

TELEOLOGY BEYOND REGRETS: ON THE ROLE OF SCHELLING'S ORGANICISM IN TREVIRANUS' BIOLOGY

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Abstract. *In his seminal monograph on teleology and mechanics in nineteenth German biology Timothy Lenoir considers his study of the “Kantian” teleomechanistic tradition as an answer to those who wrongly believe that early nineteenth-century German biology was dominated by Schelling’s Naturphilosophie. My goal is to argue that this is an arbitrary assumption based on a historiographical bias and that Schelling’s organicism played a pivotal role in the formulation of a conceptual framework aimed at accounting for biological organization. The formalization of biology as an autonomous science at the beginning of the nineteenth century implied in fact the shift from a regulative to a constitutive understanding of teleology, a shift most strongly endorsed in Schelling’s Naturphilosophie. I first take into account two aspects that Treviranus draws directly from Schelling: the relationship between mechanism and teleology and the continuity between nature and spirit. I then show how Treviranus reinterprets the Schellingian framework with a peculiar emphasis on ecology, stressing the important interaction between organisms and environment. On this basis, I suggest that he was the first naturalist in the German speaking world to sketch the outline of a theory concerned with the historical transformation of living forms.*

0. Introduction*

The title of this paper refers to an old controversy in the history and philosophy of biology that originated in the scholarly work of Timothy Lenoir. In a paper entitled «Teleology without

* Many thanks to Giovanni Menegalle and Charles Wolfe for reviewing previous drafts of this paper.

regrets»¹ Lenoir discusses the main features of the account he had elaborated in a series of papers on the same topic², and which would soon converge in his seminal monograph on teleology and mechanics in nineteenth-century German biology³. According to the standard account, he maintains, the real beginnings of scientific biology are best exemplified by the efforts of the ‘1847 group’ (Ludwig, Du Bois Reymond, Helmholtz and Brücke), who threw off the yoke of «vitalistic explanation» and swore allegiance to the cause of «mechanistic reductionism» (neither of these terms is given a clear definition). Vitalism and teleology had thereby been cast aside and the reign of mechanistic biology inaugurated⁴. Although, according to Lenoir, this account implies that the only consistent foundations of biology are those supplied by mechanistic reductionism, he argues that a coherent and well-developed research program guided the development of the life sciences in Germany from the 1790 through the mid-1850s. He defines this program as «teleomechanism» and analyzes it in terms of three different phases: «vital materialism» (Kant, Blumenbach, Reil, Kiemeyer), «developmental morphology» (Meckel, Döllinger, von Baer, Müller), and «functional morphology» (Schwann, Liebig, Bergmann, Leuckart).

In his attempt to analyze the first phase Lenoir employs the category of ‘Göttingen School’. This category has the merit of stressing the existence of a unitary center characterized by intense institutional and intellectual relations among nearly three generations of physicians and naturalists. According to Lenoir, the distinctive approach practiced at Göttingen derived from ideas

¹ T. LENOIR, *Teleology without Regrets. The Transformation of Physiology in Germany: 1790-1847*, «Studies in History and Philosophy of Science Part A», 12 (4), 1981, pp. 293-354.

² T. LENOIR, *Generational Factors at the Origin of “Romantische Naturphilosophie”*, «Journal of the History of Biology», 11 (1), 1978, pp. 57-100; ID., *Kant, Blumenbach and the Vital-Materialism in German Biology*, «Isis», 70, 1980, pp. 77-108; ID., *The Göttingen School and the Development of Transcendental Naturphilosophie in the Romantic Era*, «Studies in the History of Biology», 5, 1981, pp. 111-205.

³ T. LENOIR, *The Strategy of Life: Teleology and Mechanics in Eighteenth Century German Biology*, Riedel, Dordrecht 1982.

⁴ T. LENOIR, *Teleology without Regrets*, cit., pp. 293-294.

fashioned by Blumenbach, who synthesized some of the best elements of Enlightenment life sciences, especially Buffon, Linnaeus and Haller, in terms of a view of biological organization he found in the writings of Kant. Blumenbach graduated at Göttingen in 1776 and was appointed professor in 1778. His reputation was considerably enhanced by the publication of his *Institutiones Physiologicae*, a condensed, well-arranged view of the animal functions. His physiological theories established the foundations of the Göttingen School and were developed by his most distinguished students: Alexander von Humboldt, Johan Christian Reil, Carl Friedrich Kielmeyer, Heinrich Friedrich Link, Gottfried Reinhold Treviranus⁵.

William Bechtel has pointed out that the aim of Lenoir's reconstruction was to identify a tradition in nineteenth-century German biology different both from vitalistic *Naturphilosophie* and reductionist materialism⁶. Released from its entanglement with vitalism, teleology could finally be considered in naturalized terms (i.e. without regrets), as a specific characteristic of organic processes marking the irreducibility of biological phenomena to physics and chemistry. Lenoir sees his study of the 'Kantian' teleomechanistic tradition as an answer to those who wrongly believe that early nineteenth-century German biology was dominated by Schelling's *Naturphilosophie* and by its 'vitalistic' conception of teleology. This reconstruction has been harshly criticized by Kenneth Caneva in a review entitled, ironically enough, «Teleology with Regrets», where Lenoir is accused of «many serious mistakes in historical analysis», «errors, misinterpretations, inconsistencies, unsupported claims and plain unclear writing»⁷. It is in fact odd to maintain that the «vital-materialism» developed at Göttingen rejected the vitalistic notion of purposive activity, given that Kant's conception of teleology was intimately tied to a notion of purposiveness, as was Blumenbach's *Bildungstrieb*⁸. More-

⁵ T. LENOIR, *The Göttingen School*, cit., pp. 115-119.

⁶ W. BECHTEL, *Teleomechanism and the Strategy of Life*, «Nature and System», 5, 1983, 181-187.

⁷ K. CANEVA, *Teleology with Regrets*, «Annals of Science», 47, 1990, pp. 291-300, p. 300.

⁸ See the paper by François Duchesneau in this volume.

over, many of Lenoir's 'teleomechanists' broke with a severe Kantian notion of teleology as a merely *regulative* concept of the understanding and instead conjured up a variety of vital forces more or less actively *constitutive* of the individual organism⁹. Stressing the heuristic value of teleological thinking in biology only inasmuch as it can be reduced to a mechanistic framework of explanation, Lenoir acknowledges a role for teleology but indeed he does so 'with regrets'.

