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Klaus Brinkmann

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HEGEL ON THE ANIMAL ORGANISM

Klaus BRINKMANN

RÉSUMÉ : Dans cet article, je me propose surtout d'expliquer et d'interpréter les concepts hégéliens d'organisme et de vie organique. Je m'efforcerai d'exposer la structure fondamentale de la section de l'Encyclopédie consacrée à l'organisme animal (§ 337-376). J'emploie l'expression « m'efforcer », car l'analyse hégélienne de la vie organique est hautement complexe aussi bien qu'idiosyncrasique à l'occasion. Cette complexité favorisera une réflexion méthodologique sur la dialectique hégélienne et l'usage qu'en fait Hegel dans la reconstruction du phénomène biologique.

SUMMARY : My primary concern in this paper will be with Hegel's explanation and interpretation of the concept of organic life. I shall attempt an exposition of the basic structure of the section in the Encyclopedia (§ 337-376) on the animal organism. I say "attempt" here for a reason, for it turns out that Hegel's analysis of organic life is highly complex as well as idiosyncratic on occasion. These complexities will prompt a methodological reflection concerning the Hegelian dialectic and the particular use Hegel makes of it in the reconstruction of biological phenomena.

In Hegel's triadic system as it appears in the *Encyclopedia of the Philosophical Sciences*, the philosophy of the animal organism occupies the third subdivision of the third part of the Philosophy of Nature (§ 337-376). For those familiar with Hegelian architectonic this placement is an indication that with the animal organism nature reaches its closure and that the end of the organic life marks the transition to an entirely new sphere, viz. Spirit. This third part of the Philosophy of Nature is entitled Organic Physics (§ 337), where "Physics" must be taken to be another word for nature and to have the same connotation as the Greek word *physis* which in its philosophical usage means both Nature with a capital N and the nature of things existing in Nature.¹ Organic Physics is preceded by two other divisions called Mechanics and Physics, respectively. Hegel's treatment of Mechanics covers topics you would expect to be dealt with in a treatise on Newtonian cosmology, such as space, time, place, movement, matter, inertia, and gravity, while the division under the heading of Physics is devoted to a treatment of the physical body in its specificity, beginning

1. See, e.g., Aristotle's definition of the nature of things in nature in *Phys.* II 1.

with light and taking up next the natural elements such as air, fire, water, and earth, to end with an analysis of magnetism, electricity, the chemical process, galvanism and other phenomena that indicate a processuality in nature and a semblance of life even in its inorganic strata. As far as the arrangement of the basic topics is concerned, we may detect a progression from abstract space, time, matter and motion *via* specific inorganic bodies and the changes and processes to be observed in them, to the concrete living body. Or, again, a progression from mechanics *via* the physics of inorganic nature (including inorganic chemistry) to biology.

Going back to Organic Physics we note that for each of its three subdivisions (*viz.*, Geological Nature, Vegetative Nature, and The Animal Organism) the concept of the organism plays a central role. Indeed, this third part of the Philosophy of Nature can be viewed as the progressive working out of the full-fledged concept of an organism and of organic life. My primary concern in this paper will be with Hegel's explanation and interpretation of this concept. I shall attempt an exposition of the basic structure of the section on the animal organism. I say "attempt" here for a reason, for it turns out that Hegel's analysis of organic life is highly complex as well as idiosyncratic on occasion. These complexities will prompt a methodological reflection concerning the Hegelian dialectic and the particular use Hegel makes of it in the reconstruction of biological phenomena.

I. THE PLACE OF THE ANIMAL ORGANISM IN HEGEL'S PHILOSOPHY OF NATURE

The place of the animal organism in Hegel's Philosophy of Nature is best understood by rehearsing its genealogy. Nature in its most abstract, most immediate form is pure externality in the sense that no center, no inwardness has as yet been established. In the depths of this externality there is more externality : the depth is another surface. This is reality in the abstract, without a privileged region or a privileged direction. It is reality insofar as it is completely homogeneous : reality as matter. It is the constituents of the *materiality* of matter we are talking about at the beginning of Hegel's Philosophy of Nature, matter in its most abstract, most immediate aspect. Space, time, and motion represent its constitutive moments. The first indication of a qualitative difference in this sea of homogeneity comes with the introduction of the concept of *inertia* (*Schwere*, § 262). Inertia prepares the way for the emergence of a privileged center within matter around which material bodies may coalesce. We thus move from abstract materiality to concrete physical bodies or *material corporeity*. Next, we may imagine an indefinite number of moving bodies scattered throughout space, but as Hegel points out these bodies are no longer completely unaffected by one another, they stand in a relationship of attraction and repulsion due to the distinction that has now emerged between their internal center and their outward periphery.

We have left the sphere of absolute externality behind us, and yet the relationship now established between material bodies in its turn is merely external. A decisive step occurs with the introduction of *gravitation* (§ 269). Gravitation for Hegel is re-

sponsible not so much for the attraction and repulsion of physical bodies,² but for the formation of a *systemic structure* among bodies which immediately goes together with a qualitative differentiation among the bodies themselves. Hegel's prime example of such a system of material bodies is the solar system.³ Here we have a privileged body, the sun, forming the center for the planetary bodies and their orbits. From materiality and material bodies we have now moved to a *system of individual*, that is to say: qualitatively distinct, *physical bodies*. In the solar system we encounter the first and still very abstract version of a Hegelian concrete universal.⁴ The degree of internal organization and differentiation of structure has increased to the point where mechanics passes over into the physics of inorganic nature which deals with the physical body in its individuality, that is to say, with the physical properties of material bodies and their interaction with one another from which result the physical processes Hegel discusses in the section entitled Physics.⁵

The central idea in the section entitled Physics for Hegel is that of processuality. At this level of concreteness, nature is essentially process. The characteristics of a physical process are the mutual interdependence of the elements involved, their transformation into different materials with a different physical or chemical structure and thus the dissolution of their individuality as something existing apart from and outside the process itself. All materials are the result of some transformation and may become the initial elements for further transformation, none is original. For Hegel this means that the category of physical process marks a further sublation of the externality with which we began. The individuality of physical bodies now appears to be due not to any intrinsic, essentialistic determination of the body or material itself but rather must be attributed to their relationships with one another and to the laws governing their transformation. The mechanistic world-view for which reality is primarily a system of ontologically independent individual bodies which are held together by forces applied to them externally is superseded. The idea that the specific nature of a physical body exists independently of its relationship with other bodies is no longer valid for the physics of inorganic nature, and chemistry in particular. Here, the identity of a specific material body is shown to depend on properties which are the result of the transformation of materials with different properties.

