

## HEGEL'S *PHILOSOPHY OF NATURE* OF 1805-06; ITS RELATION TO THE *PHENOMENOLOGY OF SPIRIT*

Daniel E. Shannon

ABSTRACT: Hegel's *Phenomenology of Spirit* (1807) was the introduction and first part of the Jena System III; it was to introduce the other parts of his project. Most commentators on Hegel's *Phenomenology*, however, do not consider how the *Phenomenology* relates to the other parts, and some discount Hegel's understanding and commitment to the natural philosophy of his day. This paper attempts to make the connection between the *Phenomenology* and the *Natural Philosophy* of 1805-6 explicit; to show where and how the connections are made; to identify how Hegel uses the natural sciences of his day in creating his system. By showing these relations we should recognize that his concept of Spirit is born within his natural philosophy. It is part of his cosmology.

Keywords: Hegel; Philosophy of Nature; Phenomenology

G. W. F. Hegel tells us that his *Phenomenology of Spirit* (1807) is the introduction and first part of his system of knowledge (*GW* ix, p. 447).<sup>1</sup> This system today is called the 'Jena System Projection III', wherein the second part contains the *Logic* and the *Philosophies of Nature and Spirit*; it was composed in 1805-6 and, thus, overlapped the composition of the *PG*.<sup>2</sup> No one has attempted to relate Hegel's *Philosophy of Nature* to the *PG*, even

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<sup>1</sup> G. W. F. Hegel, *Phänomenologie des Geistes*, Wolfgang Bonsiepen and Reinhard Heede (eds.), *Gesammelte Werke*, vol. 9, 31 vols., 1<sup>st</sup>. ed., Hamburg, Felix Meiner Verlag, 1980. Hereinafter all citations of the *Phenomenology of Spirit* are to this edition, which will be cited as *PG*, *GW* ix, followed by the page number. Hereafter references to the *Phenomenology* will be abbreviated as *PG*. German quotations retain Hegel's original spelling. All translations into English are my own. Karl Rosenkranz, the first editor of Hegel's complete works, places the *PG* within Jena System III when he states, 'Er [Hegel] trug die Phänomenologie, die er seit 1804 zur Veröffentlichung vorbereitete, einmal in Sommer 1806 wirklich vor', *Hegels Leben*, 1<sup>st</sup>. ed., rpt. Darmstadt, Wissenschaftliche Buchgesellschaft, 1977, p. 214; cf. p. 162; on the relationship between the *PG* and System III see also Rosenkranz, pp. 193-4.

<sup>2</sup> The *Logic* was never written, or if written it was lost. The *Philosophies of Nature and Spirit* is the only part that remains besides the *PG*. The Critical Editors of the *PG* tell us that the preparatory work was begun

though it has specific chapters that involve his conception of nature.<sup>3</sup> This paper makes this connection evident, and it shows that Hegel was committed to a system of philosophy that incorporated the natural science of his day.<sup>4</sup> It attempts to counter a widely held belief that Hegel's *PG* deals exclusively with self-consciousness and social science.<sup>5</sup> While Hegel's work does focus on them, 'Spirit' (*Geist*) is a natural occurrence; it is the result of the evolution from inorganic to organic nature; thus the *PG*, in order to exhibit a unified system, must relate Spirit to natural processes. The paper explicates the main divisions and sections of his *Natural Philosophy* of 1805-6 and relates them to the sections of the *PG* that are most influenced by his understanding of nature.<sup>6</sup> It serves the purpose of showing why we should think that the *PG* has integrated within it the other parts of System III.

The *NP* was the first part of System III to be written. Unlike the earlier version of 1804-5, this one is more empirical and has no discussion of God, only a brief treatment of aether, and the ideal elements appear only from the processes of the real elements.<sup>7</sup>

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likely in the spring of 1805 with the fragment 'Absolute Knowledge'. The final draft looks to have started no later than February of 1806; see Critical Editors' report, *GW* ix, 456 and following. Hereafter the *Natural Philosophy* will be abbreviated as *NP*. All translations are my own. See below n. 6.

<sup>3</sup> The Critical Editors of the *PG* provide cross-references to Jena System III. In brief the connections are: the *NP* begins with space, time, and existence, and these are also treated in chapter one of the *PG*; the constitution of bodies as 'masses' in motion in the mechanics sections of the *NP* are also treated in chapters two and three of the *PG*; the underlying forces of the corporeal substrate and the cosmology of the earth in the chemistry and process chapters of the *NP* are also treated in chapter three of the *PG*; the emergence of life and the individual's evolution from the species in organism chapter of the *NP* is also treated in chapter four of the *PG*; the formation of the organic individual as the self in the *NP* is also treated in chapter five of the *PG*; the blood ties forming ethical bonds in the *NP* are also treated in chapters four and six of the *PG*.

<sup>4</sup> A more common view, which I believe to be mistaken, is that Hegel is opposed to the explanations and models of the natural science of his day. For instance, Michael Vater claims that 'Hegel continues to explore the territory of the empirical sciences and its techniques...and their failure when extrapolated to a more universal domain', p. 156, 'Schelling in Hegel's Phenomenology', in Alfred Denker and Michael Vater (eds.), *Hegel's Phenomenology of Spirit: New Critical Essays*, New York, Humanity Books, 2003, pp.139-68.

<sup>5</sup> For instance, we see the first tendency in Robert Pippin, *Hegel's Idealism: the Satisfaction of Self-Consciousness*, 1<sup>st</sup>. ed., Cambridge, Cambridge Univ. Press, 1989, and the second in Terry Pinkard, *Hegel's Phenomenology of Spirit: the Sociality of Reason*, 1<sup>st</sup>. ed., Cambridge, Cambridge Univ. Press, 1994.

<sup>6</sup> G. W. F. Hegel, *Naturphilosophie und Philosophie des Geistes* of 1805-06, in Rolf-Peter Horstmann (ed.), *Jenaer Systementwürfe III, Gesammelte Werke*, vol. 8, 31 vols., 1<sup>st</sup>. ed., Hamburg, Felix Meiner, 1976, pp. 3-287. Hereinafter all citations to System III are to this edition. This work will be abbreviated as *NP III*, *GW* viii, followed by the page number.

<sup>7</sup> G. W. F. Hegel, *Logik, Metaphysik, Naturphilosophie* of 1804-05, in Rolf-Peter Horstmann and Johann Heinrich Trede (eds.), *Jenaer Systementwürfe II, Gesammelte Werke*, vol. 7, 31 vols., 1<sup>st</sup>. ed., Hamburg, Felix Meiner, 1971, pp. 3-338. Hereinafter citations to System II will be to this edition. The text will be

It has three main parts: I) Mechanics, II) Formation and Chemistry, and III) Organism. It is Hegel's philosophy of the 'real', which looks to the natural sciences as its source, and in it we should see the emergence of what Hegel calls the 'concept', culminating in the unity of self and world. This identity is presupposed in the *PG* itself since it, being the introduction and first part of Jena System III, necessarily assumes the other parts and their unity with it.

## I

The *NP* begins with Hegel's concept of absolute matter, which as in the System II version is called 'aether', but almost immediately thereafter Hegel turns to the concepts of space and time which are explicitly Kantian. We should accept that Hegel thinks that space and time are concepts, even though this is not how we experience them in our phenomenal existence. Experience is prior to abstract conception. The concepts are quantitative determinations of absolute matter. They are not 'ordinary' concepts of space and time but are, as geometers and physicists surmised, created from mathematical abstractions and pure intuition; these involve only the absolute forms of space and time. In the *PG*, near the conclusion of chapter one, 'Sense Certainty', we see the parallel treatment of these concepts. The universals of space and time, which he calls there the 'here of many heres' and the 'now of many nows', are formed by an act of intelligence that creates the universal in which the fleeting moments of time and space, individual nows and heres, appear (*PG*, *GW* ix, p. 68). The transcendental universal is an 'abstract concept' that determines how the matters of sense will occur in perception. The concept is in the Kantian manner 'mathematical' since it sets the order, dimension, and sequence for things and sense qualities to appear in observation.

In both accounts Hegel departs, however, from Kant's 'Transcendental Aesthetics' once he identifies the intuition of space with a mode of self-consciousness. Hegel tells us that

. . .space is in-itself the immediate inward ensouled spirit which, as being in-itself, is not valued for its truth. Instead, it now becomes a nature that is present there and is no longer in-itself. In spiritual nature the self-conscious essence of space falls *outside* of spirit; that is to say, spirit is self-consciousness implicitly, or internally, in its idea. The connection of this determinacy with existing space is that space should be considered an intuition which until this moment was not spatial (*NP* III, *GW* viii, p. 5).

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abbreviated as *LMN*, and cited as System II, *GW* vii, followed by the page number. All translations will be my own.

Space in this account is the abstract essence of nature which encloses Spirit. It is simply ‘there’, which we mark empirically, but as a concept it is only the presence of nature that has not acknowledged its own soul—self-consciousness. Spirit first begins to emerge with spatial intuitions. The spatial determinations of nature, Hegel will tell us later in the system, are absolute quantities. The important point to see is that they are moments of self-consciousness but are not recognized as such.

The *NP* is the journey of the concept to the recognition of self-consciousness in nature which only occurs in the final pages of ‘Organism’. There Hegel presents the process of individual life and death (*NP* III, *GW* viii, p. 174 and following). This journey articulates what he calls the ‘Idea’, a term he takes from F. W. J. Schelling’s natural philosophy, which culminates as the absolute point of identity between self and nature.<sup>8</sup> The *NP* in System III, as true to the earlier natural philosophies, is heavily influenced by Schelling and his circle. What this implies is that the *PG* is also deeply rooted in this school of natural philosophy.<sup>9</sup> We should look at how Hegel develops the Schelling’s account for his own purposes.