I intend to argue that we are in need of a new general account going beyond those regrets. In fact, I will argue that that the formalization of biology as an autonomous science at the beginning of the nineteenth century implied the shift from a regulative to a constitutive understanding of teleology – a shift most strongly endorsed in Schelling's *Naturphilosophie*. Biology as a science became possible only once organization was considered as a constitutive character of living bodies which, as such, requires scientific explanation.

The term 'biology' has traditionally been traced back to Lamarck and Treviranus, who first used it in significant fashion in 1802 in the *Recherches sur l'organisation des corps vivants* and in the *Biologie, oder Philosophie der lebenden Natur für Naturforscher und Ärzte*. In fact, other authors had already used the term *en passant* slightly earlier, such as Georg August Roose in the *Lehre von der Grundzüge der Lebenskraft* (1797) and Karl Friedrich Burdach in his *Propädeutik zum Studium der gesamten Heilkunst* (1800). As scholars have recently stressed, the word itself was used in the sense of 'biography' even earlier, so that we may have to move the date of the first use of the term another thirty years. Michael Christoph Hanov, a minor disciple of Christian Wolff, published from 1762 to 1768 a four-volume Latin compendium entitled *Philosophia naturalis sive physica dogmatica*, whose third volume (1766) bore the subtitle: *Geology, Biology, General Phytology and Dendrology, or the*

⁹ Cf. R.J. RICHARDS, *Kant and Blumenbach on the Bildungstrieb: A Historical Misunderstanding*, «Studies in History and Philosophy of Biological and Biomedical Sciences», 31 (1), 2000, pp. 11-32; J. ZAMMITO, *The Lenoir Thesis revisited: Blumenbach and Kant*, «Studies in History and Philosophy of Biological and Biomedical Sciences», 43 (1), 2012, pp. 120-132.

Science of the Earth, of Living Things and of Vegetating Things in General, as well as of Trees. However, if one discounts the running heads, Hanov does not use the word ‘biology’ in the text of the volume itself. There are even more minor Wolffians that could be taken into account, but «none of this really affects the more important question of the mechanisms of the historical development and institutionalization of the life sciences in the nineteenth century»¹⁰.

The grand baptism of the concept is still to be located in the writings by Treviranus and Lamarck. In this respect, if a lot has been said on Lamarck¹¹, almost no word has been uttered about the other pioneering endeavor, in which the idea of a unified science of life is endorsed with the strongest arguments. The reason for this silence has two explanations. The first is almost certainly the magnitude of the opus, since a nine-book treatise divided into six volumes (each around five-hundred pages) poses an obvious challenge to scholarly work. Secondly, the over three-thousand pages that compose this work are filled with references to countless eighteenth-century scientific literature and, even more importantly, with a language that can be properly understood only by being well acquainted with the jargon of eighteenth-century German life sciences.

Before I begin my analysis, it is useful to have in mind an overall sketch of the general division of the work. As mentioned, the *Biologie* is composed by nine books, divided into six volumes; (1) The first volume includes a long introduction, where Treviranus defines the fundamental concepts and the theoretical framework of biology as a new scientific field, and the first book of what he refers to as «history of physical life» (*Geschichte des physischen Leben*), dedicated to the general «classification of living organisms»; (2) The second volume consists of the second book on the «organization of living nature», where Treviranus provides a detailed account of the distribution of living bodies on the

¹⁰ P. McLAUGHLIN, *Naming Biology*, «Journal of the History of Biology», 35 (1), pp. 1-4, p. 4.

¹¹ G. BARSANTI, *Dalla storia naturale alla storia della natura. Saggio su Lamarck*, Feltrinelli, Milano 1979; P. CORSI, *The Age of Lamarck. Evolutionary Theories in France: 1790-1830*, University of California Press, Berkeley 1988; P. CORSI, J. GAYON, J.G. GOHAU, S. TIRARD, *Lamarck, philosophe de la nature*, Puf, Paris 2006.

different areas of the earth, depending on different environmental conditions; (3) The third volume contains the third and the fourth book of the history of physical life: the former is concerned with the revolutions that occurred to living nature over time, while the latter is dedicated to the exposition of 'Treviranus' theory on «generation, growth and decrease of living bodies»; (4) The fourth volume is occupied by the fifth book and is concerned with the formulation of a general theory of nourishment; (5) The fifth is concerned with physiological issues and entails three books (sixth, seventh, eighth) dedicated to «warmth, light, and electricity of living bodies», to the «automatic movement of living bodies», and the «functioning of the nervous system» respectively; (6) The sixth is dedicated to the «connection of the physical with the intellectual world» and provides an outline of brain physiology in the animal kingdom.

The overall work provides perhaps the best example of the sedimentation of the conceptual framework elaborated at Göttingen and developed by *Naturphilosophie*. In this respect, to characterize the *Biologie* as a 'ground-breaking' work would probably be an overstatement. Nevertheless, despite its compilatory nature, this massive collection of materials is the final result of a conceptual course concerned with the endeavor of providing an adequate definition (and a corresponding explanatory framework) to the way living nature is capable of organizing itself. Roughly speaking, this course can be said to begin with the Haller-Wolff debate¹² and culminates with Schelling's idea of nature as a «universal organism», i.e. as a dynamical system capable of organizing and regulating itself. Despite its being defined as «dynamic evolution», this self-organization is understood by Schelling as a non-temporal process. The production of living forms is the result of the eternal tendency of nature to give exposition to the absolute, a task that, according to Schelling, can never be completely fulfilled. Among German naturalists, Treviranus was the first author to place this process on a temporal plateau: this happens in the third book (entailed in the first part of the third volume), which, for this

¹² Cf. S.A. ROE, *Matter, Life, Generation. Eighteenth-Century Embryology and the Haller-Wolff Debate*, Cambridge University Press, Cambridge 1981.

reason, is the most relevant of all. As with Lamarck in France, Treviranus was the first author to endorse at once the scientific autonomy of biology and a consistent theory of tranformism.

I will provide evidence for these claims in two steps: (1) I will take into account two aspects that Treviranus draws directly from Schelling's *Naturphilosophie*: the relationship between mechanism and teleology and the continuity between nature and spirit; (2) I will then show how Treviranus reinterprets the Schellingian framework with a peculiar emphasis on ecology, stressing the important interaction between organisms and environment. On this basis, I will suggest that he was the first naturalist in the German-speaking world to sketch the outline of a theory concerned with the historical transformation of living forms.