Hegel thus prepares us for the transition to the organismic structure. Two additional conditions have to be fulfilled in order to move from process to organism. Firstly, processes are essentially linear, that is to say, their initiation depends on a condition which is not part of, and is not reproduced by, the process itself. Typically, the process runs its course and burns itself out, it does not renew itself by itself. For this self-renewal to occur, the end of the process would have to mark a new beginning of

2. See the sharp distinction Hegel makes between attraction and repulsion, inertia and gravitation, in *Enc.*, § 262, 269.

3. Cf. *Enc.*, § 269 *Zusatz*, § 270.

4. *Enc.*, § 198, where Hegel compares the solar system with the state: both are systems of three syllogisms. The solar system is also called the first organism in § 337 *Zusatz*. It is, however, an organism within the sphere of mechanism, a mechanical organism, if you like.

5. See *Enc.*, § 272, 273.

the same process. This is, Hegel argues, what organismic structure means : a *self-sustaining cyclical* process that initiates and continuously renews itself (*der unendliche sich selbst anfachende und unterhaltende Prozeß*, § 336).

The second condition to be fulfilled is that of an integration of the individual elements or materials of the process into elements whose identity is defined exclusively by their relationship to the whole of which they form part. In this way, the separateness and independence of the individual body, or of interacting materials which nonetheless remain separate “substances”, is replaced by a higher order structure in which the constituent elements have become “moments” not only conceptually, as with the solar system, but in actual fact. That is to say, even their outward existence now qualifies the parts as moments. In this new, more complex structure, the parts are no longer independent individuals or substances, but *members* (*Glieder.*, § 337, 350), whose *identity* depends entirely on their relationship to, and their functioning within, the whole. As such, they are *organs* of the organism. Like Aristotle, Hegel insists that the relationship between organs and organism is so intimate that the organs lose their essential characteristics if separated from the whole.⁶ In sum, we have now reached a level at which nature exhibits the most Notion-like structure it is capable of according to Hegel.⁷ This organismic structure is characterized by a cyclical, self-referential, and self-sustaining process, in which the material elements, i.e. the organs, are not separate individuals but individuals subsumed under, and defined by their membership in, an overarching whole. In other words, the phenomenon which confronts us here is *life*. Since for Hegel the Philosophy of Nature is the explication of the Idea in its aspect of externality, life can also be viewed as the immediate form in which the Idea exists outwardly (instead of merely inwardly as in the preceding stages) (cf. § 337). At last, nature begins to breathe. Or, to use Hegel’s own metaphor, we have now exchanged the prose of inorganic existence for the poetry of the living body.⁸

So far, I have talked about the organism in general, or what I referred to as organismic structure. As mentioned earlier, Hegel includes the subject matter of geology among organic phenomena. He discusses the different kinds of rock and minerals, the nature of air, water and land insofar as they represent a kind of global metabolism,

6. The severed hand, says Aristotle, is a hand in name only, not in reality. Among a number of similar passages see, e.g., *Met. Z* 10, 1035b 22ff. ; and *Pol. I* 1, 1253a 19ff. Hegel echoes Aristotle’s idea in § 350 *Zusatz*.

7. See, e.g., *Enc.*, § 336 *Zusatz* : “Der chemische Prozeß ist das Höchste, wozu die unorganische Natur gelangen kann ; in ihm vernichtet sie sich selbst und beweist die unendliche Form allein als ihre Wahrheit. So ist der chemische Prozeß durch den Untergang der Gestalt der Übergang in die höhere Sphäre des Organismus, in welchem sich die unendliche Form als unendliche Form reell macht, d. h. die unendliche Form ist der Begriff, der hier zu seiner Realität kommt. [...] Hier hat die Natur also das Dasein des Begriffs erreicht ; der Begriff ist nicht mehr als in sich seiend, nicht mehr versunken in ihr Außereinanderbestehen. Das ist das freie Feuer α) als gereinigt von Materiat, und β) im Dasein materialisiert. Die Momente des Bestehens sind selbst zu dieser Idealität erhoben, haben nur dies Sein der Idealität und fallen nicht zum beschränkten Bestehen zurück ; so haben wir die objektive Zeit, ein unvergängliches Feuer, das Feuer des Lebens, wie Heraklit das Feuer als Seele aussprach und die trockenen Seelen als die besten.”

8. Cf. *Enc.*, § 336 *Zusatz*.

but his observations here can hardly qualify as scientifically informed.⁹ Nor does Hegel's inclusion of mineralogical topics seem entirely appropriate here in view of their mostly inorganic subject matter.¹⁰ It has been suggested that this whole section could be considerably improved by putting a philosophy of the ecosystem in its place, and I agree that such a re-orientation would be in keeping both with the function of this section as well as with Hegel's intentions.¹¹ Hegel is fully aware of the fact that the make-up of the earth's body as he discusses it, the planetary changes in weather and the tectonic movements included, are not strictly speaking of an organic nature. In view of this fact, he calls the geological organism a non-life and only the corpse of the life process (§ 337). The changes in, on and near the earth's surface are to be called an organism only insofar as there is a point of view from which all movements and processes in inorganic nature can be understood holistically, as forming a totality whose internal changes represent cyclical and apparently self-renewing processes. Another justification for placing the earth's body at the beginning of the discussion of organic life is that, as Hegel will point out later, the organism defines itself in opposition to inorganic nature. In fact, inorganic nature for Hegel is a necessary moment in the full phenomenon of organic life, and thus its inclusion at this stage in the Philosophy of Nature may seem appropriate.¹²

II. GENERAL CHARACTERISTICS OF THE LIVING ORGANISM

Before I turn to Hegel's detailed treatment of the animal organism, I would like to focus on those characteristics of organic life which in Hegel's view together constitute its most important signature. We have met one of those characteristics already when I referred to the organism as a self-referential process. Hegel's categorial expression for self-referentiality is *subjectivity*. Subjectivity for Hegel signifies a unified structure characterized by double negation, that is to say, a unity which maintains itself by negating its internal differences, a situation which Hegel famously calls "sublation" (*Aufhebung*) and of which life is the paradigmatic exemplification in nature. The conceptual antecedents of subjectivity go back to the concept of the Notion in Hegel's Logic which in turn is prefigured in such early categories — early in terms of Hegel's categorial hierarchy — as the so-called true infinity and "being-for-self".¹³ In the animal organism, this self-referential structure acquires an outward existence, but its most adequate manifestation, Hegel will argue, is in the form of Spirit, where the aspect of existence itself assumes a spiritual character (e.g., language, law, morality, art, and the religious cult).

