the conception of a living object, the ego resolves the dilemma that arose at the

level of understanding, by dropping its belief that the object possesses non-revelatory properties; the ego now simply regards the object as outwardly manifest. In thus conceptualising the universal object as outwardly revealed, the ego is conceptualising a living organism, according to Hegel. He makes this claim because he defines the living organism precisely as a universal centre that displays itself within its exterior, this exterior existing as a set of interconnected "members". As he incessantly repeats, members retain their identity only when conjoined with their co-members ("a hand ... hewn from the body is a hand in name only, but not in actual fact" (EL §216A/p. 291)), forming an interconnected ensemble that reveals the universal centre within.

The living object, as conceived by the ego, has a conspicuously similar structure to the really existing living organism, described within the "Organic Physics" as "the union of the concept with exteriorised existence, in which the concept maintains itself ... Life is ... the resolution of the opposition between the concept and reality" (EN §337A/Vol. 3, p. 10-11). Within living organisms, matter finally manifests the inner concept, and unsurprisingly Hegel concludes that the living organism inaugurates the unification of concept and matter, therein duplicating the logical idea within nature: "life is the idea" (§337A/Vol. 3, p. 9). For Hegel, the last and most perfect organic form is the animal, whose fully interconnected limbs and organs satisfactorily reveal its unitary centre. The long chain of natural progression is at last "perfected through the sentient being of animal life, since this reveals the omnipresence of the one soul in all points of its corporeality, and so reveals the sublatedness of the extrinsicity of matter" (PSS §389A/Vol. 2, p. 13).

This comparison between Hegel's accounts of the ego's consciousness of a living object and of the really existing living organism reveals the particularly marked similarities between these two accounts. He argues that the ego devises the conception of a living object specifically because it adopts the belief that its object is manifest within its exterior, and likewise the living organism arises as that kind of natural entity whose materiality openly displays the permeating concept. Moreover, both the living object, as conceived by the ego, and the naturally occurring organism resemble their creators, the ego and the logical idea. The ego has at last constructed the concept of a kind of object that shares its own structure; this enables the ego to acknowledge its own conceptualising activity and bring the progression of stages of consciousness to a close. In the natural case, nature has engendered a kind of entity that resolves the antagonism of concept and matter and replicates the unified structure of the logical idea, thereby realizing the idea's original aim of creating (itself as) an objective world that resembles and embodies it. The developmental trajectories of both consciousness and nature reach their goals, and cease, with the emergence of the living organism.

Our examination of Hegel's depictions of consciousness and nature has confirmed that he organizes the stages of nature upon the same developmental model as the forms of consciousness. This is no coincidence, since he identifies both domains as starting from initial states that possess basically identical structures and basically identical contradictions. Both sensuous consciousness and the spatio-temporal sphere contain entities that are allegedly discrete

but in fact prove undifferentiated. These initial contradictions compel both consciousness and nature to progress into necessarily succeeding states, which also possess fundamentally identical structures, because they arise in response to similar initial contradictions. Consequently, these states in turn develop substantially identical difficulties; and hence, the entire courses of development of consciousness and of nature prove alike. Because of this likeness, comparing Hegel's *Philosophy of Nature* to his account of consciousness has enabled us to acquire a programmatic understanding of his theory of natural development. It is helpful, in conclusion, to summarise this understanding.

As I have argued, Hegel's theory holds that nature exhibits an overarching progression towards the unification of its two constituent elements, thought and matter. He conceives nature as the form that the logical idea assumes in order to become a real, not merely intellectual, unity of thought and matter. Yet nature does not immediately embody this unity of thought and matter, but becomes unified only by transcending an original opposition between these elements, this opposition consisting initially in the existence of matter unaccompanied by thought. The first natural entity is therefore this independently existing matter – space. Because the multiple constituents of space lack differentiation, space proves as much conceptual as material, a problem that also afflicts the succeeding natural entities, time and bodies with mass. Generally, at the mechanical stage, matter takes various forms in the attempt to exist with no conceptual admixture, but repeatedly proves indistinguishable from the concept. This stage involves matter's primordial division from thought, which is equally its direct fusion with thought.