1. Naturphilosophie *behind Biology*

1.1. *Mechanism and Teleology*

The first element I will take into account is the relationship between mechanism and teleology. This is a pivotal theme in the natural philosophy of German Idealism, which originated in Kant's *Critique of the Power of Judgment*. In the second part of this work, dedicated to the «teleological judgment», Kant addresses the problem of whether the specific form of a living being can be judged as being organized according to specific purposes. The form of a bird, especially its bone structure and the position of its wings, suggests a positive answer to the question, as their intrinsic purpose seems to be that of flight. To Kant, however, this is the same as to conceive nature in technical terms, i.e. as if it were the product of a maker, because «nature, considered as a mere mechanism, could have formed itself in a thousand different ways without hitting precisely upon the unity in accordance to such a rule»¹³. This assumption is at the basis of the so-called antinomy of teleological judgment: on the one hand, in fact, «all

¹³ I. KANT, *Kritik der Urteilkraft*, Akademie Ausgabe, 5, 360; *Critique of the Power of Judgment*, Cambridge University Press, Cambridge 2000, p. 234.

generation of material things is possible in accordance with merely mechanical laws», while on the other hand «some generation of such things is not possible in accordance with merely mechanical laws»¹⁴. The Kantian solution to this dilemma is the introduction of the distinction between *determinant* and *reflective* judgment. The former refers to a *constitutive* property of the object called into question, the latter to the way in which our cognitive faculty makes sense of things. According to Kant we must consider living organisms *as if* they were the product of intentionally acting causes, while dealing with them in a mechanistic framework of explanation¹⁵.

In his early philosophy of nature, Schelling was the first to challenge this view. In the *Erster Entwurf eines System der Naturphilosophie* (1799), mechanism, chemical affinity and teleology are considered as different «powers» (*Potenzen*), which characterize different levels of the natural system. At the lowest levels, elementary compounds are extrinsic from one another and interact only through mechanical relations; at a higher level, magnetism and chemical affinity testifies to the existence of more intrinsic interactions, in which the relation between the terms in play determines their proper character; finally, the realm of living organisms is altogether holistic, as the whole thoroughly determines the structure and the function of the single parts. This framework received a most schematic formulation in the section *Objectivität* of Hegel's *Science of Logic*, which is explicitly divided into three parts entitled «mechanism», «chemism» and «teleology». The idea behind this schema is that the teleological features manifested by living organisms is not a mere imputation of our faculty of judgment, as claimed by Kant, but rather a constitutive property of their structure.

In the fourth volume of the *Biologie* Treviranus maintains that in order to satisfactorily account for the functions of living bodies it is necessary to adopt a new point of view. This point of view implies a shift from a mechanical to a teleological approach.

¹⁴ Ivi, p. 387; p. 259.

¹⁵ Cf. I. GOY & E. WATKINS (eds.), *Kant's Theory of Biology*, DeGruyter, Berlin-New York 2014.

That is, one has to understand the functioning of living organisms as acting in accordance to the specific purpose of maintaining the general structure and overall organization of the living body. Treviranus maintains that teleology must be envisaged as the truth of mechanism, i.e. as an explanatory principle necessary to explain organic nature, a realm characterized by higher organizational complexity. If the principle of mechanism can be employed to account for the phenomena of physics, biological entities must in fact be considered according to the principle of purposiveness, i.e. their functions must be understood as serving specific purposes. It is fruitless to look for an explanation of life if we do not assume that its emergence «is grounded on a principle to which must be ascribed a certain degree of independence from external influences, of self-determination to effectiveness, analogue to spontaneity». The vital principle (*Lebensprinzip*) of every organism is grounded in a common fundamental force (*Grundkraft*) through which «living nature displays phenomena whose cause is higher than mere mechanical or chemical powers»¹⁶. Chemical principles can explain the elements of which living bodies are composed. One can also investigate «all the traces of electricity, magnetism and all further physical forces in the living body and pursue them as far as possible» but «the actual secret of living nature will not be disclosed»¹⁷. The realm of living organisms is different from those of mechanism and chemical affinities and requires a reference to teleological principles.

This notion of teleology as an inherent property of biological beings is the first element linking the conceptual framework of Treviranus' *Biologie* to that which was first elaborated by the philosophy of nature of German Idealism in contrast to Kant. It is hard to see how the striking similarity between the two could be explained otherwise than through their belonging to the same discursive configuration. The way in which Treviranus articulates the relationship between nature and mind provides further arguments in favor of this thesis.

¹⁶ Ivi, p. 629.

¹⁷ Ivi, p. 631.

1.2. *Nature and Spirit*

The purposive characteristics displayed by living organisms are for Schelling a first manifestation of the intrinsic spiritual character of nature. This character is completely concealed in the phenomenon of mechanism and starts manifesting itself in chemical affinity and magnetism, as the relation between the terms in play becomes more internal and less extrinsic. It is however at the biological level that the spirit within nature is fully manifested. A first mark of this spirituality is the fact that living organisms display a form of independence and spontaneity, which is absent in mechanical and chemical phenomena. This spontaneity is testified by animal instincts and completely realized in human consciousness. A further effect is for Schelling the «technical drive» (*Kunsttrieb*), which is «only the final work of the same force that produced the organism itself»¹⁸.

Treviranus formulates a very similar argument, claiming that organisms display characteristics which have a very determinate purpose: the instincts or natural drives (*Naturtriebe*). These can relate either to the individual or to the genus. In the former case they include the drives of self-preservation and self-defense, in the latter the drive to reproduction. They all «have in general the character of purposiveness (*Zweckmässigkeit*)»¹⁹. The waking of instincts is a result of «the continuing and partially modified activity of the original formative drive, the only one among the vital forces (*Lebenskräfte*) which, like the instincts, displays purposiveness and an appearance of spontaneity in its effects»²⁰. As with Schelling, Treviranus considers the ‘mind’ to be an internal development of nature which manifests its intrinsic teleological features.

The discussion of instincts leads in fact towards a «domain full of obscurity»: the intellectual faculties of living organisms. Treviranus maintains that, throughout history, scholars expressed

¹⁸ F.W.J. SCHELLING, *Erster Entwurf eines Systems der Naturphilosophie*, Frommann-Holzboog, Stuttgart 2001, p. 202.

¹⁹ G.R. TREVIRANUS, *Biologie, oder Philosophie der lebenden Natur für Naturforscher und Ärzte*, V, Röwer, Göttingen 1818, p. 430.