9. See, e.g., § 341 *Zusatz*.

10. See the discussion of mineralogical phenomena in § 340 *Zusatz* and of the function of atmosphere, sea, and land in § 341 *Zusatz*.

11. See V. HÖSLE, "Pflanze und Tier", in M.J. PETRY, ed., *Hegel und die Naturwissenschaften*, Stuttgart, Frommann-Holzboog, 1987, p. 392-394.

12. The only remaining problem with this section would then be a terminological one, viz. the fact that the general term for this section does not fit all its parts.

13. For the structure of the Notion see, e.g., § 164 in Hegel's so-called Lesser Logic which forms part one of the *Encyclopedia* system; for true infinity and the concept of being-for-self see § 94 *Zusatz* and § 95.

What is meant by saying that in the self-referential structure of subjectivity *an internal negation or difference is being negated*? In the case of the organism, nothing more mysterious is implied than that the organism maintains itself through the continuous transformation of alien organic and inorganic material into its own body tissue. Generally speaking, the reason why the organism represents a “negative self-referential unity”, as Hegel calls it (*sich auf sich beziehende negative Einheit*, § 337), is that it both reproduces and cancels the difference between its changing material existence and its abiding structural identity. To give an example, the complete outer skin tissue in humans is periodically being renewed within a matter of weeks. Every six or eight weeks, we find ourselves with a new skin. The organism thus reproduces itself by continuously replacing parts of itself, or, in the words of Aristotle, while changing it remains unchanged.¹⁴ Hegel was aware of this periodical self-renewal of the organism :

They say that after five, ten or twenty years nothing remains of the [human] organism, all its matter has been consumed, and only the substantial form abides (*Enc.*, § 356 *Zusatz* [9, 461]).

The latter observation justifies Hegel’s introduction of the category of subjectivity at this point. As with all Hegelian categories, this one exists in a series of more or less abstract versions. At the level of the living organism, subjectivity stands for species identity of the self-renewing organism as well as for the process of maintaining that species identity throughout physical change. Indeed, Hegel points out that an organism is essentially this *process* of self-renewal, the activity of maintaining its identity throughout change, the physical embodiment, if you will, of double negation.¹⁵ In modern biological terms we would say that the organism has the capacity for autocatalysis which enables it to copy its own genetic information and to produce a replica of itself, a process known as cell division or mitosis. The process of renewal in the individual organism is therefore not only cyclical, it is also genetically invariant (leaving aside for now phenomena such as mutation and evolution). The fact that in the process of growth and reproduction the organism assimilates material which originally does *not* carry the organisms own genetic information — and is not even of an organic nature, as in the case of plants — is precisely what makes Hegel’s reconstruction of the living organism in categories of subjectivity or self-referentiality convincing.

Against this background, we are perhaps no longer surprised to learn that Hegel calls the living organism a paradigm of idealism which can be understood only speculatively, i.e. with the help of the dialectic :

Life can be grasped in speculative terms only, for life is the existence of the speculative [principle]. The continuous activity of life is thus [an expression of] absolute idealism : it

14. Cf. *Phys.*, II 1, 192b 20-23.

15. If the chemical process were to renew itself by itself after it has run its course, this would be life. says Hegel. Therefore, life could be defined as a chemical process made self-perpetual (ein perennierend gemachter chemischer Prozeß, *Enc.*, § 335 *Zusatz* [9, 333]). See also *Enc.*, § 352 : “nur als dieses sich Reproduzierende, nicht als Seiendes, *ist und erhält sich* das Lebendige ; es ist nur, indem es sich zu dem macht, was es ist [...]”.

becomes something other which, however, is always being sublated. If life were to be a realist, it would stand in awe of externality ; but it continuously frustrates (*hemmt*) the reality of the other and transforms it into [a part of] itself (*Enc.*, § 337 Zusatz [9, 338]).

There is yet another fundamental characteristic of the living organism we need to consider before we tackle Hegel's account of the animal organism. According to Hegel, life is also *an end in itself* (*Selbstzweck*, *Enc.*, § 337 Zusatz [9, 339 and § 352]). This is to be taken in a specific sense : Life is an end in itself in that the self-referential, self-sustaining life process constantly *creates* the condition for its own sustenance and survival. In other words, the living organism *produces* out of itself the means which *cause* the process through which it maintains itself. The organism is, so to speak, a *causa sui*, a case of self-causation. If we translate this into a language which is not Hegelian, but which reflects Hegel's insight, we might say the following. The organism is an end in itself, because it assimilates alien material which fuels the metabolism through which it keeps itself alive. In this sense, the organism represents an *autoteleological structure*, i.e. a *self-regulating system*. A self-regulating system works in accordance with certain built-in parameters (such as body temperature in mammals) which determine the difference between the "is" and the "ought" state of the system. The sum total of those parameters I will call the autoteleological parameters of the organism. In view of this self-regulating capacity, the organism could also be described as a system which reacts to and strives to eliminate any is/ought discrepancy within itself or which tends to maintain a metabolic equilibrium.

If we now add Hegel's final fundamental characteristic of living organisms, viz. that it is capable of reproducing its kind by replicating itself in another individual, we arrive at the full definition of organic nature in general : Organic nature exists as individualized life which is typically organized in the form of a self-sustaining, self-renewing, self-regulating, identity maintaining, and self-replicating process, or, for short, which represents an autoteleological system.¹⁶

III. HEGEL'S THEORY OF THE ANIMAL ORGANISM

So far, Hegel's general account, although different in terminology, seems to agree well with what we would expect in a modern biology course book. This in itself is something to be acknowledged and maybe even admired. In his theory of the animal organism, however, Hegel does a few steps beyond what we might find in a contemporary biology manual, and it is to these interesting additions that I now turn, before outlining the detail of Hegel's reconstruction of the animal organism.