In Schelling’s explication of the Idea, nature has a soul that is the organism from which the human species develops. Hegel accepts that the soul of the world is generated from the organism as a result of this development. In the *Philosophies of Nature and Spirit* of 1805-6, like the *Logic, Metaphysics, and Philosophy of Nature* of 1804-5, the focus of the journey of the Idea is on nature, and the process of the species appears central to his presentation of the concept. But the account in System III expresses the *experience* of the parts of the system, and also articulates the Idea as the essence of the entire movement. It is the complete concept. While the Idea is abstract, it comes from

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<sup>8</sup> It is Schelling who points out that Hegel’s ‘concept’ is just what both of them had been calling ‘idea’; see Schelling’s letter to Hegel, November 2, 1807, in *Briefe von und an Hegel*, Johannes Hoffmeister (ed.) vol. 1, 4 vols., 3<sup>rd</sup> ed., Hamburg, Felix Meiner, 1981, p. 194. Later, Schelling explains more completely, in his Munich lectures *On the History of Modern Philosophy* (1827), that Hegel developed the concept of Spirit as germinating from the ‘idea’ rooted in natural philosophy: ‘God is nothing other than the concept that by stages becomes the self-conscious idea, and as this idea discharges itself into nature, and, returning from nature into itself, it becomes absolute spirit’, *Sämtliche Werke*, K. J. Schelling (ed.), vol. 10, 14 vols., 1<sup>st</sup> ed., rpt., Darmstadt: Wissenschaftliche Buchgesellschaft, 1980, p. 127. Citation is the original pagination. The translation from German is my own.

<sup>9</sup> Hegel relies on the same version of natural science that Schelling articulates in such works as *On the World-Soul* (1798). Hegel’s objection to Schelling’s view of natural science occurs in System II, where he considers Schelling’s version to express only the quantification of the concept. Schelling’s entire system is placed under the category of Quantum. In the Preface to the *PG* Hegel also objects to the occultism inherent in Schelling’s system. Vater, ‘Schelling in Hegel’s Phenomenology’, among others, denies the inherent connection between Hegel’s *PG* and Schelling’s natural philosophy; see pp.145-9.

experience.<sup>10</sup> The complete concept comprises in this manner the factual evidence present to consciousness itself. It is not a concept generated from metaphysical laws or conceptual formalities, which had been the case in System II.

In System II, Hegel approaches the journey of the concept rationalistically (its centrepiece, 'Essence', was adapted from Leibniz's *Monadology*),<sup>11</sup> but in System III he attempts to show the compatibility between empirical investigations and transcendental idealism. In the new version of his natural philosophy the *evidence* of the concept is empirical. We are supposed to see it vindicated in the experimental and theoretical work of contemporary natural scientists. But their empirical work would be useless without the *form* of the concept; the form is *a priori* and reflects an abstract universal. Thus, empirical science only presents the concept as it shows itself in the material world. It does not show us how the form of the concept occurs. The essential drive of the complete concept, or Idea, is the generation of Spirit from nature. The development of the concept from 'Organism' onwards is the presentation of embryonic Spirit. But let us return to the beginning of the *NP*.

## II

When the movement of space and time finally emerge as matter in motion, Hegel shifts the emphasis away from quantity to movement. Matter is a 'mass', that is, a body with extension and weight, and it is in continuous motion; it fills its place, it spreads to every inch that it can occupy. Because nature abhors a vacuum, matter moves to assure that no vacuum can actually be formed among masses. Matter is essentially a moving fluid, but a mass is a body fixed to its place by other matters. It has, in contrast to the fluidity of matter, a principle of individuation due in it to inertial tendencies: to rest, to resist, and to fall.<sup>12</sup> Hegel is speaking of how a thing remains 'one' externally despite the fact that it exists only in relation to other bodies in a continuum of parts outside of parts.

<sup>10</sup> 'Experience' (*Erfahrung*) is formal knowledge, that is, knowledge mediated by concepts. Hegel has in mind 'scientific experience', which involves ratiocination, critical reflections, and schematization in order to fathom the depths and complexities of the concept.

<sup>11</sup> 'The dialectic of Reciprocity is the dialectic of rational monads...The only real or active reciprocity is the establishment of the closed cycle of monadic rationality', H. S. Harris, *Hegel's Development: Night Thoughts*, vol. 2, 2 vols., 1<sup>st</sup> ed., Oxford, Clarendon Press, 1983, pp. 373-4. Hereafter this work will be cited simply as *HD* II, followed by the page number.

<sup>12</sup> 'Die Masse in diesem Sinne fixirt heißt, *träge*; nicht so daß das Ruhen damit ausgedrückt würde. Die Dauer ist Ruhe in der Beziehung, daß sie als Begriff ihrer Realisirung der Bewegung entgegengesetzt wird', *NP* III, *GW* viii, p. 23.

The genuine identity of a body is internal to the mass according to its inertial property. A mass's material identity belongs to these inert qualities which we observe and calculate as a body's specific gravity. Its composition in motion and its preservation of place requires a force to repel other bodies which attempt to occupy its location. The principle of its identity thus appears Archimedean. When Archimedes discovered the principle of true material identity as specific gravity he noted that the 'weight' of each substance is unique in regard to its displacement of water. He was measuring the *Träge* (specific weight) of a mass. So, the qualities of a body's mass in motion are essential to forming the body itself, and they show within the body relations of comparative forces at play. The analysis of mass in Hegel's natural philosophy also appears in the *PG*; specifically, at the beginning of chapter three, 'Force and Understanding', where he identifies the underlying substance of a perceived body as a play of forces (*GW* ix, p. 86). The body itself is the individuated mass. That it is 'one' and moving is due to the unseen but necessarily occurring play between the fluidity and individuating mass of the body.

A 'mass' is both a continuum of fluidity and an individual entity restricted to a place. Hegel investigates its two sides as two *relata* in one conceptual relationship. Concerning the continuum of matters, a body becomes an individual due to the influence of the external motion of its mass, which is in opposition to other masses, and of the internal motion of its chemical formation, which forms its internal cohesion. Hegel considers first external motion, which is presented as 'accidental' to the body's essence, and second he considers internal motion, which is presented as the essence.

We will look at external motion first. Hegel tells us to consider the body as belonging to cosmic movements. A cosmic mass may move externally in one or two ways: either in a perfect cycle, such as the 'fixed stars', or in an irregular cycle, such as the comets and planets. The latter are 'irregular' because they are elliptical and have a distinct polarity (cf. *NP* III, *GW* viii, p. 32). The planetary cycle, in which our earth is a part, presents the oscillating ellipse, and the bodies themselves are rotating ellipsoids. Hegel believes that this particular shape and irregular movement are important to the concept since these 'imperfect' bodies show a dynamic tension of expansion and retraction between their poles. There would not be such an irregular motion if there were no poles, that is, no opposite forces pulling and pushing on each other. An oscillating ellipse occurs only through a dynamic that moves from one extreme to another, continuously strives towards equality, but never succeeds in attaining it. The irregularity of the motion shows us that the poles exist as opposing unstable tendencies. Only the fixed stars have equality without conflict, and thus they

are less important to the concept than the planets and comets. In contrast to the stars, the shape and motion of the oscillating earth show that a 'natural history' is possible because such an imperfect shape shows continuity within change: a repetition of oppositions that seeks unity without rest.<sup>13</sup>

This oscillating earthly motion and its ellipsoid shape are suggestive of how Hegel's transcendental logic, or dialectic, should also be represented for World Spirit. The logical movement captures the motions that determine precisely the principles of identity and difference in all things. The cycle of oppositions understood logically is not a perfect series of contraries and contradictions. (If they were there would have stasis, no actual development, and thus no history.) The logical pattern of opposition concerns *this earth* and our existence emerging from it, living on it, and ultimately returning to it. The earth cycle is elliptical and 'imperfect'; its movement has, then, a natural history of oppositions *in extremis*, that is, one side supersedes the other, only to be undone by its counterpart. Similarly, the logical pattern discovered in the earth cycle is elliptical, that is, it has an irregular movement that strives for equality and unity through the supersession of opposites, but it never actually sustains them in unity. Hegel will use this pattern of the earth cycle both in the opening section of chapter four, 'Self-Certainty', and the opening section of 'Estranged Spirit' in chapter six, 'Spirit' (cf., *PG, GW ix*, pp. 105-8, 269). He is reminding us that 'Spirit' can only *repeat* the pattern of the earth cycle; it has only that logical movement even as it develops its own identity. It also tells us that the reality of World Spirit will come to an end.

The logical pattern governing World Spirit seems superficially uniform; its shape is formed by its peripheral movement. The pattern, examined in-depth, is in fact irregular, like the orbits of planets and comets, and *inertial*. The continuous striving for equality in planetary motion is a movement towards decay and death, and this will also be Hegel's *leitmotif* concerning the materiality of World Spirit: death is precipitated in it. The inertial features of a mass inform us of this, and the specific external appearance of movement on the earth always has this 'downward' feature. The natural pattern of motion is towards destruction. In relation to his mechanics of bodies, this simply means that bodies seek to return to the fluidity from which they arose; that the rigidity of their existence is contingent on a separate process by which the fluid matter became inertial.

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<sup>13</sup> 'Es hat sie [Bewegung] an ihm, aber sie bleibt ebenso gleichgültig, und verschieden zurück, als ein besonderes Daseyn, *als eine Geschichte*, oder als der Ursprung, gegen das Fürsichseyn gekehrt ist, um eben für sich zu seyn', *NP III, GW viii*, p. 33. Emphasis occurs in the original.

The significance of the inertial tendency for Spirit is seen in the *PG*. Hegel makes the same point in the opening section of chapter four, which leads to the confrontation of one self to another in a life and death struggle, ending in death for the vanquished (*PG*, *GW* ix, p. 112). Further, in chapter six the final gasp of ‘Self-Estranged Spirit’ is when the *être supreme* is killed in the ‘Absolute Freedom and Terror’ section (*GW* ix, p. 318). As long as the process is governed by the logic of material forces, that is, by the cycle of the earth, then death is the only outcome. Spirit is an earthly phenomenon. Even as it produces its own history and social identity, it cannot transcend its material origins. However, we are still only looking at the external side of the motion, not to its internal development, or its essence.

The other motion of the body, which was mentioned previously, is internal, and it produces the necessary and sufficient conditions of individual existence (*Existenz*). It is the responsible agency for generation and natural motion. Thus, Hegel’s complete concept, or Idea, moves from external inertial tendencies to internal dynamics, and by doing so it develops towards ‘Organism’ in which the soul of nature will be demonstrated.