²⁰ Ivi, p. 443.

two opposed views on this issue: either spirit and matter were considered completely different in nature or as related to one another. By contrast, he claims that life «lies in a principle, whose essence is self-activity». The use of this notion is very innovative in a biological context, as much as it is frequent in the vocabulary of German Idealism. This self-activity «expresses itself as formative drive and is merely immanent. It persists also in the formed organism and expresses itself through further formation and preservation»²¹. Autonomy is the fundamental character of animal life. An organism that displays this autonomy behaves «with the appearance of conscience and freedom, but nevertheless unconsciously and according to necessary laws»²². Generally speaking, memory is the most widely shared intellectual capacity in the animal kingdom. Treviranus considers bees that every year return to the place where they had been fed the previous summer. This ability «is not possible without imagination (*Einbildungskraft*), which must thus befit animals». If the use of this term were not sufficient, the footnote to this page explicitly refers to the correspondence between Jacobi and Fichte.

Certain «technical drives» (*Kunsttriebe*) must also be ascribed to animals, because otherwise it would be impossible to explain the construction of artifacts in the animal kingdom, such as the building of a nest. This is the same notion employed by Schelling in the *Erster Entwurf*. Although, in fact, humans are different from animals, they are not so different that similarity is eliminated. This is because «the degrees (*Stufen*) that humans go through from their origin to their complete formation» can be compared with «the degrees of development of the animal kingdom from infusoria to human beings»²³. This is a reformulation of the recapitulation theory sketched by Kiehmeyer and developed by Oken (later known as the Meckel-Serres law). According to Treviranus, moreover,

the same force that forms living bodies from formless matter,

²¹ Ivi, p. 5.

²² Ivi, p. 6.

²³ Ivi, p. 24.

works in them as a conservative and healing force of nature after their formation, expresses itself as instinct and on the spiritual side, as imagination, it is the producer of ideas²⁴.

This idea of continuity between nature and spirit is strikingly similar to that endorsed by Schelling, and later by Hegel²⁵.

The textual evidence I have provided so far should be sufficient to sustain the thesis that the framework elaborated by *Naturphilosophie* played an important role in laying the foundations for the emerging biological science. This is especially true of Schelling's organicist views, according to which nature and mind are conceived of as different developmental levels within a single natural system. The various degrees connecting these two include mechanism, magnetism, chemism and teleology. This framework implied a crucial shift from the Kantian understanding of teleology as a mere regulative principle to a conception of teleology as a constitutive property of living beings. In the following section I explain how Treviranus adopted this schema and extended it in relation to the empirical research of his time, thereby elaborating a consistent theory of transformism.

2. *Biology beyond Naturphilosophie*

Despite these convergences there is one pivotal difference between Schelling and Treviranus. For the former the succession of different degrees of organization is conceived of as merely logical, i.e. it describes the way nature is synchronically structured and accounts for its internal articulation. This articulation itself never changes. Schelling sees nature as composed by a series of degrees which progressively manifest its intrinsic spiritual character. Treviranus adopts this framework but interprets it in diachronic terms.

The emphasis on the geographical distribution of organic life was fundamental for this reinterpretation. In fact, for Trevi-

²⁴ Ivi, p. 28.

²⁵ See the paper by Luca Illetterati in this volume.

ranus the distribution of animals does not take place in a mere *logical* space, as was the case for Schelling, but in a *real* and *historical* one. According to Treviranus, the «fundamental problem of biology» is in fact the distribution of living bodies according to different environmental pressures. Treviranus' research on this issue must start from the assumption «that all living forms are the product of physical influences»²⁶. Kiemeyer had stressed for the first time the necessity of a general theory of animal organization concerned with the laws that regulate the distribution of vital functions in the animal kingdom²⁷. This program had been developed by Schelling, who had envisaged Kiemeyer's famous *Rede* as the beginning of a new epoch of natural history²⁸. Albeit with some differences, they both aimed at the formulation of universal laws capable of accounting for biological variety. These laws involved the idea of nature as a self-regulating organism that maintains its internal equilibrium through an equal distribution of vital functions among the different species. This, however, does not imply the idea of a dialectical relationship between organism and environment. The emphasis on environment and external conditions is what allows Treviranus to go beyond Schelling.

In his *Ideen zu einer Philosophie der Geschichte der Menschengeschiehtes* (1785) Herder had defended a theory of the transmutation of living species. This idea had been criticized by Kant as a «daring adventure of reason»²⁹. Treviranus embarked on this adventure more than anyone else in the German-speaking world. As with Lamarck, the engagement with the geographical distribution of organisms and the question concerning their ability to adapt to the surrounding environment led Treviranus to the first coherent statement of a theory of biological transformation. He

²⁶ Ivi, p. 264.

²⁷ A. GAMBAROTTO, *Vital Forces and organization: Philosophy of nature and biology in K.F. Kiemeyer*, «Studies in History and Philosophy of Biological and Biomedical Sciences», 48, 2014, pp. 12-20.

²⁸ T. BACH, *Biologie und Philosophie bei C.F. Kiemeyer und F.W.J. Schelling*, Frommann-holzboog, Stuttgart-Bad Cannstatt 2001.

²⁹ I. KANT, *Kritik der Urteilskraft*, § 80, Akademie Ausgabe, 5, 419; cf. P. HUNEMAN, *Naturalizing Purpose: From comparative anatomy to the "adventures of reason"*, «Studies in History of Biological and Biomedical Sciences», 37 (4), pp. 621-656.

begins by asking the following questions:

through which of these causes did living nature obtain the form it has now? Did all the different genera of living bodies emerge from formless matter, or only certain prototypes (*Urformen*), while the rest arose from them through degeneration or formation of bastards?³⁰.

To answer these questions, the consideration of geographical distribution is not sufficient anymore. Treviranus deems it necessary to account for the modifications of living nature over time. The purpose of the third volume of the *Biologie* is in fact to find out «which transformation living nature went through before obtaining its present formation (*Bildung*)»³¹.

It is possible to assume that

the organism of living nature, just as everything else in space and time, is subject to infinite transformations. But then should not the organization of living bodies change as well? Should not entire kinds (*Arten*) perish and new one emerge?³².

Since a species (*Gattung*) cannot disappear from living nature without effecting its organization, the downfall of a kind must necessarily imply the emergence of another. Therefore, according to Treviranus, for animals and plants that we register as “newly found” in our indexes, the name of «newly produced» is perhaps appropriate. These kinds (*Arten*) that were already present in the first times of the history of the human kind, and that have reproduced up to the present, are considerably different from their previous form (*Gestalt*)³³.

Treviranus maintains that nothing can be determined about the history of living nature as long as we are uncertain about the genesis and formation (*Entstehung und Bildung*) of the earth. For this reason, part of the book is dedicated to a discussion of the

³⁰ Ivi, p. 499.