In the animal organism, Hegel tells us, the external shape is an expression of the internal unity of the organism insofar as its parts exist as idealized parts, that is to say

16. I use the expression "autoteleological" so as to distinguish the self-regulating nature of the organism, which since Aristotle is also part of *its teleological structure*, from other connotations connected with the expression "teleological", such as the entelechial orientation towards a divine Prime Mover which Aristotle attributes to natural things. The term "teleonomical" has also been suggested to exclude the metaphysical connotations of "teleological" (see the dictionary *Philosophie und Naturwissenschaften*, Berlin, Dietz, 1991, II, p. 888).

as members, thus indicating their dependence on the unity to which they belong (cf. *Enc.*, § 350). The external appearance of the individual animal refers us back to an internal unifying self which, since it permeates the entire body of the animal, has the character of both a universal and an individual. In fact, in Hegel's terms, the individual animal is a particularized concrete universal.

Hegel places special emphasis on the fact that it is only with the animal organism that we can speak of a genuine *self* emerging in nature. He argues that the chief difference between plant life and animal life consists in the fact that the vegetative organism does not develop a genuine self, rather, the self of the plant stands in an external relationship to the plant organism, since the genuine self of the plant is *light*.¹⁷ Thus one might conclude that even before the discovery of the role of photosynthesis for the plant organism, Hegel seems to have identified the crucial source of vegetative life. It must, however, be said that light as an indispensable *condition* for the existence of plant life cannot automatically be equated with the plant's self, if we understand by this the typical *nature* of the vegetative organism. But Hegel's characterization of the vegetative self has some plausibility, if we consider that the nature of plant life in essence seems to be profuse growth, the endless reproduction of cell tissue. In this sense it might be said that vegetative life is inherently outward oriented, and that its nature is to *spread*. It is interesting to note that Hegel associates the category of space with plants while he believes time to be a characteristic component of animal life, an association we are unlikely to encounter in a biology manual.¹⁸ Maybe in this light we are able to understand Hegel's remark, when he says (*Enc.* § 343) :

In the plant, which is merely subjective animation in its primary immediacy, the objective organism and its subjectivity are still immediately identical. Consequently, the process whereby vegetable subjectivity articulates and sustains itself, is one in which it comes forth from itself [*Außersichkommen* : loses hold of itself] and falls apart into several individuals. The singleness of the whole individual is simply the basis of these, rather than a subjective unity of members ; the part — bud, branch, and so on — is also the whole plant (*Enc.*, § 343 ; PETRY, III, 45 [9.371]).

The plant, then, is the life process *in its immediacy*, and that is to say that the plant does not develop the kind of subjective center which dominates the rest of the animal body. Instead, the whole organism here constitutes more of a nutritive basis for the vegetative process, it is an *eidos* immersed in matter rather than a self. On the other hand, the plant's self, i.e. light, being in a sense external to the plant and something towards which it strives, puts the vegetative organism at the level of opposition within the dialectical triad called Organic Physics, after the geological and before the animal organism. From this fundamental categorial characterization of vegetative life Hegel infers that the plant has neither soul nor feeling.¹⁹ For there to develop feeling, there must be a self present to itself *in* its embodiment, which can occur, however, only when the parts of the organism are "idealized" to such a degree that their functioning has become genuinely subservient to the functioning of the whole. In charac-

17. *Enc.*, § 344 Zusatz [9, 374f.].

18. *Enc.*, § 344 Zusatz [9, 375f.].

19. *Enc.*, § 344 Zusatz [9, 378f.].

teristic Hegelian parlance, then, the plant is a self, i.e. a subjectivity, which has not yet returned back into itself out of its other — it is subjectivity only objectively, not yet subjectively, too.

The crucial step in moving from plant to animal organism, then, is for the animal to have developed a dimension of inferiority in which it is *for* itself, an inner space, as it were, which creates a distinction between what it is “immediately”, i.e. a body, and what it is essentially, i.e. subjectivity, or a self which *experiences* itself, because it experiences *its* self.

A cautionary remark : Self-experience at this level of relative abstraction, i.e. at the level of animate nature, is not to be confused with consciousness. Hegel treats of consciousness at a much later stage, in the Philosophy of Subjective Spirit, and after his discussion of the soul. For him, consciousness has essentially to do with the cognitive and volitional relationship between mind and world. And thanks to this categorical differentiation Hegel cannot easily be entangled in such tricky questions as whether or not animals are conscious and if so, whether they must not also possess self-consciousness etc. Self-experience at the level of natural life and self-consciousness, although structural analogues, are two different phenomena altogether.

The specific form of self-experience enjoyed by animals is *self-feeling* (*Enc.*, § 356). The general conceptual structure of the animal organism, viz. that it represents a negative self-relation or [quote, unquote] “a self reflected into itself” (*Enc.*, § 350 [9, 430]) both explains and requires this phenomenon for Hegel. To say that the animal experiences self-feeling is in a sense tautological. For to feel anything, to be sensitive to something, already implies that what is being felt or sensed is never merely the object (of touch, smell, vision, or hearing), it is always also the experience of your own body, of the fact that this self *is* an embodied self. Thus Hegel also simply speaks of the animal’s feeling or sensitivity.

To understand Hegel’s argument here more fully, I suggest the following reconstruction : The animal is capable of sensitivity and self-feeling precisely because it is sensitive throughout its whole body *and* because that body is “for it”. The self-relation we are talking about, therefore, is not a relation of the animal self to its self *qua* self — such a relationship would indeed presuppose a more developed kind of subjectivity. What is thus “for” the animal, what it is confronted with or relates to, is its own bodily sensation and with it its body.

However, Hegel argues, that bodily sensation exists only because the animal’s body is indeed not merely a physical entity but is also pervaded at all points by the self. Hegel even goes so far as to claim that it is this “idealization” of each physical point of the animal’s organism which is responsible for the fact that, unlike the plant, the animal has locomotion : Due to this permeation of the entire body by the universal ideal self, which itself can not be identified with any part of the body, the animal has overcome the inertia of the plant and moves freely in space :

The sensuous aspect of the animal is certainly weighted, and remains bound to the center. The animal’s singularity of place is exempt from gravity, however, for gravity is not rigidly binding upon the animal. [...] The precise mechanical relationship of gravity consists

of something being determined in space, and having this determination only in something outside it. However, as a self-relating singularity, the animal does not have singularity of place as something determined from without. As a singularity which is in communion with itself, the animal is indifferent to inorganic nature, and in its free movement is only related to it by means of space and time in general. Consequently, the singularization of place lies within the power of the animal itself, and is not posited by means of another. It is the animal itself which posits this place. In all things apart from animals, this singularization is fixed, for it is only in the animal that the self has being-for-self (*Enc.*, § 351 *Zusatz*; PETRY, III, 105 [9, 432f.]).