Hegel describes the formation of mass through its internal activity in the second chapter of ‘Mechanics’, which he calls ‘Formation and Chemistry’. ‘Formation’ (*Gestaltung*) accounts for how material bodies come to exist according to common powers and what is the material effect of these powers on individual bodies. Hegel comments that ‘matter as immediate pure totality enters in opposition between what it is *within itself* and what it is *for another*— this constitutes its determinate existence [*Daseyn*]; for its determinate existence does not yet have inherence within itself. Matter, as it has been conceived, exists as both the unrest of this swirl, which belongs to the self-connecting movement, and as the return to being on its own account...’ (*NP* III, *GW* viii, p. 35). *Daseyn* is a logical category for the qualitative determination of the concept, as opposed to a quantitative determination, which defined *Träge*. It is the category that shows how a body exists as something for-itself, achieving ‘being on its own account’. To define the motion of the individual in and through *Daseyn* is to penetrate into the essence of material reality.

Hegel further tells us that matter exists in determinacy because of the unrest in its internal continuum and the striving to overcome that unrest in producing equilibrium. The common powers of matter by which a body gains shape are just the expression of this motion. A ‘common power’ is empirically a complex idea of primary and secondary qualities; it is noted because of perception, but its *real* existence is due to the way material substances interact. Hegel in chapter two of the *PG*, ‘The Thing and Its Properties’, discusses explicitly two such powers: the ‘one’ that provides perceptual

identity, and the ‘also’ which provides cohesion of matter (*GW* ix, pp. 71-81).<sup>14</sup> In terms of his *NP*, the ‘qualities’ that we ascribe to a body do not belong to a perceptual quality, what the empiricists took to be secondary and primary qualities, but what belongs to the oscillating movement of material fluidity. These powers are those common characteristics that involve both actions and passions of bodies in their essential fluidity. For Hegel we can sum up these powers by describing a body according to its degree of *elasticity* (cf. *NP* III, *GW* viii, pp. 38-40). This degree is what provides the body its observed shape. ‘Shape’ (*Gestalt*) is thus a result of the interaction among many bodies in a restless continuum of motion. Among these qualities ‘light’ is exceptional; for it is a power that comes-to-be outside of terrestrial interactions. It occurs from the excitement of matter, and it operates independently of inertial heaviness. Hegel’s account of how an individual entity comes to sustain its existence as a being-for-itself, that is, as an independent thing, is based on the opposition present between a body’s external movement toward death and the exciting phenomenon of light. Let us look more closely at this relationship.

Hegel contends that light is the shape of matter which appears to have none of the common characteristics belonging to the other externally moving shapes. Its *Gestalt* has an antithetical motion compared to theirs. Whereas the ‘determinate existence’ of external motion is cyclical and returns only to inertial characteristics, light ‘...is the pure existing force of filling space; its being is absolute velocity’ (*NP* III, *GW* viii, p. 35). Its motion is constant and has no internal rotation, and no motion exceeds it. Hegel considers light to be ‘against *determinate existence*’, by which he means that pure light is free of inertial tendencies (*NP* III, *GW* viii, p. 35). Yet, without light there would be no ‘shaping’ of terrestrial matter either. The occurrence of common forces, as identifying the way that matter exists, requires the agency of light. ‘Shape’ is seen and attributed to bodies only because light is either reflected or absorbed by them. Matter considered apart from light is only, in Hegel’s words, ‘darkness or abstraction’; light absorbed by and reflected off rigid matter provides the chemical shape of individual entities, and as this reaction occurs light will take shape in reciprocity with its effects; that is, pure light becomes fractured by its interactions with dark, cold matter, and it becomes part of the inertial cosmos (*NP* III, *GW* viii, p. 35). Hegel describes this process as the pure force that loses its force, or the force that becomes impotent, and then

The *determinate actuality* of light, its subjectivity, is henceforth the tearing into innumerable points of the bad infinite [i.e., quantitative determinacy]. This

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<sup>14</sup> The distinctions continue to be developed throughout chapter three, ‘Force and Understanding’, *PG*, *GW* ix, pp. 83-5, 88, 91. The ‘One’ becomes identified with the essence or form of the material substrate.

impotently internally-existing force has, however, essentially an externality named 'reality'; it is the sun, the celestial sphere that is the midpoint of motion, that becomes the light which is the source of life but not life itself (*NP III, GW* viii, p. 36).

Light is fractured into innumerable particles because it has been absorbed into and reflected out of dark, lifeless matter. It becomes seen as a corporeal entity only as it is drawn into the centre of a system by an extreme inertial force, namely, the sun. From this centre point light takes on its corporeal particular 'shape' as particles and spreads out away from the centre, filling space and producing heat. But, because it has entered into and gone out of the centre, light enters into a cycle of decay. It acquires inertial mass as moving particles. It is from light, however, that a necessary condition of life is forged. From light comes 'warmth', and for Hegel the generation of heat in matter forms the most important condition of nature because it leads to the creation of organic molecules.

Hegel's cosmic account is only one reason why he makes mention of light and the sun. When he turns to the section 'Chemistry' he wants to account for what the physicists describe as 'caloric matter'. Sunlight brings with it warmth, and in chemical interactions, which account for the relative elasticity of bodies, the warmth of certain chemical reactions he believes comes from the residual effect of light being absorbed in dark, cold matter.<sup>15</sup> Even before 'Chemistry', Hegel shows that he will only accept the 'real account' of chemists as providing the material principle for why matter is formed specifically through reactions. Note, however, that light while being material is a phenomenon set apart from other matter. It is associated with *aether*, a divine element, from which the cosmos receives its impetus to grow and evolve.<sup>16</sup>

Hegel turns to Henrich Steffens (1773-1845), a follower of Schelling who is also cited in Schelling's *Ideas* (1797) and *On the World-Soul* (1798) treatises, and reports on his theory that ordinary matter is formed through a *cohesion* of fluidity (cf. *NP III, GW* viii, pp. 47-8). Steffens believed that the earth was held together by magnetic forces. Since Benjamin Franklin's (1706-1790) discovery of electricity in 1752 and Leonard Euler (1707-1783) investigations into magnetic forces, the energy of the magnet was considered to be a caloric fluid that permeated all matter. This belief was supported by John Dalton (1766-1844), the father of modern atomic theory, who speculated that

<sup>15</sup> For instance, Hegel says, 'Als Schwingen ist es diese Negativität, diß Erzittern in ihr selbst die achsendrehende Bewegung, oder das unruhige *Licht*, das itzt zum Daseyn herausdringt', *NP III, GW* viii, p. 46. Emphasis is in the original.

<sup>16</sup> Aether is the element that Newton and the Cambridge Platonists favoured in order to account for gravity. Hegel is borrowing from them. Newton elaborates on aether in his *Optiks* (1704). Henry More championed aether as the divine element against Descartes' mechanics.

the atmosphere of the earth is held onto its surface by magnetic powers in the stratosphere.<sup>17</sup> Thus, it is not surprising that Hegel treats magnetism as the force of cohesion. The earth's magnetic poles, as mentioned previously, account for the planet's ellipsoidal shape; the magnetic force pulls towards the centre along the north-south axis, while pushing outward at the poles, thus elongating the earth's body. Schelling had already noted this point in *On the World-Soul*, and Hegel alludes to Schelling here when he states that

The *whole body, the earth*, is a magnet, which means that the magnetic axis does not pass through it or that the magnetic force is a line. The magnet and the various intensities of it are represented according to the determinate points of decline or incline of the magnetic needle connected to such an axis. . . . The physicists have returned to the position that the iron rod, or the determined existence in the direction of the axes, should be surrendered. They have discovered that practically speaking the only acceptable location of the magnet is in the middle of the earth, which has infinite intensity but is without extension; that is, it is hardly a line as such....Magnetism is instead the total *universal* earth....In the earth the magnet is everywhere (*NP III, GW viii*, p. 53).<sup>18</sup>

One of the more significant philosophical problems that Hegel raises here is what constitutes the focal point of philosophical natural science. He objects to any formalism that places a 'model' in a privileged position against the totality of nature itself. When he comments that the 'iron rod...should be surrendered' he is explicitly denying that natural philosophy should be wed to artificial models or paradigms. The whole earth is the paradigm.

We can see that Hegel makes this same point in the *PG*, also in connection to magnetism and the earth's poles, when he describes the *inversion* of worlds at the end of chapter three, 'Force and Understanding' (*GW ix*, p. 97, line 10). The connection in this section of the natural philosophy to Schelling's treatment of magnetism is important because Schelling in the *Ideas of Nature* and *On the World-Soul* essays, relied on occult models, the very paradigms that Hegel believes *science* comes to reject, and what he explicitly rejects in the *PG*.<sup>19</sup> The 'new movement' of science is to return to totality,

<sup>17</sup> John Dalton, *Meteorological Observations and Essays*, 1793, rpt., London, Baldwin and Cradock, 1834; see 'Section Eleventh', pp. 60-3, and 'On the Aurora Borealis', esp., pp. 170-4.

<sup>18</sup> Hegel is repeating the points about the terrestrial magnet that Dalton makes in his essay, *Meteorological Observations and Essays*. See note above, especially, pp. 60-2.

<sup>19</sup> It is not natural science or scientific objectivism that Hegel is disproving in 'Force and Understanding'; it is arbitrary and occult models that are not truly based on earth science. Hegel, as we can see in the

that is, to the earth as the basis of scientific experience. Magnetism has a special function in this regard; it shows us how the whole earth is shaped and also the *direction* that the concept should follow. That direction is to form distinctions in the earth's constitution. Hegel remarks that

The distinction that is present here is, however, the determination of specific gravity; the poles are of various specific weights. There are also electrical divisions, and chemical, etc. ... *This is above all else the occupation of physicists, namely, to investigate and present the identity of the concept as the identity of the appearances. The variation of the poles is therefore a delineation of a universal determination* (NP III, GW viii, p. 54, emphasis added).