³¹ G.R. TREVIRANUS, *Biologie, oder Philosophie der lebenden Natur für Naturforscher und Ärzte*, III, Röwer, Göttingen 1805, p. 3.

³² Ivi, p. 21.

³³ Ivi, p. 23.

different layers of the earth. The oldest ones, which consist in limestone, contain fossils of polyps and crustaceans only in small number. Among them there are different kinds of slate containing not only remnants of vegetable-animal organisms (*Tierpflanzen*) and mollusks. The number of these organisms gradually increases in rocks of more recent formation: in the following layers, in fact, skeletons of fishes and invertebrate animals can be found. These data suggest a modification of living nature in which several of the previous kinds of marine animals progressively disappeared while new ones emerged in their stead. In all these layers there is no trace of land animals: bones of quadrupeds can be found only in the most recent ones. These facts imply that

the formation of living nature began from polyps and mollusks, i.e. from the lowest levels of organization, progressing from those to plants, and only afterward to land animals. A similar process from the simple to the complex takes place today in the generation of vegetable and animal substance from formless matter in infusion³⁴.

Living nature is to Treviranus «an eternally self-transforming organism that progresses regularly towards a certain state of development (*zu einer gewisser Grade der Entwicklung*)»³⁵. In an infusion, complex organisms develop from animal and vegetable substance. If one considers that the whole living nature has also gradually progressed from the simpler to the more complex, «so it is clear that all life can reach the higher levels of organization only from the lower». But how else could this not imply that «simple organisms were progressively formed from generation to generation»? All the remains of the prehistoric world «are the original forms from which all the organisms of the higher classes emerged through gradual development (*Entwicklung*)»³⁶. From this, he maintains, it seems to follow that the animals of the prehistoric world were not destroyed by great catastrophes, but rather that

³⁴ Ivi, p. 40.

³⁵ Ivi, p. 173.

³⁶ Ivi, 225.

«many of them survived and disappeared from the current nature because the kinds to which they belonged completed the cycle of their existence and transformed in other genera». Everything on earth «is volatile and temporary, the kind as the individual, and the genus as the kind. Even humans will maybe elapse and transform». It is in fact possible to assume, not without reasons, «that nature has not yet reached the highest level of organization in humans, but rather that it will produce even more advanced and elevated beings, more noble forms»³⁷.

Treviranus' theory of transformism can be understood as a *historical* reinterpretation of Schelling's notion of a *logical* succession in the graded series of organisms. Schelling's philosophy of nature partially constituted the metaphysical framework of the emerging biology, but Treviranus' emphasis on environmental pressures allowed him to go beyond Schelling's schema, interpreting it in terms of a real transformation of living forms.

3. *Conclusions*

In conclusion, a careful analysis of the *Biologie* demonstrates that we need to go beyond Lenoir's regrets if we are to understand the conceptual foundations of biology as it emerged at the beginning of the nineteenth century. Scholars have already argued that the alleged agreement between Kant and Blumenbach was based on a substantial misunderstanding of the respective conception of teleology. In fact, Blumenbach ignores the Kantian distinction between constitutive and regulative principles and conceives of the *Bildungstrieb* as a goal-directed drive proper to all organized beings³⁸. For this reason the Lenoir thesis can no longer serve as point of departure for reconstructing the history of nineteenth-century German biology. I especially agree with Zammito that the «vital materialism» developed at Göttingen is not quite the Kantian «transcendental philosophy of nature» that Lenoir wants it to have been. On the contrary, we find the Göttingen School far closer to

³⁷ Ivi, 226.

³⁸ R.J. RICHARDS, *Kant and Blumenbach on the Bildungstrieb*, cit., pp. 30-32.

the *Naturphilosophen* than Lenoir would like³⁹.

The formalization of biology as a field implied in fact a consideration of the teleological features displayed by living organisms as their most proper characteristic, not as a mere imputation of our faculty of judgment. This means that the formulation of a general biology at the beginning of the nineteenth century was the result of a conceptual shift from the Kantian conception of teleology as a mere regulative principle, to a new understanding of teleology as a constitutive property of living entities. This shift is given a first philosophical formulation in Schelling's *Naturphilosophie* and was later endorsed by Hegel as well. Both considered teleology as an explanatory principle of a higher degree than mechanism and chemical affinity, one that was necessary in order to provide an adequate conceptual account of living organisms. In Schelling's organicist view, the teleological features displayed by living organisms are understood as the link between the lower plateaus of nature (the most extrinsic, manifested by the phenomenon of mechanism) and higher ones (more intrinsic or holistic, progressively manifested in chemical affinity and teleology). Accordingly, 'spirit' or the 'mind' (*Geist*) are presented as the final manifestation of this *Stufenfolge*.

I hope to have shown that Schelling's organicist views are frequently employed in key passages of the *Biologie*. In fact, the Schellingian idea of nature as universal organism constitutes a sort of metaphysical (or at least conceptual) foundation for Treviranus' idea of biology. At the same time, the emphasis on the geographical distribution of organisms and the importance granted to the environment projects the *Biologie* beyond this framework. Schelling's system of nature consists in the *logical* deduction of an *ideal* series of organizations. Treviranus interprets it as a *real* sequence, thereby providing the foundations for biology as a *historical* science. This might lead us to the conclusion that German Idealism played a relevant role in the formulation of a general explanatory framework aimed at accounting for biological organization. Only a historiographical bias, unsupported by textual evidence, could lead us to think otherwise.

³⁹ J. ZAMMITO, *The Lenoir Thesis revisited*, cit., p. 130.

THE CONCEPT OF ORGANISM IN HEGEL'S PHILOSOPHY OF NATURE

by Luca Illetterati

Abstract. *I focus my attention on the conceptualization Hegel offers of the organism in his philosophy of nature. The aim of my paper is to show the naturalistic roots of the notions of subject. Through this path I also intend to shed light on the way the connections between these different notions – organism, subject, freedom – are capable of producing a certain re-definition and re-determination of the immediate use of the terms with which these are usually represented in ordinary language and the way they appear, prima facie, in Hegel's system. This process of conceptual re-definition and re-determination of the terms that are here at stake could also be of some interest in relation to the philosophical debate of these last decades on naturalism and anti-naturalism. More specifically, it could shed light on the different ways of inflecting the notion of naturalism in philosophical context.*

At the beginning of the third part of the philosophy of nature in the *Encyclopaedia of the Philosophical Sciences* (1830), Hegel describes the organism as «an impregnated and negative unity, which by relating itself to itself, has become essentially self-centred and subjective»¹. To understand what these determinations constituting the fundamental characteristic of the organism are, it is necessary to look at that part of organic physics where Hegel discusses the significance of the life of animals. Unlike rocks and plants, where these characteristics are only formally or directly disclosed, but not effectively and fully realized, it is with animals that they are actually concretized.