This is a prime example of Hegel's way to rationalize the disparate. Why indeed should the animal have the capacity to move, but not the plant? This is hardly a matter of pure coincidence. But do we have to invoke a quasi-transcendental, speculative argument to explain this difference? There is in fact another, straightforwardly empirical, way of explaining the capacity for locomotion in the animal. I shall come back to this point later. The self is, so to speak, amalgamated to every point in the animal's body. In this way, the self does indeed relate to *itself via* the body. The body's being other than the self is what is being negated, and this is already a second negation, because it is the negation of the inseparable identity of self and body that was attributed to the plant. The difference between self and embodiment must be an explicit or "posited" one, if the negation of the difference is to occur. Consequently, with this difference established, we have identification of the self with itself *qua* other, or negative self-relation.

The traditional concept Hegel introduces here and which functions like a synonym for the elaborate description "negative self-relation at the level of animate life" is *soul*. The soul, at least in its most fundamental aspect, is nothing but the capacity for self-feeling. With all the necessary precautions and reservations it would also be quite legitimate to say that the structure identified here by Hegel and traditionally known as soul is a primitive version of Kant's transcendental apperception, the transcendental apperception in the form of the soul, so to speak. It is interesting to note that Hegel himself draws a parallel between self-feeling and intuition:

This [animal subjectivity] is not yet the pure and universal subjectivity which is for itself, however, for it is only aware of itself through feeling and intuition, not through thought (*Enc.*, § 350; PERRY, III, 103 [9, 431]).

Presumably, no reference to Fichte's intellectual intuition is intended. A reference is, however, explicitly made to the Hegelian Notion. For Hegel, the animal organism with its negation of the otherwise acknowledged difference between inferiority and externality, represents not only the first appearance on the scene of the Notion, but even that of the Idea itself. Considering that the sphere of nature in its entirety is supposed to be a manifestation of the Idea, what we need to add by way of clarification is that it is with the animal organism that the Idea finds a means for *adequate* realization here for the first time, if only insofar as the animal organism represents the mode of immediate existence of the Idea, that is to say, the first reality in nature which indicates *by its outward appearance* that from now on we will be dealing with structures of subjectivity.

So as not to make this sound too cerebral : What, we may ask, does subjectivity mean in its most rudimentary, most elementary form ? We can answer this question, if we can answer this other question, viz. What does self-feeling ultimately consist in ? I mean : What does it *give* us ? The answer is : It gives us pleasure or self-enjoyment. The animal, because of its negative self-relation, is the first entity in nature which is capable of self-enjoyment. Conversely, the animal marks the point at which nature begins to enjoy itself. And it is certainly not a coincidence that for Hegel the animal organism marks the beginning of Spirit as well.

The opening up of a dimension of inferiority through which the animal is “for itself” is the foundation for a number of further characteristics of the animal organism, both phenomenological and structural. By “phenomenological” I mean characteristics which the animal exhibits in its outward behavior. “Structural” refers to the organization of the animal organism, its inner and outer anatomy, or *body plan*. Let us take the phenomenological traits first. In addition to (1) feeling and (2) locomotion, which I both introduced earlier, Hegel lists the following features : The animal is specifically characterized by (3) voice, (4) body warmth, and (5) interrupted intussusception, i.e. the capacity temporarily to interrupt food intake. These are all *differentiae specifica*e of the animal organism not shared by plant life. And to repeat, they are also all of them correlates of the animal’s “ideality”, i.e. its relative independence of, and its increased flexibility *vis-à-vis*, inorganic nature. Indeed, one would have to say that the animal organism marks the beginning of a very rudimentary form of freedom — freedom of movement, the liberating effect of releasing inner tension by means of the voice, the relative independence of seasonal changes due to body warmth, and the freedom to roam the environment because of the capacity for interrupting food intake. These, Hegel would claim, are all of them essential features of animal life (actually, they are essential to mammals only), despite the fact that from a more narrowly biological point of view some of them, such as voice and feeling, easily get lost sight of.

The description of the structural features which concern primarily, but not exclusively, the animal’s body plan (again, what follows will be true mostly of mammals), takes up the bulk of Hegel’s account of the animal organism. It is also one of the most elaborate pieces in the Philosophy of Nature and one into which Hegel has worked an enormous amount of the empirical information of his day. Today we know both from the study of the manuscripts and from the list of books in Hegel’s private library that Hegel tried to keep pace with the most advanced empirical research in biology — and not only in biology — of his time. Most of this information is discussed by Hegel in the so-called *Zusätze* (additional material) from the lecture manuscripts and students lecture notes. Here, I will restrict myself to giving you an outline of this very intricate *tableau*.

Hegel divides his reconstruction of the animal (or mammalian) organism into three large sections which reflect the three stages of any dialectic triad. 1) The animal organism considered in relation to itself as distinct from its relation to something other than itself — the animal’s physical matrix or its inner and outer anatomy ; Hegel refers to this as the *Gestalt* (shape or *morphe*). 2) The animal organism considered in

its relation to its environment and to that which is other than itself, viz. inorganic nature — the animal's means of orientation, adaptation, and survival ; Hegel calls this section *Assimilation*. 3) The animal organism considered in its relation to an other which is like itself — the relationship of species and individual, zoological taxonomy, sexual reproduction, and, finally, disease and death of the animal ; Hegel's title for this stage is *The Generic Process*.

As we can see, this ordering of the material is structured in accordance with the chief moments of the Notion, but it would be difficult to maintain that some vital aspect of animal life has been ignored by Hegel because of this.