Hegel believes that physics is actually showing the development and direction of the concept. Physicists have returned to the philosophical understanding of the whole replacing abstract 'conjectural' models of how nature works. He is endorsing and approving of their endeavours.

Whereas previously the magnet might have been approached through seeing how a needle is affected by load stone, now that the entire earth is viewed as a magnet we get a better appreciation for the true fluid dynamic of magnetic force, and thus we can see how the rigidity of the earth's mass arises from the suppression of its fluidity. It is the force of magnetism that provides *tone* (*Ton*) to matter. Hegel comments that 'The magnet moves itself further. Its essence is the universal self-resting total dimensionality of fluidity inwardly extinguishing itself, in which it has tone within itself. Nonetheless, the movement of the magnet is something *external*, insofar as even its negativity does not yet have a real substantial side, or the moment of totality is not yet free' (NP III, GW viii, pp. 55-6).<sup>20</sup>

In the earth the metals and crystals show us the structure of the magnetic lines: 'The lines of the crystal constitute this indifference; one can be separated from another and the lines remain, but they have absolute significance only in connection to another' (NP III, GW viii, p. 57). The purpose of the universal magnet is to form these lines in the earth's crust and to indicate that the inner earth, the core, is the source of the force.<sup>21</sup> The magnetic forces that have shaped the whole of the earth are, however, also responsible for shaping its parts, and for Hegel the 'bones' of the earth are the rocks, especially metals and crystals, that should be seen as formed through

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above passage, and the one that follows below, contends that natural science had already made the turn to the naturalistic earth model.

<sup>20</sup> Hegel relies primarily on Johann Ritter's investigations regarding the magnetic properties of the earth. Johann W. Ritter, *Das Electriche System der Körper: Ein Versuch*, 1<sup>st</sup> ed., Leipzig: C. H. Reclam, 1805, pp. 379-80.

<sup>21</sup> 'The purpose [of the lines] is this unity and absolute significance' NP III, GW viii, pp. 55-6.

force. This is the way the parts of the earth are formed due to the total effect of magnetism on the whole body. Internal cohesion expresses itself externally as our globe that has a rigid, hard crust.

The composition of the earth is *externally* presented in the physicists' understanding of the magnetic globe, but Hegel turns the question of the body's composition back to its internal unity, or what accounts for the gravity (*Schwere*) of the whole. He notes that this question takes us back to light and its absorption in dark, cold matter. In this absorption light warms the minerals. In this warmth light is present '...as the forceful determinate existence or the pure material force which constitutes the moments of substance—pure chemical stuff' (*NP III*, *GW* viii, p. 59). This 'pure material force' is *caloric matter* (*Wärme*). Light is what brings warmth to matter and thus matter to substance; that is, to its genuine actuality as existing on its own account. The effect of light is an internal force, and chemistry investigates it. This is why the section on 'Chemistry' shows us the true substance of things is caloric matter.

Before we look at the particulars of 'Chemistry', we should consider why this account of formation in the natural philosophy is important for the *PG*. Since the *NP* of 1805-6 was written with the *PG* in mind and since the *PG* is the introduction to it, we should expect that at least some sections of the *PG* would approach the question of how the natural world is formed internally.<sup>22</sup> Hegel wrote the *PG* as in part a *recollection* of his 'real philosophy', and the development of the concept there, as a concept of the self that is connecting itself to world, must include nature within the development, otherwise there would be no such entities and no unity between them. The sections of the *PG* that explicitly deal with the natural world occur in chapter three, 'Force and Understanding', and the first section, 'Observing Nature', of chapter five, 'Truth and Certainty of Reason'.

'Force and Understanding' concerns our conception of the natural world as a whole, and in it we find Hegel discussing how natural philosophers think of the material substratum, what concepts they use, and what natural laws are formed. His treatment of nature there is a recollection of his treatment in the *NP*. It is the same concept with the same references. In 'Force and Understanding' the two central phenomena which bridge nature and Spirit are magnetism and electricity (cf., *PG*, *GW* ix, pp. 93, 96). The reason why these phenomena are emphasized in the *PG* is only explained, however, in the 'Formation and Chemistry' section of his *NP*, since within

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<sup>22</sup> We know this from Hegel's 'Self-Advertisement', where he lists the volumes of the *System of Science*: vol. 1, the Phenomenology of Spirit; vol. 2, the Logic, and Philosophies of Nature and Spirit; see *GW* ix, p. 447.

these phenomena caloric matter appears as the agent of attraction that accounts for ‘shape’.

Chemistry is the science of material essence, but the presentation of its concept occurs as a syllogism determining *all* natural processes. In the margin, Hegel remarks that chemistry has three moments: ‘a) shape in respect to caloric matter, b) caloric matter, [that is] its internal determinacy; and c) shape, which later is cohesion; initially it is where caloric matter becomes real according to its elastic fluidity, or [where] temperature becomes the determinate existence, and thus caloric matter becomes the object that is not divided from references to sensation...’ (*NP III*, *GW* viii, p. 60). Chemistry is not just an empirical science; it is the natural philosophy that looks to the reactive processes underlying material formation. It looks to discover what cannot be found through the ‘ordinary’ sense qualities of the body, even as it accounts for our sensation of them. Hegel is committed to the principle that the cohesion of the earth’s body and the observation of qualities can only be explained through caloric matter, which is responsible for the specific gravitational pull of the poles.<sup>23</sup>

Hegel is writing just after one of the great controversies in modern chemistry, whether or not there exists the element phlogiston. ‘Caloric matter’ is typically the other name for phlogiston. The unfortunate part of Hegel’s explication is that he is using an inaccurate description of a process that was already outmoded several years before he composed his treatises. It is as if he knows that phlogiston has been refuted, but he still uses the language of phlogiston in order to describe the basis of chemistry. He has some reason to do this. Joseph Priestly (1733-1804), whose work ultimately led to the refutation of phlogiston, defended its existence and necessity in natural philosophy.<sup>24</sup>

Recall that for Hegel light is the principle element for internal action; it conveys warmth to cold celestial matter. Caloric matter is, then, the stuff that light has conveyed to inert matter; it is supposed to be that which accounts for attraction and ultimately for cohesion among material particles. He thinks that there must be some kind of energy at the atomic level, which is the energy that light gives to matter. So he calls these particles of energy ‘caloric matter’, even though he has no real way of describing it. He, like most scientists, believes that the effects tell us something about causes. Thus, he looks to the effects of chemical actions, which are measured by

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<sup>23</sup> ‘Das Wärme ist durch das Princip der Cohäsion das sich in sich selbst bewegende, dem die Bewegung weder mehr ein Fremdes noch Innres ist. Seine Bewegung in der Gestaltung hat daher die Form daß das Wärme zu sich selbst hinzutritt, als allgemeine zum Besondern, als freyes zum Bestimmten – (wie das Schwere zum Schweren)’, *NP III*, *GW* viii, p. 61.

<sup>24</sup> Most notably in Joseph Priestly, *The Doctrine of Phlogiston and the Decomposition of Water*, 1<sup>st</sup> ed., Philadelphia, Thomas Dobson, 1796.

temperature, pressure, rates of combustion, etc. Within the internal essence of matter, that is, within chemical interactions themselves, there is a duality. There is darkness and light; there is cold and heat. This duality, he believes, will account for the two kinds of pull which naturally occur in nature (what we commonly call the centripetal and centrifugal tendencies), but he sees them as occurring internally in the chemical reactions of the body.

How matter interacts with this duality can best be explained through the work of chemists on the gases. Specifically, Claude Berthollet (1748-1822) and Dalton have contributed most to his understanding that matter is essentially porous, fluid, capable of interpenetration, and when compressed the gases will form rectilinear shapes, not unlike crystals, and produce heat.<sup>25</sup> Thus, caloric matters are the particles of energy that cause interactions that stabilize atomic relationships and bring forth stable molecules. It is their electrical charge that produces magnetic force.

The interaction itself by which the fluidity of matter becomes stable and takes on a shape Hegel simply calls the 'Process' (cf. *NP* III, *GW* viii, pp. 70 and following). There are two kinds. The first, which is the subject of chemistry as empirical science, is the 'real process'. It examines the constitution of the elements, their weight, their relative stability, and it treats them as molecules that compose the everyday substances of perception.

There is a second kind that Hegel is especially interested in, since he believes that it shows a divine presence in the planet. Hegel names it the 'ideal process', which deals with combinations of 'ideal elements'—earth, air, water, and fire. The 'ideal process' comes from the real process. It is not actually a different system but a different appearance of the real interactions. Chemistry, as the empirical science, is only concerned with how the parts work; what, for instance, will happen if hydrogen is combined with oxygen when ignited. The 'ideal process' is not about how the parts work, or what they form when ignited, but what is occurring *for the whole* when all real processes are occurring continuously. In other words, this second process is about how the whole works, and what will happen to the earth when all real interactions are occurring continuously.

The 'ideal elements' are analogies for global interactions. For instance, the element 'earth' is not simply the planet or the ground we walk on; it is by this analogy the combination of warmth and cold parts of matter that form the solids of the crust. These solids are *in reality* rocks, sand, and soil, and the 'earth' is the symbol for the

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<sup>25</sup> Cf. Hegel's long marginal notes, *NP* III, *GW* viii, pp. 64-5. Dalton and Berthollet are named, and there are clear allusions to Dalton's work on the nature of mixed gases in chapter three, 'Force and Understanding', *PG*, *GW* ix, pp. 83-4. Cf., Critical Editors' report, *GW* ix, pp. 495-6.

whole of them. Likewise, the element ‘air’ is not simply the layers of gases that form the atmosphere; it is by this metaphor the combination of warm and cold elements that absorb moisture from the sea, form the intercontinental winds, and therein what brings forth the changes in climate, temperature, and seasons.