The concept characterizing the animal sphere is, first of all, that of *subjectivity*, a notion thematised for the first time in Hegel's systematic development of a naturalistic context. But in what

¹ G.W.F. HEGEL, *Enzyklopädie der philosophischen Wissenschaften im Grundrisse* (1830), GW, Bd. 20, hrsg. von W. Bonspien u. H.-C. Lucas, unter mitarbeit von U. Rameil, 1992, § 337 (henceforth: Enz. C).

sense is it possible to say that animal is subjectivity? What does Hegel mean by stating that the animal's way of being is a subjectivity's way of being? Animals are thus described in the 1817 *Encyclopaedia*:

Organic individuality exists as subjectivity insofar as its individuality is not merely immediate actuality but also and to the same extent suspended, exists as a concrete moment of generality, and in its outward process the organism inwardly preserves the unity of the self (*die selbstische Sonne*)².

To understand these words, and especially what Hegel means with the idea (which disappears in the English translation) that the animal, in its relation to the outside world, still has a sort of *selbstische Sonne* – an image that summarizes on a representative level the meaning it has in Hegel – it is necessary to explain the way plants had been conceived: incomplete organisms, characterized by a peculiar immediacy. Such immediacy implies that on one hand, plants cannot be authentic unities within difference. On the other hand, as plants have their determinacy outside themselves, they revolve around something else (the sun, or more generally, light)³. What makes plants a partial and immediate realisation of the concept of organism is their specific characteristic that, in Hegel's words, they have another *self outside themselves*, an outside unity towards which they tend and on which they depend. This self outside themselves is primarily light, towards which plants turn, and that on them has the strongest power. In fact, plants do not move of their own accord, but are conditioned in their movements⁴.

The main element of animal subjectivity is the negation of such immediacy, appearing as a sort of liberation from the

² Cf. G.W.F. HEGEL, *Encyclopädie der philosophischen Wissenschaften im Grundrisse* (1817), in GW, Bd. 6, § 273 (henceforth Enz. A).

³ Enz. A, § 269.

⁴ Hegel thus writes: «light is this physical element outside the plant towards which it turns the same way man searches for other men» (G.W.F. Hegel, *System der Philosophie*, in G.W.F. Hegel, *Sämtliche Werke*, Jubiläumsausgabe in 20 Bänden, hrsg. von H. Glockner, Bd. 9, Frommann, Stuttgart 1929, § 344 Z, p. 500).

dependency that characterises plants in their relation with natural elements. The structure of an animal is such that the target towards which it aims is not, as with plants, external. Instead, it identifies with itself⁵. Even when the organism's activity, starting from the *need* it is experiencing, moves away from its singularity and towards what is other, it always realizes itself. This means that the animal, in its inward activity, has a movement that, in moving outward, always has in itself its objective and its centre. This makes it a *subject*.

Since it has in itself its centre – the centre around which its activity revolves, animal subjectivity is, according to Hegel, a *concrete unity*. It is not simply a formal unity, as in plants, where the parts are independent from the whole, and capable to keep on living once severed from the whole giving birth to new consistent wholes. That of animals is a *concrete unity* since it realizes through difference and internal ramifications. It is a unity in which the parts constitute the whole in a way that if they were separated from each other, they would stop being what they are, losing their coherency. The concrete unity of animal subjectivity is what makes animals individuals in an actual and tangible sense, a way of being that cannot be divided without being nullified in its ontological structure. Such structure is always one with itself, even in its internal ramifications and always becoming other than itself⁶.

As subject, the animal has in itself the core of the principle of its unity and thus differs greatly from both rocks and plants as being the only one capable of self-movement. It is the only one capable of not being under – even if only partially – the control

⁵ Karl Heinz Ilting and Franco Chiereghin have discussed this passage from plants to animals. See: K-H. ILTING, *Hegels Philosophie des Organischen*, in *Hegel und die Naturwissenschaften*, ed. by Michael J. Petry, Frommann-Holzboog Stuttgart-Bad Cannstatt 1987, pp. 349-368; F. CHIEREGHIN, *Finalità e idea della vita*. La recezione hegeliana della teleologia di Kant, «Verifiche», 19 (1990), pp. 127-229. On the analogy of animal and sun see. G.W.F. Hegel, *System der Philosophie*, § 350 Z, p. 576-577.

⁶ Animals are the concrete realisation of life in nature since «it is the one that has all the parts in their freedom unites in it. It divides in it, gives them universal life and sustains them in itself as their negative, their force» (G.W.F. Hegel, *System der Philosophie*, § 342 Z, p. 491).

of exteriority (light, gravity, etc.) and to self-determine according to its location, but also its own needs and reasons. It is not a case then that in the very final section of organic physics the idea of *freedom* appears for the first time. For Hegel, the concepts of subject and freedom are deeply connected, to the point that the two words are sometimes used to express one another. Animals' subjectivity is expressed precisely in the capacity to free from the necessary bond of the external forces that prevent the plant from even the smallest form of self-determination (and thus freedom).

Hegel connects and explains the animal's possibility and capability to change its dwelling place as the peculiar relation that it has with *time*. If the plant has to rely on light, especially when it comes to its movements, it is also dependent on nature's cyclical passing of time for its growth, nutrition and reproduction. Animals instead, require what Hegel calls «free time»⁷. This expression means that animals are, to a certain extent, independent from the external and natural time to which plants are subjected, which makes them *autonomous* and capable of *self-determination*. This *free time* manifests itself through self-movement, which cannot be merely understood as moving from one place to another. It is «ideal» self-movement, a condition that is origin to all those characteristics that define the animal way of being and that constitute the particular determinations that will eventually find new development at the level of spirit. These are the vocal faculties, animal *heat*, the *interrupted intussusception*, and, above all else feeling (*Gefühl*).

The vocal faculty is, for Hegel, the organism's expression of «free vibration *within itself*»⁸ and in this sense expression of its subjectivity. Surely, the *Stimme* that characterizes animal subjectivity is not yet concretized in the symbolic production that will be recognized, at spirit's level, of actual language. However, the *Stimme*, as manifestation of the animal's subjectivity in its expression, exteriorization of its interiority, pain, satisfaction or feelings, can be read as a sort of natural precondition to that symbolic ability that will develop only at the level of spirit. Vocality is not

⁷ Enz. C., § 351.