More specifically, according to Hegel the animal's self-relation which implies both the difference and the identity of self and body is reflected physically in the animal's inner anatomy. That is to say, *because* the animal is an individual which actually *experiences* the difference between self and body, if only in the form of feeling, this difference must also be articulated at the physical level. For Hegel this means that to the ideal inferiority there corresponds a real inferiority, one which the plant does not develop. In short, the animal possesses an internal system of self-maintenance and self-reproduction such as blood circulation, respiration, and intestinal system which makes it relatively independent of the environment. In fact, this internal system of self-maintenance is developed both *in response to and as a prerequisite for* the greater flexibility achieved by interrupted intussusception. This raises the question of what we are to make of the *explanatory force* of this reconstruction, a point I shall return to later.

Again, the animal's mediated position *vis-à-vis* its environment, its *negative* relation to its other, requires an analogue or a correlate of mediation at the physical level : Thus the animal needs a theoretical and a practical sense to orient itself in the environment, it also needs bodily weapons to defend itself against enemies and to catch prey, and, finally, it needs a certain creative capacity to build an abode for itself and its offspring and generally to create, and adapt to, its particular niche. Technically, this is called the *nisus formativus*, the instinct to form or build.²⁰

And thirdly, the animal's mediated self-relation, i.e. its *positive* relation to its other, calls for a consideration of the identity and difference between species and individual (Hegel refers to genus instead of species) and a thematization of the sexual relationship. Here again, the difference with plant life is instructive : Although there are plants that reproduce sexually, they do so through the mediation of another organism or a natural mechanism, such as the wind, bees, insects, etc., while the animal recognizes itself in the other animal, if only as a species being, not as an individual as humans do.

All three sections (Shape or Anatomy,²¹ Assimilation, and Generic Process) are again subdivided into three or four subsections in keeping with the further differen-

20. See PETRY's translation of Hegel's "Bildungstrieb" and "Kunsttrieb" as *nisus formativus* (*Hegel's Philosophy of Nature*, III, p. 166ff.).

21. PETRY offers "formation" as an alternative to shape (*ibid.*, p. 109).

tiation of the Hegelian Notion. Thus under shape or anatomy, Hegel lists three physiological systems which correspond to the three general characteristics of the animal organism. The fact, Hegel claims, that the animal is a sentient being reflected into itself rather than merely outwardly oriented like the plant implies for Hegel that it be characterized by (a) sensibility (or, sentience), (b) irritability (or responsiveness to external stimulus) and (c) by the "unity" of these two aspects, i.e. the capacity for reproducing (*Enc.*, § 353). As you will have noticed these three aspects are again modeled on the three aspects of the Notion (which is also that of any dialectical triad), viz. immediate self-relation, relation to something other, here, however, as it is reflected within the organisms relation to itself, and mediated self-relation, i.e. relation to itself *via* an other. To illustrate this last point, the other here is the animal's food which, however, gets transformed into body tissue, and thus assimilated, through the digestive system.

This fractalization, as one might call it, of the Hegelian triadic structure continues. For Hegel now goes on to argue that these three moments of sensibility, irritability and reproduction have their counterparts in the physical and physiological organization of the animal. This means that for the animal actually *to be* sensitive, irritable, and reproductive, it needs to have developed a nervous system, a system of blood circulation, and a digestive system (*Enc.*, § 354). The detailed exposition of these individual anatomical and physiological systems, Hegel claims, must again follow the general determinations of shape so that each of the three systems will have subsystems answering to the aspect of sensitivity within the nervous system or the aspect of reproduction in the system of blood circulation. To give a few examples, the brain and nerves are correlated with the moment of irritability within sensibility while the muscles are considered to exemplify the moment of sensibility within irritability, and the pulse answers the moment of irritability within irritability. Thus Hegel is able to integrate, occasional casualties included,²² all kinds of organic body features, organs and organic functions (*Enc.*, § 354).²³ Hegel even believes that he is able to accommodate the three basic kinds of body tissue out of which, as the biologist Treviranus claimed, all organs consist, viz. cellular tissue, muscular fibers, and nerve pulp. These three constituents, he suggests, represent the moments of sensibility, irritability, and reproduction in their abstract existence as mere material for the formation of organs (cf. *Enc.*, § 354 *Zusatz* ; PETRY, III, 112).

IV. METHODOLOGICAL CONSIDERATIONS

Let us pause here to make sure we understand what is going on at the level of argumentation or at the methodological level. Is Hegel claiming that he can *deduce a*

22. By occasional casualties I mean such less intuitively plausible correlations as that of the bone system with *unsensitive* sensitivity or the placement of the skin under the moment of reproduction (see *Enc.*, § 354 *Zusatz*).

23. The enormous detail of Hegel's analysis from bone marrow down to the knots forming in nerves, saliva, the lymph, and "pancreatic juice" is displayed in the *Zusätze* (see, e.g., § 354 and the extended *Zusatz* running to over thirteen pages in PETRY's translation).

priori from the general structure of the Notion which actual physical features or organs an animal must exhibit ? There are indeed passages which give the impression that this might be Hegel's intention. Consider, for instance, what he says about the blood :

Pulsation [...] is inward activity, or irritability differentiated for itself [...] [i.e., it is irritable irritability]. [It] is living self-movement, the material of which can only be a *fluid*, or living *blood* (*Enc.*, § 354 ; PETRY, III, 112).

Or, to take another example :

Knots are formed on the nerves by the sensibility which has withdrawn into itself. This sensibility is the extremity of internality, by which sensible being is no longer abstract [...] (*Enc.*, § 354 *Zusatz* ; PETRY, III, 117).

Is Hegel not suggesting here that the material for pulsation must be a fluid, *because* irritability, which itself was introduced as the moment of relation to another, requires a substance which is capable of self-movement ? Are we to conclude, then, that animals have blood *because* they must possess a physical analogue for the moment of irritable irritability which was itself derived from the general structure of the Notion ? Again, does Hegel argue that sensibility *posits* nerve knots ?