In the *PG* the ideal elements take precedence over the real elements, and it is fairly clear why this is the case. They are what we first observe, and they form the planet’s biosphere; without them there would be no life. They account for the colour of water and sky, the seasonal temperatures in the temperate zones, and the rain that nourishes the soil and dissolves the rocks, which release nutrients for plant growth. For ordinary natural consciousness these are the elements that count as the show of appearances, but they are not the real appearance of atomic unities of chemistry that constitute the actuality of appearing things. Ordinary consciousness knows the ‘show’ (*Schein*) but only scientific consciousness knows the ‘real appearance’ (*Erscheinung*).<sup>26</sup>

These ‘common elements’ will account for the symbolic manifestations of Divine Providence in reflective consciousness. If we look at the literature on nature before Kant, such as, Thomas Burnet’s *Sacred Theology of Earth* (1681), Johann Albert Fabricius’s *Hydro-Theology* (1734), and Jean Robinet’s *Of Nature* (1763),<sup>27</sup> we can see that the common elements are thought to represent divine handiwork. Hegel acknowledges these earlier ‘occult’ writings in the *PG*, but he sees them as ‘ideal elements’ representing subjectivity in nature (see *GW* ix, p. 269). Even in the *NP* of 1805-6 Hegel will speak of the water that ‘rents itself’ or light as ‘pure subject’, as if he is speaking of a living thing (*NP* III, *GW* viii, p. 82). This is not because he actually believes that an element is alive; instead, he wants to show that *subjectivity* is already present in nature; it is there in the wind, sky, light, and night that make the planet inhabitable. Chemistry as the study of real processes, parts outside of parts, does not reflect upon the connection between the chemical reaction that forms H<sub>2</sub>O and the existence of warm blue water; for Hegel it is not the chemical compound but the blue water that is the ‘common element’ for living things, including Spirit, because all life is water based.

The real and ideal processes belong to one whole, which Hegel calls ‘total process’, which is where Shape re-emerges in the form of substance.<sup>28</sup> ‘Total Process’,

<sup>26</sup> The distinction appears in chapter three, ‘Force and Understanding’, *PG*, *GW* ix, p. 143.

<sup>27</sup> Hegel quotes Robinet’s treatise on natural philosophy, specifically to the mixing of metals that forms natural composites, in *PG*, *GW* ix, p. 284. There are two additional allusions to this work at *PG*, *GW* ix, 312 and 313. Hegel is speaking of social consciousness being formed by mixing together the nobility and baseness of class consciousness; this is in the ‘Culture’ section of chapter six, ‘Spirit’. See Critical Editors’ notes, *GW* ix, p. 511.

<sup>28</sup> ‘Die Substanz ist die vom Lichte durchdrungene Gestalt’, *NP* III, *GW* viii, p. 76.

which is the last section before 'Organism', contains Hegel's theory of how through the real and ideal processes the earth and moon are formed. The 'shape of substance' involves sublunary phenomena, since only this Shape consists of the unique cosmic process that leads directly towards life. Hegel does not believe that life occurs beyond the earth. His treatment of this section concerns the uniqueness of the earth among all planets, because it retains the warmth of the sun within the internal cohesion of the planet. This internal warmth yields the necessary energy for life.

In Hegel's account of 'Total Process' the earth begins as a dark cold crystal that is warmed by sunlight. The warming breaks down the rigidity of the crystal, releasing gases and water vapour which form an oxygenated atmosphere. The gases expand and interact with each other, thus they compose the sufficient condition for wind and rain. The water, carried across the face of the earth by the wind, returns to the mineral earth and begins to dissolve the surface of the crystal. The erosion fills the seas with minerals, and in the sea the first organic substances are formed. Each stage of the earth's 'formation' is marked by the predominance of one of the ideal elements: the epoch of the sun's warmth is marked by 'fire', the epoch of the expansion by which gases are released forming the atmosphere is marked by 'air', etc. Even though the 'Total Process' is 'real' in terms of actual physical alterations on the earth, the more significant features of it are 'ideal' since they show a turn towards life and subjectivity. When our planet is finally formed as the 'fertile earth', from which flora and fauna evolve, the 'universal individual' or Self has also emerged (*NP III*, *GW viii*, pp. 81-2). Hegel is referring to 'Spirit' that is being born from the earth's cycle of ideal elements.

Before we turn to Hegel's treatment of the fertile earth one point should be made about his views on how it becomes vitalized. Its initial condition posits a lifeless rock, but the vitalizing activity comes through electricity. Hegel believes that the earth is itself a bipolar cell in the great battery of the solar system. His view is an adaptation of contemporary discoveries at the University of Jena. Johann Ritter's (1776-1810) proto-battery was first built in Jena in 1801. It was composed of dozens of cups, where each one had either a base or acidic solution. In each cup Ritter experimented with different metals and minerals, such as gold, silver, and zinc, to see how an electrical current could be established by either wires or foil running from cup to cup. Hegel, thinking of Ritter's experiments, believes that the earth itself is composed of 'cells' of metals mixing with acidic or base fluids, producing electrical currents that flow among

them.<sup>29</sup> Not only is the earth thus composed, but it is part of a cosmic electrical interaction or is a kind of solar battery.

Hegel believes that electrical atmospheric discharges originally came about through the relation between the earth's crystalline structure and the crystals of the comets and the moon.<sup>30</sup> The electrical relationship is only briefly explained. It seems that there is a friction, due to the reflection of light and the expansion of the gases, among many celestial bodies, and this friction produces electrical discharge. The earth is a cell in this exchange, and it is a level of the solar voltaic pile, having the sun at the centre continuously generating light particles. Cosmic electricity has the power to dissolve the crystalline structure of the earth, and it, as part of a greater system, allows the free exchange of current to pass along it. This changing current could, he opines, account for the intensity of the thunderstorms and the exploding meteorite showers (see marginalia, *NP* III, *GW* viii, p. 80). Hegel is explaining how the solar system constitutes an 'open system' of reciprocating electrical forces.

In 'Total Process' the earth is not itself a perfect system; it is only a part of the cosmic whole. In terms of its own totality, the earth begins as a lifeless mass but develops its own cycle due to its position in relation to the sun and other cosmic bodies. Its cycle, arising from the cosmic electrical current, becomes 'closed' in the sense that it will perpetuate itself. The earth becomes a kind of self-recharging battery. Magnetism is generated from the electrical currents, and the tension between the opposing poles, centred at the middle of the earth, accounts for earth recharging itself. The earth process has the potential for life; it will reach its apex only with the cycle of Spirit in the development of the human species. 'Total Process' brings the dialectical account to the fruition of a planet that has the potential for life, or in Hegel's words: 'It

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<sup>29</sup> Reporting on his experiments with the voltaic pile, Ritter writes, '. . . so at present it has been shown that, as was earlier discovered as a possibility, in all bodies there resides a conflict where their electricities yield an *inverted* order; these bodies in this manner *picture a complete inverted series*—what *previously* in one was the *most positive* body becomes *now* the *most negative*, which *inverts the series or order precisely because it is completely inverted*. . . what in the *first external* electrical process was the "positive" side of the series now in the *result* is the *second inward* [side] that becomes "negative", but what was previously the "negative side" now becomes "positive"', pp. 363-4. He points to the same shifts of polarity in hydrolysis (pp. 72-3) and also in magnetism (p. 376). Johann Ritter, *Beyträge zur nähren Kenntniss der Galvanismus*, vol.2, 2 vols., 1<sup>st</sup> ed., Jena, Friedrich Frommann, 1802. The translation of *The Electrical System of the Body* is my own. Hegel uses Ritter's example of electrical inversion in 'Force and Understanding', *PG*, *GW* ix, p. 97.

<sup>30</sup> 'Im Prozesse aber, oder an der realen Erde sind sie nicht selbständige Wirklichkeiten, sondern sie ist das Werden zum Monde und zum Kometen; diese getrennten Selbständigkeiten bleiben in ihrer Sphäre eingeschlossen. Sie sind nur *gespannt* gegeneinander, oder sie als diese ganze Individuum ist es, das nur in der Form der Krystals, und der Kometen wird. (Ihre Wirklichkeiten sind *gesannt*; d. h. sie sind im elektrischen Verhältnisse gegeneinander)' *NP* III, *GW* viii, p. 80. Emphasis is in the original.

is perfectly *actualized* matter. Its absolute actuality is here light, or *pure subject*, that is, the qualitative simplicity of essence, or soul *qua* life' (*NP III, GW* viii, p. 82).

Once 'pure subject', or 'soul *qua* life', is conceptually present, 'Total Process' shifts towards self-determination. As Hegel describes the earth's world-body it begins to acquire sentient features. It has colour, tactile qualities, and odour.<sup>31</sup> To speak of physical nature as having sentient qualities does not imply that the earth itself is alive, but it is the prologue to life, that is, the first analogue in the ideal relations that result in sentient life forms. What had been its inert qualities begin now to be described by Hegel in terms of their significance for sentience. He will say that 'The determined physical body is therefore a *colour...colour is in itself* dissolved gravity' (*NP III, GW* viii, pp. 84-5). He means that individual sentient beings have their living capacities as a result of nature's fecundity to produce colours, shapes, and odours.

Hegel's conclusion to this section is important for us to note in terms of the *PG* as well, since chapter two has a thesis that the thing is nothing other than its properties. From the perspective of *NP* we can see why Hegel accepts this claim to be true as it relates to sentience, even though what is not acknowledged in the chapter is that a thing is only sustained through its chemical properties. It is not until the end of the chapter, when the thing is dissolved into the indifferent medium composed of countless 'free matters', that we see Hegel adopting the materialism of atomic structure (*PG, GW* ix, p. 76). It is not until chapter three that we see the atomic structure is bonded together by forces of attraction and repulsion due to magnetism (*GW* ix, pp. 97-8). The phenomenological journey from chapter two to three is a recollection of understanding matter as presented in 'Total Process'. It anticipates chapter four, 'Self-Certainty', where individuated life emerges.

There are two subsections in 'Total Process'. The first is the 'Mechanic of the Iridescent Fire or the Forming of the Physical Body' (*NP III, GW* viii, pp. 88-99), and the second is the 'Chemistry of the Physical Singular Body or of Iridescent Fire' (*NP III, GW* viii, pp. 99-108). The first section is a description of how the 'earth crystal' is formed. The earth crystal is itself the 'iridescent body', since the earth itself produces coloured-things. Hegel is attempting to describe the physical shape of the world through the kinds of qualities that are produced by the caloric earth.<sup>32</sup> These qualities

<sup>31</sup> 'Die Natur welche zuerst sich als ihren Sinn *der Gefühl* entwickelte, entwickelte itzt ihren Sinn *des Gesichts*, von diesem geht sie zum Geruche und Geschmack über, und kehrt in dem Gehöre endliche in sich selbst zurück' *NP III, GW* viii, p. 84.