⁸ *Ibidem*.

simply the consequence of some internal mechanism of the organism. Since it is exteriority of self-movement, it is self-production, a phenomenon through which animals express their self to give a form to their subjectivity and to their *Gefühl*. Only because the animal feels, it can express through its voice what could be called, without necessarily implying self-consciousness, its Self. *Gefühl* constitutes the determination through which the animal feels itself, its own self, submerged in pain, pleasure, satisfaction or suffering, in all situations which the *Stimme* can exteriorize and objectify.

The animal's subjective structure is further expressed by Hegel in the context of the relation with the outside world, which is an assimilative process. This relation begins through subjective *feeling*, connected to the self. And the first feeling is loss. Thus, animal subjectivity develops as the «push to suppress»¹⁰ such sense of loss. The assimilative process starts from a specific need determined by a structural deficiency, and by *possibility*, a characteristic found only in living beings and that determines their intimately subjective structure to feel such need and deficiency¹¹. Deficiency, need, intended as the perception of such deficiency, and the push to satisfy that need are fundamental elements in Hegel's conception of living beings and natural subjectivity. The living being first of all has a need, which is an integral aspect of its essence. This means that if a living being did not have needs or deficiencies, it would not be a living being anymore. Any living organism, no matter its size or complexity, needs to demolish and rebuild its constitutive materials through its metabolic activities: assimilation, transformation and elimination. Being in need is the way a living being exists, and through the processes of transformation and

⁹ *Ibidem*.

¹⁰ Enz. C, § 359.

¹¹ «Only living being feel loss» (Enz. '30, § 359 An.). In *The Science of Logic* Hegel writes: [G.W.F. Hegel, *Wissenschaft der Logik. Zweiter Band. Die subjektive Logik (1816)*, Gesammelte Werke, Bd. 12, hrsg. von F. Hogemann u. W. Jaeschke, Meiner, Hamburg 1981, pp. 187-188 (trad. it. p. 874)]. See also G.W.F. Hegel, *System der Philosophie*, § 358 Z, p. 632. It is important to underline that pain is not the same thing as loss – otherwise it would not be a living being privilege. It is the capacity to feel it.

modification takes in what is other from it, using for its own construction of what is external.

A living being is in constant transformation, in a process in which the organism acts on itself and on the outside world in order to continue being in transformation, to keep on being itself. This being in constant need in order to exist (*die Tätigkeit des Mangels*) is what differentiates living from inorganic matter, which is always the same and does not have any constitutive lack¹². Saying that the living organism is marked by its need does not mean saying that it needs something else to be considered a whole. Therefore an organism needs something to be itself the same way a car needs gas. A living being is a process and it never stays the same. If two stages of this process were absolutely identical we could say that the being has ceased on living. However, it can still be defined as a system that is always a unitary whole¹³. Thus, deficiency is not simply a weakness that can be overcome, or realizing that there is a missing piece that prevents the system from working. Deficiency is integral to life. If it is true that we consider complete beings that are complete *vis-à-vis* their constitution, and that life is acting on a deficiency, what life needs is need itself. Without it, life would not be life¹⁴. Deficiency and need cannot be understood as defects or interruptions that can be solved to gain constant fulfilment. Life's peculiarities and potentialities are not different from the negativity of need. They are entangled in this way of being.

¹² The expression *activity of lacking* (*Thätigkeit des Mangels*) is used by Hegel to determine the structure of *impulse* (*Trieb*) belonging to living being. See G.W.F. Hegel, *Zum Mechanismus, Chemismus, Organismus und Erkennen*, in *Gesammelte Werke*, Bd. 12, hrsg. v. F. Hogemann u. W. Jaeschke, Meiner, Hamburg 1985, pp. 259-298, in part. p. 280. In relation to this text and its value for theory in general and Hegel specifically, see the Italian edition G.W.F. Hegel, *Sul meccanismo, il chimismo, l'organismo e il conoscere*, trad. it. L. Illetterati introduction and comments, Trento 1996, p. 54.

¹³ See H.R. Maturana - F.J. Varela, *Autopoiesis and Cognition. The realization of the Living*, Kluwer, Dordrecht 1980.

¹⁴ To clarify the many meanings of *necessary*, Aristotle says «*necessary* means what it is impossible to live without». Breathing, eating. (ARISTOT., *Metaph.*, V, 1015 a 20 sgg.). But since need, food and air are a form of deficiency, it can be said that lack itself is necessary.

Animals, then do not simply lack something, but they also live and experience this deficiency within themselves. It is because of this feeling of lacking something, and the consequent inherent contradiction and pain, that the living being is the real subject.

The *subject* is a term such as this, which is able to contain and *support* its own contradiction; it is this which constitutes its *infinity* (Enz. '30, § 359 An.).

The infinity connected to the subject in the passage above has to be understood as the possibility it has to let go of the concrete shapes of need and deficiency. The subject's infinity is its capacity to perceive its contingency, to express its negativity, to live its limit and to push it. It is thus revealed how the subject can transcend itself the very moment it is determined as limited. Thus the subject's essential finiteness, its limitation and structural insufficiency emerge as biological conditions. The tension the organism experiences to overcome its condition, to pass the limit, to satisfy its restlessness pushes it to engage with the outside world, and makes it what it really is.

In this sort of double process, where animal subjectivity perceives itself and finite, and transcends its limits, only to discover itself, once again, as finite, is particularly evident in Hegel's analysis of sexual relations and reproduction. In reproduction and sexual relations, individuality opens to the outside world in the hope of finding in another individual the completeness it lacks, to integrate, through this union, its ontological weakness, and "to bring the genus into existence by linking itself into it"¹⁵.

¹⁵ Enz. '30, § 369. On similarities and differences between gender, Hegel insists in the 1805/06 Jena *Naturphilosophie* where he analyses sexual organs and quotes specific researches such as J. F. Ackermann's and G. H. Schubert's (see JS III, pp. 173-174). It is possible to see a correspondence between men's testicles and women's ovaries, for instance, but beside all the possible analogies, there is an essential difference, whereby the female is characterized by being indifferent and the male instead by opposition and by the division, from which follows that the male is the active element, the bearer of the principle of subjectivity, while the female is receptive, the matter must take the form (see JS III, p. 173-174). The reference to the ancient Aristotelian theory, according to which the male provides the form and principle of change (*archén*

The other individual shares the same sense of deficiency, fragility and insufficiency («that feeling of insecurity»¹⁶, Hegel says) that pushed it to look outside. However, this attempt is inevitably a desperate one. Unlike what is described in Aristophanes' tale in Plato's *Symposium*, sexual relations are not the integration and mutual fulfilment of two finite and isolated entities. Rather, they are the reason for the birth of a new individual, a new singularity that has the same feeling of deficiency and ontological inadequacy as the other two. The attempt to overcome such inadequacy is both reason and origin of its existence. The individual's struggle is solved in nature with that bad infinity to which the individual is destined to succumb:

This process of propagation issues forth into the progress of the spurious infinite. The genus preserves itself only through the perishing of the individuals, which fulfil their determination in the process of generation, and in so far as they have no higher determination than this, pass on to death¹⁷.