The ensuing physical stage sees the emergence of the kind of natural entity that satisfactorily individuates itself by possessing specifying spatial parts within which it appears. Because this entity appears throughout its multiple parts, it counts as universal and so conceptual for Hegel. Yet, paradoxically, this “physical”, conceptual, body simultaneously fails to appear within its parts due to their spatiality, a paradox that the body, despite persistent efforts, never truly overcomes. Insofar as material parts reveal the body as their inner, conceptual, form, matter is “united” with thought, standing to thought in the stable relationship of manifestation. But insofar as matter remains spatial, it continues to be divided from thought, as it was during nature's mechanical stage (a mode of existence that is, moreover, in itself contradictory, given that matter's separation from thought implies its fusion with thought). The physical stage is characterised by this uneasy co-existence of unity and division, which ends with nature's climactic organic stage, in which the concept succeeds in manifesting itself in material parts through their becoming an interconnected, non-spatial, ensemble. Hence matter's division from thought is at last superseded in favour of an entirely harmonious relationship.

It is apparent that, for all its unfamiliarity, Hegel's account of nature exhibits a little-suspected degree of intricacy, internal consistency and systematic rigour. Commentators have therefore been quite wrong to let the difficulties of the *Philosophy of Nature* mislead them into condemning it as “absurd”, “insensate”, and “magical”.<sup>[25]</sup> The text contains an original and carefully constructed theory of the natural world which constitutes a central component of Hegel's mature

system. The work of reconstructing this theory cannot be omitted if we are to understand this system properly and assess its philosophical worth.

## Endnotes

[1] All references are to English translations of Hegel's works, often amended, without special notice, in line with *Hegel: Werke*, 20 vols., edited by Eva Moldenhauer and Karl Markus Michel (Frankfurt: Suhrkamp Verlag, 1969-72). I refer to paragraph numbers where applicable, then volume and page numbers; Hegel's remarks are indicated "R", additions "A". These abbreviations are used: EL = *Encyclopaedia Logic*, translated by T. F. Geraets, W. A. Suchting, and H. S. Harris (Indianapolis: Hackett, 1991). EN = *Philosophy of Nature*, 3 vols., edited and translated by M. J. Petry (London: Allen and Unwin, 1970). PSS = *Philosophy of Subjective Spirit*, 3 vols., edited and translated by M. J. Petry (Dordrecht: David Reidel, 1978). WL = *Science of Logic*, translated by A. V. Miller (1969; reprint, Atlantic Highlands, NJ: Humanities Press International, 1989).

[2] A few scholars have attempted to reconstruct Hegel's overall view of natural development, but without recognising his basic account of nature's progressive unification of thought and matter: see Thomas Kalenberg, *Die Befreiung der Natur: Natur und Selbstbewußtsein in der Philosophie Hegels* (Hamburg: Felix Meiner, 1997), and Robert Stern, *Hegel, Kant, and the Structure of the Object* (London: Routledge, 1989). Other commentators have studied individual sections of the *Philosophy of Nature* in detail, but this does not *per se* advance our grasp of Hegel's general theory. See, e.g., John W. Burbidge, *Real Process: How Logic and Chemistry Combine in Hegel's Philosophy of Nature* (Toronto: Toronto University Press, 1996).

[3] For Hegel, "in the procedure of philosophic cognition, the object has not only to be presented in its conceptual determination, the empirical appearance corresponding to this determination also has to be specified" (EN §246R/Vol. 1, p. 197).

[4] Consequently the prevailing view is that Hegel's theory comprises merely a flexible organizing framework for scientific results. M. J. Petry promoted this view in the "Introduction" to his edition of the *Philosophy of Nature* (1970). The same view is adopted in most papers in recent collections: see, e.g., R.-P. Horstmann and M. J. Petry, eds., *Hegels Philosophie der Natur: Beziehungen zwischen empirischer und spekulativer Naturerkenntnis* (Stuttgart: Klett-Cotta, 1986); M. J. Petry, ed., *Hegel und die Naturwissenschaften* (Stuttgart: Frommann-Holzboog, 1987); M. J. Petry, ed., *Hegel and Newtonianism* (Dordrecht: Kluwer, 1993).

[5] For a related, though divergent, reading of the *Phenomenology*, see Michael N. Forster, *Hegel and Skepticism* (London: Harvard University Press, 1989), part 3.

[6] Hegel both denies (WL p. 843) and affirms (WL p. 834) that logical thought effects a "transition" to nature. This inconsistency reflects his belief, explained below, that nature is a form of logical thought, not a fundamentally distinct entity.