<sup>32</sup> For instance, Hegel says, 'Das Metall hat die Farbe an ihm, als dem Lichte noch schlechthin angehörnd, das noch in *seiner reinen Qualität*; noch nicht aufgelöst ist, als *Glanz*; eine elastische Farbe, die unmittelbar erst mit der Bestimmtheit, ist, —der Bestimmtheit, die noch einfach der Natur des Lichts noch nicht widerspricht' *NP III, GW* viii, p. 90.

convey light or iridescence. Why Hegel reasons this way is not transparent. He seems concerned with colours and their relationship to the earth *principally* because of their influence on animals. It is not simply that we perceive them as secondary qualities of things, but there is also a vital relationship between colour and animal behaviour: whether it is the colourful anemone, or the alternating chameleon, or even the spotted leopard, the animal uses its colour in foraging, hunting, or protecting itself. ‘Colour’ becomes part of sentience and is painted into the fabric of life.

He notes this relationship as belonging to animals’ interests in the *PG*, chapter five, section C, ‘The Spiritual Kingdom of the Animals and Deception...’. Here he explains that the animals live with the four elements, and they adopt these sensible qualities so that they might fulfil their appetites (cf. *GW* ix, pp. 216-7). He also characterizes the natural faculties and talents of humans as having a ‘tincture of spirit’, as if humanity’s innate abilities reflect the colours of the earth’s elements (*PG*, *GW* ix, p. 217). His natural philosophy is influencing his consideration of Spirit.

Most of the ‘Mechanic of Iridescent Fire’ deals with the noble metals—such as gold and silver—that interest Hegel both for their unique physical properties (higher specific gravity but relatively low melting point) and because they are produced by the combination of ideal elements interacting with light, magnetism, and electricity.<sup>33</sup> The veins of such metals prove, Hegel opines, an early grand smelting of the elements in their cosmic interaction with the sun. This smelting process resulted in divisions in the earth’s crust, which Hegel separates into four kinds: flint, clay, talc, and chalk (*NP* III, *GW* viii, p. 97-8.). These four ‘earth types’ combine earth, air, fire, and water, and Hegel believes these are the original types from which the organic earth evolved.

The second subsection, the ‘Chemistry of the Physical Body’, moves to the ideal element of water (cf. *NP* III, *GW* viii, pp. 100, 102-3). He is preparing us for the concept’s advance to life, and life begins as he knows in sea water. The chemical interaction that concerns Hegel most is how oxides are formed by fire in water (cf. *NP* III, *GW* viii, p. 102). The chemical reaction by which oxidation occurs will account for the continuing dissolution of the earth’s crystal, the formation of carbon dioxide and oxygen in the atmosphere by which plants and animals breathe, and the specific biological mechanics used by a living system.

Hegel spends several pages examining the different oxides and how they are formed, but it is not until he approaches the issue of how galvanization occurs that his

<sup>33</sup> For instance, Hegel comments, ‘Einige Metalle halten die chemische Differenz unter [–oder] innerhalb der Gestalt; und sind magnetisch; –theils an die Luft gebracht, oxidiren die sich nicht sogleich, theils gestrichen; –es ist mehr also blosser Erwärmung, weniger als Oxidation, und selbst als Elektrizität, die zum Funken übergehen kann’, *NP* III, *GW* viii, p. 96. The textual addition is made by the Critical Editor.

motive for this discussion becomes clear. His concern is to produce an ‘image of the organic’ as a chemical system that balances the oxides and puts them into neutrality. This neutrality, Hegel explains, presents the solidity of the earth’s formations. The chemicals represent simplicity, but as they are dissolved in sea water, the electrical bonds of the chemicals break apart bringing forth the galvanizing process (cf. *NP III*, *GW* viii, pp. 104-5).

Galvanism is the phenomenon most closely associated with the cause of sentient life. Even though it was discovered in 1780 by Luigi Galvani (1737-1798), Johann Ritter was the one who understood how the process worked in living tissue. ‘Ritter’s Law’, which deals with the flow of electrical current in muscle tissue, is named after him. Hegel in effect is saying that galvanization occurs in nature through oxidation. What we see in Galvani’s original experiments with a dead frog is just the same reaction as what occurs in inorganic nature. The frog’s muscles contain the same chemicals and react to the electrical charge just as the chemicals react in sea water. The difference is in the complexity and ‘solidity’ of the frog’s leg, but the process is not of a different kind.<sup>34</sup>

Ritter discovered how the electric current flows through the muscles, but what is crucial for us to understand is that the electrical current naturally flows through the body because of the neutrality of its chemical composition. The living organism makes its own electricity that it takes from the compounds that it breaths and eats. ‘Life’ should then be represented as a self-sustaining galvanization. Hegel remarks, however, ‘The galvanizing process is now the image of the organic process, but it is not yet the self; it still falls outside. It is the fire generating itself by virtue of itself and coming from the physical independent body which has the self in it’ (*NP III*, *GW* viii, p. 107). The ‘Self’ is implicitly in the natural chemical processes, but it will only emerge on its own account when it is considered as a universal, that is, as a distinct concept, and not as something analysable into its component elements. This distinct concept belongs to the final chapter, ‘Organism’.

The difference between the ‘Chemistry of the Physical Body’ and the ‘Organism’ is the distinction between a lifeless and a living system. Chemistry presents the unfolding concept in terms of its elements and simple processes, but that does not tell

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<sup>34</sup> ‘*Galvanischer Proceß*; er ist weder nur electricischer Proceß, noch der chemische Proceß überhaupt, so daß alle andern *eigentlich* galvanische wären; er ist eine besondere Weise der Existenz des chemische Processes...’ *NP III*, *GW* viii, p. 105. Galvanism and Ritter’s experiments are also cited in the *PG* as contributing to how the understanding of two worlds, one sensible and one intelligible; see *PG*, *GW* ix, p. 98. Hegel appears to be citing directly Ritter’s *Beyträge zur nähren Kenntniss der Galvanismus*, vol. 2, p. 333. Ritter is explaining in the passage cited by Hegel how the world is divided into an unconditioned portion, or what appears purely intelligible, and the conditioned portion, or what appears empirically.

us anything about the actual subject in which the chemical interactions are occurring. For Hegel the organic structures *result* from the inorganic process; the latter constitutes the necessary and sufficient conditions for the organism's existence. While the two are materially equivalent, they are nonetheless formally distinct. We see this almost immediately in his treatment of the organic concept; the concept presents the Species as a logical category. As a category Species exists independently from its material manifestation. It is a biological entity but is also a formal representation; it is a 'natural kind' that describes how living things belong to an endless continuum.

Hegel's formal representation of the organism is a syllogism. It is the syllogism of the whole as a process of division which separates inorganic from organic nature. This occurs physically in the first appearance of life as an independent process, wherein the 'determinate existence' of an individual eats, respire, and reacts to its environment. The actuality of life develops beyond this point, however. Hegel remarks that it 'divides the organic process into two universal extremes, the inorganic nature and the species, and constitutes the middle term' (*NP III, GW viii, p. 120*). Life is also a process that unifies the universal with the actual, and thus it can be observed primarily in the sexual relationship among the species members; for in the sexual union the chemical basis of life is tied to the requirement of the species to perpetuate itself. This moment of unity is when the universal of life mediates inorganic nature and shows its power over the individual, who seeks to fulfil his or her desires as a species member (cf. *NP III, GW viii, pp. 120-1*). The result of the sexual union is the 'other', namely, the offspring, who replaces the parents in the continuing cycle of living nature. As we will discuss shortly, the same syllogism appears in the *PG*.

Hegel in his *NP* gives a further elaboration on how the process develops from sexual union in order to show the completion of the circle by which Species endures. Roughly, there are three periods that constitute the series. The first is theoretical: the organic realm is the unity of singularity and universality, which will set the singular being free from the necessity of nature. It is here that we discover that 'self-consciousness' presents the theoretical concept of the practical life; it is the unity of extremes that nonetheless maintains the distinction between Self, as individual, and Species, as the universal natural kind. The individual through recognition (*Erkenntnis*) will think of itself as a free being, and it will forget that it comes from nature and is in a continuum with its species. This point explains in part why the second section of the *PG*, 'Self-Consciousness', appears as a theoretical concept, set between the first section, 'Consciousness', rooted in perceptions and natural concepts, and the third section, 'Reason', rooted in observations of natural differentiae and establishing analogical relationships for the purpose of taxonomy. From how Hegel understands

the category of Species, expressed in the movement from theoretical to practical sides of life, the section ‘Self-Consciousness’ is seen to present the theoretical concept of sentient life evolving in terms of individuation. Life as a rational-empirical object is observed, marked, and differentiated in the section, ‘Reason’.

‘Self-Consciousness’ is also where the syllogism of life, developed in his *NP*, is repeated (cf. *PG*, *GW* ix, pp. 107-8). This is where the individual identifies Self with self-consciousness, separating himself from the species as a whole. The individual’s identity with the whole is thus presupposed prior to the awareness of a singular being’s self-conscious identity. The account of the Self’s emergence in the *PG* would be opaque unless one views it as a recollection of the syllogism of life in the *NP*. The *PG* repeats the organic cycle and, then, moves beyond it to self-identification. The objectivity of self-consciousness lies in its connection to Species, but the practical side of its concept, its true subjectivity, does not emerge explicitly until World Spirit appears in chapter six of the *PG*. This is also anticipated in the *NP*.

The second period of Species in *NP* III is when the individual ‘consumes itself[.]...it sublimates its own inorganic being, nourishes itself from itself, articulates itself within itself, and sunders *its* universality into distinctions’ (*GW* viii, pp. 121-2).<sup>35</sup> We also know from chapter four of the *PG* that this is the moment of self-consciousness when natural things are recognized as objects of appetite (cf. *PG*, *GW* ix, p. 108). This is where the first stage of life is fully conceptualized as individuality, hence the inorganic realm is sublimated within the singular self, and its existence is articulated only by his actions based on desires. The world becomes the place to hunt and feed no matter what else is found there.