The genus exists only through the death of the individual, and thus is a higher form of life than the single entity, which is always divided in its universality. It is a natural form of life that however, sometimes, also transcends nature:

In this new life, in which singularity is removed, subjectivity is maintained, and the genus has become, for itself, reality, becoming something higher than nature¹⁸.

tés kinéseos), while the female the body and matter, is obvious here (ARISTOT., *De generat.* 1, 729a). The reference to Ackermann, who taught anatomy at Jena in 1804, is not devoid of interest because his works were probably a significant influence in the scientific training of Hegel. Ackermann had already published in 1806 a work in which he undertook to show the unsustainability, from a scientific point of view, of the phrenology of Gall against which Hegel wrote against at the same time in the *Phenomenology of Spirit*. Ackermann's work, published in Heidelberg in 1806, is entitled *Die Gall'sche-Hirn, Skull-, Organ- und Lehre vom Gesichtspunkt der Erfahrung* Enz.

¹⁶ Enz. '30, § 369, An.

¹⁷ Enz. C, § 370.

¹⁸ Enz. A, § 291.

Spirit is what is higher than nature. Here, a reconfiguration between individual and universality occurs. This reconfiguration is gradual and it is never fully free from objectification, apart from the moments of complete awareness. Nature and the outside world that it embodies, and the tear of deficiency that it manifests in its most complex form, do not disappear in this reconfiguration. It gains a new and different meaning that reorganizes and gives new structure to that very same exteriority, deficiency, and need. In animal subjectivity nature – which is primarily exteriority – is fulfilled. Here nature reveals its conceptual structure that, in all its other manifestations, was always only internal and separated from any objectivity. If fulfilment is acknowledgement and revelation of what it really is, nature, through animal subjectivity, reveals a peculiar tendency to go beyond nature itself and that strict necessity that, according to Hegel, is a necessary characteristic of nature and being other. What is interesting is that this movement to overcome this strict law of nature does not act from the outside. It is in nature itself, thus allowing and making necessary a redefinition of the concept of nature itself.

The broader conception of nature that makes Hegel think about the relation between nature and spirit as different, but never opposed world, does not seem to be unrelated to nature's essence. The structure of subjectivity and the consequential freedom are not the outcome of some kind of *infection* of spirit on nature, or of an external influence that initiates something that would otherwise remain unscathed from this type of dynamics. Life is a manifestation of nature. The structure of subjectivity and the freedom that exists in it are nature's highest achievement in terms of organization and structure. According to Hegel, the limitations of physical reductionism (and of strict naturalism) do not appear out of anti-naturalistic assumptions, but from the radical consideration of nature's essence. From a certain perspective, Hegel's position seems, on one hand, to go towards a *naturalization of the subject*, showing how the subject's way of being (the subject is intended here as a structure revolving around itself, autonomous and self-determined) develops primarily in nature and, specifically, in animals. On the other hand, however, it also involves a redetermination of the idea of nature

with a process that can be seen as sort of *denaturalization of nature*, and that Hegel would describe as unilateral, intellectualistic and reductionist.

Finding the genesis of subjectivity in nature prevents from thinking about it as a disjunctive element, as something that would appear only after nature and within the social practices and dynamics connected to it¹⁹, or as the bursting in of a supernatural principle on a natural layer. However, understanding nature as the place where the subject literally takes shape prevents seeing it as simple exteriority with no freedom, the way in which, at least *prima facie*, it is constituted within a systematic structure. Thinking about the subject and about freedom in a radically naturalistic way prevents seeing nature and spirit as juxtaposed, as if opposing a determined-by-necessity nature with an independent supernatural reality. The contraposition between nature and spirit starts, instead, from abstract conceptions of both notions. Through this process of conceptual redefinition aimed at overcoming intellectualistic abstractions, Hegel attempts to show spirit's development in nature and nature's redefinition in spirit. In this perspective, *second nature* is not only erasing *first nature* – what Hegel would have called *natural nature* – but it is a new redefinition of the complex human structure, of the subjective structure of man as an organism.

Second nature, the grounds on which the human way of being and spiritual world develop, is rooted in human being's free subjectivity, in his being a development of those characteristics that essentially define animals as such. Hegel aims at solving any form of dualism characterising some of the relations with the outside world and that are the origin of a certain spiritual and physical

¹⁹ The argument here highlights the limits of the interpretations of Hegel's philosophy, which emphasized the social dimension as the original place where the structures of subjectivity and freedom are revealed. It is in many ways around this problem that the controversy between J. McDowell and Robert Pippin develops. *Nature Leaving behind* that Pippin wrote against McDowell implies a conception of subjectivity and freedom in Hegel that is intended to show the elements that break nature and that are irreducible to any form of rationalism. Equally apparent in Pippin in his polemic against DeVries' emergentist Hegel.

reductionism. For Hegel, spirit is not simply something different from nature. This dichotomy, to use Wittgenstein's terms, is a classic conceptual pathology. Spirit cannot appear unless the natural bonds where it originates and develops are recognized. And if spirit is not different from nature, since it arises from human beings' nature, it is clear that such condition necessitates a further development of the concept of nature.

The opposition to a physicalist reduction of nature does not produce a spiritualistic ontology, nor a reduction of reality to the mind, as in a classical but radically idealistic reading. Materialism and spiritualism have sense only within the abstract and opposing logic that maintains them. They are unilateral determinations that, in the overlaying dualistic vision, are each other's reversal. The appearance of subjectivity within nature, and the decline of animal subjectivity through relations that require freedom is proof of the need to let go (also in a therapeutic sense) of all the dualisms and abstractions that are at the origin of many forms of reductionism. This need is the fulfilment of Hegel's system in its divisions as logic, philosophy of nature and philosophy of spirit, and its development as a whole in which every part makes sense only in relation with the others and with the whole.