[7] For simplicity I use a terminology slightly different from Hegel's own: what I call "consciousness" he calls "consciousness as such," locating it within a wider category of "consciousness" that also includes "self-consciousness" and "reason."

[8] The text of PSS includes lecture notes by Hegel's students Griesheim and Kehler as additions. References to Griesheim's notes are indicated (G).

[9] For Hegel, consciousness' "knowing" the external object is equivalent to its thinking of it as external: "In that I posit this being as an *other* ... I am *knowing*" (PSS §413A/Vol. 3, p. 5).

[10] In consciousness "I ... distinguish the two, myself and ... the object" (PSS §415A (G)/Vol. 3, p. 285).

[11] I read Hegel's *Logic* as describing the serial forms assumed by extra-human, objectively existing, thinking activity, following his statement that thought is not merely "a subjective activity, but rather ... strictly universal and hence objective at the same time" (EL §80A/p. 127).

[12] Hegel, *Aesthetics: Lectures on Fine Art*, translated by T. M. Knox (Oxford: Clarendon Press, 1975), Vol. 1, p. 143.

[13] This progression is rational, not temporal (Hegel condemns the idea of evolution at EN §249R, A/Vol. 1, p. 212-14).

[14] Hegel equivocates here. He usually treats life as a mere "transition" between understanding and self-consciousness, not a fully-fledged stage, but at PSS §423A (G)/Vol. 3, p. 311-13 he instead identifies *understanding* as merely transitional between perception and life. It is most helpful to simply suppose that consciousness contains four stages.

[15] This correspondence is reinforced by Hegel's close association of "sense-certainty" with space and time in the *Phenomenology*; he criticises this association in the *Philosophy of Spirit* yet, obscurely, retains it (PSS §418A (G)/Vol. 3, p. 299-303).

[16] For a succinct account of Hegel's concept of the "singular" (or "individual") see David Kolb, *The Critique of Pure Modernity: Hegel, Heidegger, and After* (Chicago: University of Chicago Press, 1986), p. 61.

[17] "What is sensuous is not to be presented as being in the senses" (PSS, §418A (G)/Vol. 3, p. 299).

[18] However, because the conceptions deployed in sensuous consciousness are so minimal, the ego retains particularly extensive non-conceptual access to its content; in this relatively refined sense, sensuous consciousness is "richest in content" because "poorest in thought" (PSS §418R/Vol. 3, p. 19).

<sup>19</sup> Robert B. Pippin locates the same argument in the *Phenomenology* chapter on "sense-certainty": the sense-certain subject cannot know objects because, to know



objects, one must be able to pick them out (*Hegel's Idealism* (Cambridge: Cambridge University Press, 1989), p. 119).

[20] Hegel identifies naturally existing universals as “forms of the concept” (EL §24A2/p. 59), or more precisely phases in the development of the concept (EN §246/Vol. 1, p. 197). This equation of universals with forms of the concept can be observed at work throughout the *Philosophy of Nature*. (See also the extended discussion of universals and the concept at EN §246A/Vol. 1, p. 197-205.)

[21] Hegel describes the material body in questionably anthropomorphic terms, later claiming that it reaches an “acknowledgement” (*Bekanntnis*) of its inner deficiencies (EN §262R/Vol. 1, p. 242). He speaks anthropomorphically because, for him, spirit is the most fully developed form of reality; less fully developed forms, such as natural entities, approximate inadequately to spirit, consequently receiving characterisation in terms that apply to spirit.

[22] “[T]he singularities ... are all merely units, many units; they are one” (EN §262A/Vol. 1, p. 243).

[23] Hegel, *Lectures on the Philosophy of World History: Introduction: Reason in History*, translated by H. B. Nisbet (Cambridge: Cambridge University Press, 1975), p. 48. See also EN §262R, A/Vol. 1, p. 242-3.

[24] EN §324R/Vol. 2, p. 167 refers to “the concept existing as particular bodies.” That “essential” bodies are forms of the concept is also evidenced in Hegel’s later discussion of life (§337A/Vol. 3, p. 10-11).

[25] Alexandre Kojève, *Introduction to the Reading of Hegel*, translated by James H. Nichols, Jr. (New York: Basic Books, 1969), p. 146.