The question whether or not Hegel actually believes that the Notion, or the Idea, *creates* its own physical basis is indeed of crucial importance. I think that there can be little doubt that he did believe this. But I am also firmly convinced that there can be a much better reading which avoids emphasizing Hegel's metaphysical pretensions — pretensions which unnecessarily, it seems to me, diminish the credibility of his philosophy — without thereby distorting the meaning of Hegel's method. Take, for instance, his claim that the animal organism is an end in itself and hence posits the means for its own incarnate subsistence. This can be read in two ways. Firstly, it may be understood to imply that, *if* there is going to be a higher form of organic life than plant life, then the abstract moments connected with the shape of the animal organism must find expression in specific physical counterparts whose physical make up can be determined *a priori*. In other words, if there are to be animals, they have to have blood circulation. Let me call this way of looking at the dialectic the *projectively teleological approach*. It seems to me that such a methodological position is untenable, because it would presuppose omniscience on the part of the philosopher. Hegel would then have to claim to be able to predict the outcome of evolution or, more generally, of history. However, not only does Hegel, to my knowledge, nowhere make such claims, to the contrary, he also famously maintains the opposite, viz. that philosophy comes on the scene only *after* reality has worked out whatever *telos* it may be pursuing.

On the strength of this last remark, to which others could be added, Hegel can be understood to advocate not a projective, but a *retrospective teleology*. That is to say : Given (a) a certain level of complex organization in nature (or in culture), and (b) a well-defined standard of intelligibility (in this case : the structure of the Hegelian Notion), the dialectic allows us (c) to *rationalize* this level of complexity in conformity with the requirements of the Notion. Hegel's frequent remarks, in the *Philoso-*

phy of Nature, that the Notion must remain the standard of intelligibility and the conceptual means for ordering and sequencing the wealth of empirical data in a dialectical progression can be understood in this way. Serious questions concerning the epistemological status of such rationalizations do remain, such as whether retrospective teleology does not imply a weakening of *a priori* claims still connected with and essential to philosophical theorizing. I may be allowed to set these larger issues aside for the moment.

I would like to mention one further point in this connection, however. Retrospective teleology, I suggest, would be Hegel's way of dealing with the problem of *emergence* which is currently being debated in the philosophy of science. The fact that philosophers of science acknowledge the existence of a phenomenon called emergence is equivalent to the recognition that not all of macrocosmic nature is amenable to a strictly causal reconstruction. Emergence refers to the appearance on the scene of organic structures or transphysical phenomena such as consciousness that could not exist without a physical support system but are nonetheless not reducible to or causally deducible from their physical substratum. In other words, given a functioning brain there is no causal necessity that consciousness will result. In a retrospective teleology, we accept the existence of such seemingly enigmatic non-reducible and non-deducible novelties. The problem here is not one of deduction but of reconstruction. That is to say, given the internal organization of a certain complex structure, we need to ask, What are the essential prerequisites for this structure to sustain and maintain itself, on the assumption that, say, an organism is a self-referential, auto-teleological and reproductive system with certain specific needs. We are then able to rationalize the empirical data in accordance with the demands this structure places on its physical substratum. Let me make it very clear that what I am suggesting here is *not* a method for empirical research but for philosophical reconstruction.

Now it is precisely from the point of view of retrospective teleology that Hegel's particular reconstruction of the animal organism can seem lacking. To give an example, Hegel lists the brain and the central nervous system as the second moment of sensibility. In other words, in terms of the taxonomy of the dialectic, the brain and nerves are a necessary physical substratum for the animals sentiency. Hegel is aware of the fact that the brain and nerves are also the media which enable the animal to register motion, because he says that the nerves have "an inner and outer reference as nerves of sensation and [!] motion" (*Enc.*, § 354 ; PETRY, III, 111). However, from a consideration of the biological description of the actual function of brain and central nervous system it would appear that these systems play a much more complex role in the animal organism, such as enabling the organism to maintain most of the body functions, to allow it to meet its built-in parameters or to coordinate the animal's locomotion, which is a lot more than merely enabling it to have kinesthetic sensation and to be generally sentient. What this means is that the biological centrality of the brain is not captured by, and cannot even be inferred from, the place accorded it by the dialectical taxonomy.

To take one more example, the skin gets grouped together with glands and cellular tissue as the first moment of reproduction (*Enc.*, § 354 *Zusatz* ; PETRY, III, 125 [9,

453]). But while cellular tissue, skin tissue included, is indeed reproducing itself, it seems odd to view it primarily as an organ of reproduction. Now Hegel correctly believes that one aspect of reproduction concerns the identity over time of the organism's external shape. And he assumes that the skin is that organ which is responsible for maintaining the shape of the animal over time. I quote :

The skin constitutes the organic activity of shape [...]. [It] is the immediate return of the exterior organism into itself, and through it the organism becomes self-related. At first, the skin is still only the Notion of the internal organism [i.e., it is the internal organism implicitly], and consequently the externality of shape. The skin can be and become anything, including nerves and blood-vessels etc. ; in its *absorbent* capacity it is the general digestive organ of the vegetative system (*Enc.* § 354 *Zusatz* ; Petry, III, 125).

Here we can see quite clearly that the reason for associating the skin with reproduction is its identification with the reproduction of the animal's outward appearance. From a scientific point of view, however, this association with shape has little to commend itself and may actually be rather dubious.

In other words, we have before us two examples of doubtful functional identification. This may not be a coincidence, in fact it may be due to *Hegel's methodological procedure*. Generally, Hegel's method in correlating moments of the Notion with organic systems or organs, while certainly not arbitrary, seems to rely on intuitive association more than on functional connections. But it is the latter [i.e. the functional connections] which we would like to see reconstructed. Instead of a linear sequence in which one function presupposes the existence of another function or organ, and so forth, that is to say, instead of a *sequential functional propter hoc explanation*, Hegel gives us a *functional pros hen explanation*. By this I mean that Hegel determines the place of an organ or organic function within his account by reference to its affinity, or alleged affinity, with the central point of reference, i.e. the Notion. I quote :

[The] idealism which recognizes the Idea throughout the whole of nature, is at the same time realism, for the Notion of living existence is the Idea as reality [...]. In real, sensuous being, philosophy recognizes the Notion in general. One must start from the Notion, and even if it should as yet be unable to exhaust what is called the "abundant variety" of nature, and there is still a great deal of particularity to be explained, it must be trusted nevertheless. [...] The Notion holds good of its own [...], and [the detail of] singularity will therefore yield itself in due course (*Enc.*, § 353 *Zusatz* ; PETRY, III, 111 [9, 438]).