This second period represents the existence of the troglodyte, for whom nothing in life is really separate from appetite. *Self-recognition* occurs at this point of the dialectic, since the individual knows himself through his desires and emotions, but there is no recognition of the other beyond the satisfaction of desire. We are observing still an asocial natural organism, an animal, which is indifferent to the lives of others, even of its own kind.<sup>36</sup> The ‘Self’ at this point becomes a distinct subcategory within Species;

<sup>35</sup> Hegel has in his MS a diagram placed in the margin alongside of the second period. The diagram is an illustration of the cycle of the Species; it illustrates what occurs in the last part of the *NP*, beginning with ‘Organism’. H. S. Harris has attempted to interpret the diagram, which I believe successfully shows that Hegel is discussing the movement of nature as the true infinity in the formation of Spirit. See Harris, *HD* II, pp. 522-44.

<sup>36</sup> The identity between the human and animal is commonly missed in the commentaries; for instance, Emil Fackenheim excludes animal from human life, when he says ‘Animals are part of a larger whole in their activities of feeding, reproducing, and protecting....[A]nimals lack the power of self-making....To be genuine power of *self*-asserting, human desire must be not for this or that part of nature but rather for nature as a whole—a desire which, when acted out, does not express the natural whole but rather *tears*

a sentient but not entirely rational thing. As it learns to become rational, and thus more sociable, its world becomes articulated (*gliedert*) into distinctions of different kinds as they relate to the individual's desires. Most importantly the distinctions come to relate to other Selves: there is a 'friend', here is a 'foe', etc. These articulations are still theoretical differentiations, but they will form the first rational distinctions of practical life, since an individual learns to behave one way to a 'friend' and quite another way to a 'foe'. The troglodyte is not yet fully a rational animal; it appears to lack self-understanding apart from natural tendencies. It lacks spiritual self-identification. In the *PG* we know how the troglodyte will develop through its conflicts with others, either suffering thralldom or rising to lordship (*GW ix*, pp. 112-3), but in the *NP*, it remains a 'thing of nature', a sentient but not yet spiritual being.

The third period of *Species* is the unification between the theoretical universal and the practical singular life. This turn towards unity constitutes 'the whole organism' (*NP III*, *GW viii*, p. 122). This is where the independence of the sexes emerges and gender identities are fashioned. Each sex has its own being-for-self; neither is subservient to the other. When they are united sexually, each is equal to the other in forming the biological unit of kinship. What is happening in this period is that the individual *per se* is being sublimated in a group. The whole, comprising the *Species*, is divided into distinct parts—first the sexes and, then, into families and tribes—which, because they are distinct from each other, posit themselves in opposition to each other. In simpler terms the category of Self, focused on the individual, is overcome and replaced by Family, but the individuating distinctions are retained as proper natural differentiations within it. So, each family member has his or her particular identity not simply as a Self but as a unit of the Family, which forms the natural whole of the Self. Only in terms of how the opposition is socially formed among families will equality and unity cease to exist. Beginning with the troglodyte husbands will rule wives, parents will rule children, and as societies develop masters will rule servants. Oppositions and conflicts will result internally in the whole. These distinctions and conflicts are not due to nature in terms of the *Species*, but the dissolution of natural equalities is due to social forces and culture.

As we can see this third period comes to focus on family or tribal unity, which Hegel calls in the *PG* 'the universal blood' (*PG*, *GW ix*, p. 99, line 31), and the essence of action within the unit, which he calls 'blood kinship' (*PG*, *GW ix*, p. 244, line 3).

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*itself loose from it*, *The Religious Dimension in Hegel's Thought*, 1<sup>st</sup> ed., 1967, rpt., Chicago, University of Chicago Press, 1982, p. 39. Emphasis is in the original. The contrast which Fackenheim is making is *not* what the *NP* shows; instead, humans are animals and have the same desires as other animals, but they learn sociability and rationality based on their interactions. Because we learn to be self-makers we distinguish ourselves from the other animals.

Mutual recognition (*Erkenntnis*) has already occurred among the various kinds of individuals, for they know themselves both as individuals and as parts of the whole; they know themselves both as subjects of appetites and objects of desire, but the 'essence of life' remains for them the preservation and protection of the family.

The tribal members acknowledge the divisions and their respective roles; they accept them not because they are 'naturally right' but for the sake of the family. This juncture is the point of *Anerkenntnis*: the *acknowledgement* of social roles and divisions that constitutes naturally formed self-consciousness.<sup>37</sup> Thus, from this perspective the division of labour has already been established, hence the independent actions of both sexes occur in reciprocity to each other. The values of social life, which was a matter of indifference in the second period, are also made explicit. Each individual is both a 'family member' and a separate person; she belongs to a clan but also seeks her own vocation. The 'natural kind' of the individual is in this period explicitly determined through custom and mores, or what in chapter six of the *PG* is called the 'ethical life' (*Sittlichkeit*), but each individual retains the natural drive to be her own self, which is part of her biological membership in Species.

The natural members of the tribe become divided according to the distinctions of Family in the third period comprising ethical life: some will be citizens (free men), while others are not (children, slaves, and in many societies women). Only in the social division belonging to Family are there both servants, *Knechten*, and masters, *Herren*. Nature does not make this division. It is not a natural distinction in Species. In terms of the genders, the males tend towards the social universal, defined by legal rights and freedom, and the females tend to identify themselves with blood kinship, defined through religious duties. The latter constitute the ethics of natural law. Each individual is bound to its division, and remains set there until Spirit, as a distinct category, emerges fully through social praxis and world history. Yet, the organic cycle is not yet done; it still moves on.

It continues anew for the individual who is begotten as the child of the family. We do not see exactly how it moves and changes its appearance until we are in the *PG*, at the beginning of chapter six, 'Spirit', section A, 'True Spirit', The phenomenological account of the organic cycle continues and furthers the description of the natural process, which the *NP* omits. Hegel shows how the cycle works for two generations in chapter six. We will consider these briefly.

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<sup>37</sup> *Erkenntnis* means 'cognition', the awareness both of objects and the self. It occurs when we recognize things or people categorically. It first appears in chapter two, 'The Thing and Its Properties', of the *PG*. *Anerkenntnis* means 'acknowledgement' or 'acceptance'; it involves a practical judgement. It first appears in chapter four, 'Self-Certainty', of the *PG*. The terms are often mistranslated.

The first generation constitutes the cycle where passion and blood ties oppose each other (cf. *PG, GW ix*, p. 246). Nature does not discriminate between the genders in the blood ties, thus in the first generation we are shown the pathos of Oedipus in his incestuous relation with his mother, Jocasta. Nature also does not discriminate with the passions: the struggle for life can pit son against father, and sexual desire might draw son to mother. It is only in the ethical order, which transcends nature, that spiritual understanding and the ethical taboos occur. Only here does patricide and incest create the sufficient condition of pathos, which will lead to the wife-mother's death and ultimately to the son-husband's redemption through suffering.

The second generation will not repeat the *same cycle*, Hegel tells us, because the family members have internalized the organic divisions within themselves and at the same time have overcome them. Hegel makes much of the fact that a sister, for instance, Antigone, will not sexually desire her brother, for instance, Polynices; the love of the sister for her brother becomes a pure ethical relationship (cf. *PG, GW ix*, p. 247). The organic divisions are still present of course. In nature incest between brother and sister is not uncommon; brothers will struggle and kill each other. But, Hegel's claim is that implicit in nature is Spirit, and what we see in the second cycle is that while brothers still kill each other, it is not nature but honour and duty that motivates them, and while sisters love their brothers and their love is reciprocated, neither gender desires the other carnally because they identify their organic unity exclusively with ethical obligations. These individuals, unlike the troglodytes, are genuine spiritual beings.

This second generation shows the pathos of Family, the 'universal blood', which is divided by first war and then by the contest between human and divine laws. It is the second generation that has moved beyond the essence of life as a simple organism into the realm of Spirit. That the suffering of the second generation is immediately connected to the sin and guilt of the first is important only to show that the blood tie is sacred, and its pollution is carried over to the second generation in order to be resolved by it. Notwithstanding the blood tie the second generation *acts* differently than the first. Organism has evolved away from the blood taboos to a fuller ethical recognition of the other as kin to whom one owes obligations, even if he has committed a crime or even if he is dead: 'The brave youth for whom the female principle has desire, the oppressed principle of destruction, comes into the daylight and has value. It is now the natural force that appears as the accident of fortune...' (*PG, GW ix*, pp. 259-60). Notice that in this development the natural force, represented in the male gender, is raised into the ethical realm and becomes the force of destiny. Nature reaches beyond Organism even as it remains within it, but in terms

of the system of science we could not witness nature's evolution into Spirit unless the stage was already set in his account of Organism and Species in natural philosophy.

In the *NP*, as the first cycle of Organism closes with the family members, we see a second cycle beginning that focuses on ethical individuation. The individual, who exists abstractly and sees herself separate from nature, has her own vocation to follow. We can see process unfolding when, for instance, Antigone, acknowledges her religious duties, and the male, such as, Polynices, pursues his self-interests in seeking state-power. The shift from the syllogism of the whole to its conclusion becomes the starting point for another syllogistic sortie that will not finish until Hegel's account of the sickness and death of the individual (see *NP III*, *GW* viii, pp. 179-81).

In *NP III* we are presented with three terms of a syllogism that are representations of the individual's conditions of life. The first one represents the 'unity of the individual and the species' (see *GW* viii, p. 122). This is the major term of the syllogism, and it has its own progression, the point of which is to show that the elliptical earth with its process of becoming and decay towards death presents the logical pattern governing all individual lives. In this period the individual's *body* becomes the focus of reflection. It shows that the individual as continuity with its natural kind—its race, physiognomic structures, etc.—assimilates both the plant and animal within it. In this first stage the individual is *only* her body: an organized structure of life, sprung from the earth, composed of an array of biological systems, recognized by others from her facial, bodily, and bone structures. This creature lives by *assimilation*, that is, by digesting other things. It is a 'dissolved fluidity' of absorbing both organic and inorganic nature (cf. *NP III*, *GW* viii, pp. 124-5). The individual is purely an animal who is recognizing and feeding off her world.

The second, or minor, premise can be explained as how individuals decide on how to represent their own lives in a species (*NP III*, *GW* viii, p. 126). Central to this moment is the individual who is biologically and consciously focused on *self-fulfilment* (*Selbstgefühl*). The biological attribute is evident in what drives the individual will have: we all desire food, air, and water for our self-preservation, and we need sex for our biological fulfilment as well. We are moved according to our biological program, governed by the major premise, and this is evident in the stages of life that we pass through in order to reach adulthood. The distinction that steps beyond the biological program is that each individual has to define how to achieve self-fulfilment. We have to reason practically. In order to fulfil ourselves we consciously decide to act in a specific manner. The way we act shapes our ethical character. This natural propensity, as the minor term, is not self-sustaining however; for the drive to fulfil ourselves is only a movement that 'consumes itself' (*NP III*, *GW* viii, p. 127).

The last period, which closes the cycle of individuality, is the conclusion of this syllogism, which allows the individual to realize that he or she is an actual singular being joined with the universal, but she is self-consciously acting as her own maker. Here the individual's identity with the species is that she can become her own 'natural kind'. She finds her completion in-and-for-herself, and the concept, which all along has moved natural life to reach this point, is finally self-actualized (*NP* III, *GW* viii, p. 128). The individual has reached the extreme point of universality: he or she is complete to herself. In the *PG* this extremity is named in chapter five, 'Reason,' section C, subsection a, *die Sache selbst*, or the 'fact of the matter itself' (*GW* ix, pp. 216-28). It constitutes what we should call the *facticity* of rational self-consciousness, where the individual thinks of himself as 'self-made', acting independently of all others, following only the subjective maxims of prudence, but as such he is also deceiving himself concerning both his social and religious connections and obligations. This category includes both the self-fulfilment of animal life as a spiritualized being and the resultant self-deception that the person is complete unto himself as a singular entity.

Hegel wants us to understand that this extremity of the concept is both a 'natural condition' of Species and constitutes a 'conceit' of the emerging World Spirit. Humanity in this person may see itself a demigod on earth; the creator of all laws; the lord of the plant and animal world. Each individual can feel this way in his or her own stubbornness and independence. In the *PG* this conceited individual, when he obtains ultimate state power, is named, 'Lord of the World', and acts as a totally self-absorbed ethical egoist who represents himself as the 'spirit of the world' (*GW* ix, pp. 262-5, 321). Whenever this conceit occurs, Hegel tells us, it consumes itself in mad frenzy or shall suffer defeat, and often death, by another's hands.<sup>38</sup>

Hegel notes in the margins of the *NP* that the movement leading to facticity begins for a child when the parents die, and as the child attains his independence the blood ties and its ethical obligations are sublimated. The transition is repeated in the *PG*,

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<sup>38</sup> The concept of human conceit and its subsequent frenzy is explicated by Hegel in chapter five of the *PG*, section B, subsection b, 'The Law of the Heart and the Frenzy of Self-Conceit', *GW* ix, pp. 202-7. In the *PG* Hegel first uses 'Lord of the World' in reference to the Roman Emperor, Commodus, who was murdered by his guards. The epithet comes from the English historian, Edward Gibbon, *Decline and Fall of the Roman Empire*, vol. 1, 2 vols, abridged, 1st ed., 1807, rpt. New York, Modern Library, n.d., p. 83. Gibbon, however, applies the appellation to the Emperor Valentinian and not Commodus; cf, 'Theodosius...replied..."I am the general of Valentinian, the lord of the world, who has sent me..."', chapter 25. Napoleon is another instance of the 'Lord of the World'. In a letter to Friedrich Niethammer (April 29, 1814) Hegel points out that he predicted Napoleon's defeat in chapter six in the section 'Absolute Freedom and Terror'. See *Hegel: The Letters*, trans. Clark Butler and Christiane Seiler, 1<sup>st</sup> ed., Bloomington, Indiana Univ. Press, 1984, p. 307.

chapter six, section A, 'True Spirit' (cf. *GW* ix, p. 246). Hegel's account there is that in the second generation of the family the 'citizen' is forged by tearing apart blood kinship (cf. *PG*, *GW* ix, p. 259). The social self seeks to transcend the natural self. As a practical condition this occurs when the individual as citizen emerges from the family, when self-fulfilment is acknowledged as a 'right' in the ethical world, and when subjective freedom to enjoy life is obtained. All these aspects of subjectivity occur as moments in the condition of ethical life.

The singular species member, seeking only individual self-fulfilment, does not yet acknowledge a spiritual vocation. He stands, however, at its threshold as a biological and egoistical creation: a substance that is purely subject. But because he participates in the universal, the individual acts necessarily under the dictates of nature; the human animal exists for its species. The extreme self-centeredness of the individual seeks purpose in the world only through self-satisfaction, but the higher demands of ethical life, rooted in individual's relation to its family and tribe, appears as a divine law, yet not fully understood or accepted by him. The *NP* tells us that the pure egoistical subject is a necessary part of being a species member; it is not, however, sufficient for the life of a moral subject.

In the *PG* we looked at the 'Spiritual Kingdom of the Animals and Deception: the Fact of the Matter Itself' (*PG*, *GW* ix, pp. 216-28), and the 'spiritual' qualification marks the chief difference in the movement of Spirit from the account in the *NP*. The *PG* shows the overcoming of the mere natural tendencies of an organism. Hegel's systematic view is that the spiritual dimension overcomes egoistical self-determination tied simply to carnal self-fulfilment. 'Spirit' begins, as Hegel tells us in the earliest fragment of the *PG*, 'Absolute Knowing' (1805), with *law-giving reason* (cf., *GW* ix, p. 437), but this is just what is missing from the biologically determined self-seeking individual. Pure egoism, formed and motivated only through its biological impetus, fails to acknowledge the validity of the divine laws. It has not yet sublimated its facticity. The response to the problem of facticity is law-giving and law-testing reason, which concludes chapter five of the *PG*.

The root, but not the blossom, of ethics as a natural law is explained in the *NP*. In the last section, 'Organism', Hegel continues with an examination of the animal kingdom and the cohesion of its living systems. He refers back to the 'true infinite', or divine attribute, from which the cycle of the Species has emerged. One feature of it concerns the *blood*, which involves a chemical exchange of oxygen and carbon dioxide, but he also sees that it is much more than the liquid that fills our veins. It is the root of ethics in natural law. He says that it is

... *individual* life itself. It has been said that the [digestive] fluids are inorganic because they are secreted and that life belongs uniquely to the

fixed parts [e.g., the stomach, gall bladder, and spleen]. However, although such distinctions are inherently senseless, the *blood* does distinguish life into parts. The blood is not *life* but the living being, the *subject* as such, in contrast to Species or the universal. The delicate people of flowers, the Hindi, consumed no animal, and the Jewish lawgivers forbade the consumption of animals' blood, because the foundation of animal life is blood. It is the *universal* substance, in which all parts dissolve; it is the essence of all. It is the absolute movement, the natural life of the subject, or its process, which is not moved but is movement (*NP* III, *GW* viii, pp. 158-9).

The association of blood with the basis of subjective life oversteps its biological importance and brings us to its significance for the concept of Spirit. Hegel argues that

The heart moves the blood and the movement of the blood again moves the heart; it is a circle, a *perpetuum mobile*....Precisely because blood is itself the principle of movement, it is the spring point, which is neither inconceivable nor unknown, which if taken in another sense it would indicate something else, namely, a cause that always affects another....It is the subject as well as the *will* that begins movement. It is to be represented as my moving, precisely because it takes its quantified form alongside my ego—*representations of me* as an *ego*—not as a thing.... The self or its form is unity, that is, the universal ground; its movement constitutes the *blood* (*NP* III, *GW* viii, pp. 159-60).

'Blood' stands for a specific feature of the biological existence that has a self and will; it stands for the 'natural self' and its ties to others. We see this more clearly in the *PG*, both when Hegel discusses the 'true infinite' and its predicates at the end of the 'inverted world' section in chapter three (cf. *GW* ix, p. 99, line 31), and when we see Antigone acting on behalf of her blood relations against the state's legal authority in the 'Ethical Life' section of chapter six (cf. *GW* ix, pp. 255-6). In both cases 'blood' indicates the substance of emotional and ethical ties which are never dissolved. 'Blood' is both pure egoism, the self-springing will, but also indicates a necessary relationship to another. Hegel wants us to understand that one of the properties of the true infinite, which is what we have seen unfolding in the biological cycle, is this 'blood kinship'. On this basis the system of ethical life expressed as natural law is fashioned, and the connection to ethical substance is made.

## III

We have come to the end of the *NP*, where Hegel has prepared the transition to the *Philosophy of Spirit* of 1805-6. What I have attempted to demonstrate is that there is an intimate connection between the development of his natural philosophy and specific sections of the *PG*. To understand the latter fully we must comprehend the former. What I have also attempted to show is that Hegel is committed to incorporating into his system natural science which informs us of how the real or earthly condition of humanity develops, and from it Spirit arises. No true system of philosophy would be possible without understanding the natural conditions. He contends that concept of philosophy *requires* us to understand, appreciate, and accept natural investigations. If we understand Hegel's commitment to natural philosophy and science as essential to the understanding of his philosophical project, we should also be able to correct the common mistake that he is merely an idealist who has no appreciation of nature and material causation, or worse that he was opposed to scientific constructions. Hegel had an understanding and appreciation of biology, chemistry, and physics, and he sees them as necessarily contributing to systematic philosophy. His treatment is certainly coloured both by Schelling's 'idea' of nature and by the pre-Kantian natural theologies, which also influenced his contemporary intellectual community, but the point to make is that we cannot understand Hegel's concept of philosophy without appreciating his commitment to science and the natural conditions from which Spirit arises.

DePauw University  
United States  
deshan@depauw.edu

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