Hegel thus establishes a *direct one-to-one relationship* between a moment of the Notion on the one hand and an organic system or function on the other.²⁴ The connection between Notion and biological phenomenon should, in my view, however, be of a different nature. For if we proceed in this way [Hegel's way, that is], the *relationship between the various organic systems or functions within* a given aspect of the Notion (say, within sensibility) must inevitably be determined by the *logical* (dialectical) relationships between the individual moments of this aspect, i.e. by im-

24. This is very obvious, for instance, in the case of Hegel's discussion of the skin referred to above when Hegel claims that the skin "can be and become anything, including nerves and blood-vessels" (*Enc.*, § 354 *Zusatz* ; PETRY, III, 125). The only basis for this claim is the underlying dialectical matrix in which the skin occupies the moment of universality in reproduction and must therefore be "the Notion of the internal organism" (*ibid.*).

mediacy, opposition, and integration. However, this is patently implausible. For why should the connection between, say, the bones and the brain be that of a transition from immediacy to opposition? The bone system represents the stage of immediacy in sensibility, while the brain and the nervous system correlate with the stage of opposition. This may be correct with regard to the requirements of the dialectic. But clearly, the connection between bones and brain is *functionally* non-existent, although notionally it may be. Anybody who would want to object that Hegel is *not* to be held responsible for this kind of conceptual lapse, let me remind him or her that Hegel explicitly states, in the Introduction to the *Encyclopedia*, that it must at least be considered to be a negative test of any philosophical theory, whether or not it is in conformity with experience, which includes empirical evidence.²⁵

I submit that Hegel's reconstruction of the animal organism fails to meet precisely this standard, *not* because the Notion is Hegel's ultimate standard of adjudication, but because the dialectical correlations among the individual moments of the Notion do not match the functional connections that can be established empirically. What is not implausible, at least in my estimation, is Hegel's claim that given the general determination of an organism as a self-preserving subjectivity structure certain physical and physiological *functions* should be expected to exist at the empirical or physical level. But *their* connection need not be, and in actual fact *does not happen to be*, that of the moments of the Notion. Consequently, I would like to advocate a *combination* of general dialectical matrix with sequential functional explanation within a given moment of the Notion. This would allow us to preserve the general outline and the fundamental ontological determinations of organic life, but it would also restore an *element of non-dialectical derivation* between the individual organic functions and thus provide for a rationalization which is more in keeping with the empirical findings of the biologist.

VI. CONCLUSION

At the end of this paper, I feel that I owe you an answer to the question what a sequential functional explanation *propter hoc* would look like in combination with Hegel's general dialectical matrix and the fundamental ontological characterizations Hegel proposes. In fact, such an explanation has already been attempted by Dieter Wandschneider.²⁶ Wandschneider believes that Hegel's basic categorial determinations of the plant and animal organism are both philosophically and scientifically sound, but that the detail of Hegel's reconstruction needs to be reworked in the manner which I have called sequential functional explanation and which he refers to as a system-theoretic account. Thus he suggests that in order to differentiate between

25. Cf. *Enc.*, § 6: "As it is only in form that philosophy is distinguished from other modes of attaining an acquaintance with this same sum of being, it must necessarily be in harmony with actuality and experience. In fact, this harmony may be viewed as at least an extrinsic means of testing the truth of a philosophy." Also relevant to Hegel's assessment of the relationship between philosophy and the empirical sciences are *Enc.*, § 7, 8, 12, 13.

26. See WANDSCHNEIDER's contribution "Anfänge des Seelischen in der Natur", in PETRY, *op. cit.*, p. 443-467.

plant and animal life we should rely on that distinction which is fundamental from a biological point of view, but which is also not incompatible with Hegel's ontological characterization.

This fundamental distinction concerns the fact that plants are autotroph, while animals are generally heterotroph. That is to say, plants are capable of synthesizing organic matter out of inorganic matter through the process known as photosynthesis, whereas animals are unable to do so and hence must rely on organic food. The immediate consequence of this fact is that animals cannot support themselves by assimilating nutrition directly from the soil. Given their specific reproductive chemistry, they are necessitated to be able to move, catch food, etc. This, again, means that they need to develop a brain and a central nervous system which allows them to coordinate their body movements, identify food, maintain the internal system parameters etc. In a brilliant passage,²⁷ Wandschneider even reconstructs Hegel's distinction between the implicitly subjective structure of plant life and the explicit subjectivity of the animal organism in strictly functional biological terms. He is able to subtend empirically Hegel's contention that the animal is ontologically speaking a negatively self-relational subject, i.e. a subject with an experienced self. He does so by establishing a distinction between what he calls the functional self (*Funktionsselbst*) and the acting self (*Aktionsselbst*). The functional self is the one that monitors the internal states of the organic system *and* communicates this information *via* sensation to the acting self which in turn perceives the world surrounding it as *colored by* the sensations generated by the functional self. Thus it can indeed be said that the animal experiences a difference within its *self*, i.e. it possesses a dual self, but that this distinction is also being sublated by the integration that occurs when the functional self impinges upon, and thus becomes ingredient in, the acting self. Wandschneider's reconstruction thus perfectly exemplifies what I have called sequential functional explanation, and it does so within a retrospectively teleological framework which accepts and is able to reconstruct empirically the fundamental ontological characterizations offered by Hegel.

To conclude, what are we to make of Hegel's theory of the animal organism? What is Hegel's peculiar philosophical contribution in this area? I have discussed only a fraction of Hegel's theory of the organism. In particular, I have so far not mentioned the fact that Hegel argues that not only do animals experience their own self in the form of feeling or sensitivity, they also are the first organic entities in nature which experience appetite and the feeling of lack as well as their own death, characteristics we would not attribute to plant life. In other words, at least one of the singularly important achievements of Hegel's philosophy of the animal organism, as of his philosophy generally, consists in this that Hegel makes us aware of the total reality of the phenomenon, not only of fragments thereof, something which necessarily happens when we adopt the scientific perspective. Hegel's theory should not be read as a miscarriage of the attempt to do scientific biology. But with the modifications I have suggested this theory may one day become a plausible philosophy of biology. He-

27. See *ibid.*, p. 448-455.

gel's approach is a reminder that one of the reasons why we continue to experience the need for philosophy is that we look towards philosophy precisely because unlike science it is able to bring the phenomena into our view and grasp them as *wholes* or *totalities*, i.e. as full-fledged living entities. This holistic approach can and should serve as a corrective for the fragmentation which is typical of, and unavoidable in, empirical research.