Naturphilosophie

Naturphilosophie refers to the philosophy of nature prevalent especially in German philosophy, science and literary movements from around 1790 to about 1830. It pleaded for an organic and dynamic worldview as an alternative to the atomist and mechanist outlook of modern science. Against the Cartesian dualism of matter and mind which had given way to the mechanist materialism of the French Encyclopedists, Spinoza’s dual aspect theory of mind and matter as two modes of a single substance was favoured. The sources of this heterogeneous movement lie in the philosophy of German idealism as well as in late classicism and Romanticism. The leading figure, Schelling, assimilated and stimulated the major trends and ideas through his work.

After the death of Hegel (1831) and of Goethe (1832), Naturphilosophie quickly disappeared from the mainstream. Yet it survived in various different forms, especially as an undercurrent of German culture and science, until the twentieth century.

1 Kant and Fichte
2 Schelling and the Naturphilosophen
3 Major doctrines of Naturphilosophie

1 Kant and Fichte

The leading role among the various trends in Naturphilosophie was played by Schelling’s philosophy of nature. To understand it, it is necessary to examine also the philosophy of Kant and subsequently that of Fichte.

Kant had a threefold influence on the movement of Naturphilosophie: through his Metaphysische Anfangsgründe der Naturwissenschaft (Metaphysical Foundations of Natural Science) (1786) where he took forces as the defining properties of matter; through his third critique, the Kritik der Urteilskraft (Critique of Judgement) (1790), where he treated the concept of purpose in nature, and finally in providing a frame for these ideas through the transcendental idealism of his first critique, the Kritik der reinen Vernunft (Critique of Pure Reason) (1781/87).

In his Metaphysical Foundations Kant tried to clarify the concept of matter as it has to be presupposed by all possible scientific investigation. In contesting Newton’s views, he saw matter as constituted by the opposing forces of attraction and repulsion. Matter fills space by its repulsive force. The resulting dispersion is counteracted and limited by an attractive force. Thus Kant arrives at a dynamic view of matter which takes active opposing forces as fundamental and which avoids the conception of the atom and of empty space. His theory advanced a dynamic view of nature (‘dynamism’) as a research programme in physics, and made similar
conceptions of the sciences appear in a new light (for example, positive and negative forces in magnetism and electricity).

In the *Critique of Judgement*, Kant tried to come to terms with the teleological structure of nature. Organisms as products of nature cannot be completely explained in the causal way in which one would explain a mechanical system. For in organisms not only do the parts determine the whole, but the purpose guiding the organism as a whole also determines its parts. In understanding organism and nature as a whole we have thus to grasp it as fulfilling a purpose, to see it as a self-organizing system which has the cause and effect of its action in itself (Kant 1790: §64). However, since we can talk of purposes only in relation to free action and since nature is not an intelligent being we can ascribe purposes to nature only in a metaphorical, regulative sense, *as if* it were a free acting creature with its own purposes. Our grasp of organic nature is therefore inherently subjective and can never reach the objective validity of explanations by mechanical causality. Later Naturphilosophen attempted to overcome this Kantian limitation and to furnish nature with an objective, purposive structure which is constitutive of it, and thus to see nature as an autonomous and even indeterministic system.

In the *Critique of Pure Reason*, Kant had claimed that experience is not passively received by our mind but is determined and even produced by categories intrinsic to our own understanding. The unity of our self-consciousness, the synthetic apperception, as the ‘highest point’ of philosophy is responsible for our sense impressions being synthesized into genuine knowledge. Thus every philosophy has to start with an inquiry into the transcendental conditions of the mind itself which make knowledge possible.

Before he became acquainted with Kant’s writings, Johann Gottlieb Fichte believed determinism to be unavoidable. His view changed dramatically, however, when he realized that Kant’s transcendental idealism can be radicalized so as to make room for absolute human freedom. Nature is a system of necessity only because it is conceived by us that way. In Kant, the unity of self-consciousness was only the *formal* condition of our knowledge; some material must be given to our senses which ultimately stems from the thing-in-itself. For Kant, the process of being affected by objects does not depend on the self. Fichte, however, came to reject the idea of the thing-in-itself and claimed that the unity of self-consciousness is also the *material* condition of our knowledge. The self with its capacity for synthesizing knowledge is not reacting to something given, it is autonomously producing its reality, including itself. Knowledge of objects is derived from an initial act of self-positing; objects are the result of a law-governed production of the ego. The ‘I’, the self, is in this case not to be thought of as the consciousness of an individual person, but as a general structure independent of individual realization.

2 Schelling and the Naturphilosophen

Schelling originally started in complete harmony with Fichte’s viewpoint, but later gradually shifted away from it. Whereas Fichte stressed the certainty of which the I disposes in positing itself, Schelling tried to uncover the origin of the I, the kind of being from which it stems. ‘I am! My I comprizes a being which precedes all thinking and conceiving’ (Schelling [1795] 1856-61, vol. 1: 167). This being is now seen as more comprehensive than the ego: namely nature. The I is not its own product, as Fichte would have it, but the I and the material objects are produced by nature as a ground deeper than the I. ‘Nature’s reality stems from
herself – she is her own product – a whole which is organized out of itself and organized by itself” (Schelling [1799] 1856-61, vol. 3: 17). With this move, Schelling could ascribe to nature the structure which Fichte had claimed for the I. Schelling also thought that this would make it possible to overcome the limitations which Kant thought were necessary in our grasp of nature. Nature can now be seen as a reality which is a self-determining system for which purpose is a constitutive idea and not a regulative one as Kant had it.

From 1797 to 1806 Schelling made various attempts to formulate his philosophy of nature. This necessarily brought him into conflict with Fichte’s soulless mechanical conception of nature. For Fichte nature was just the ‘system of necessity’, the inanimate realm of the ‘not-I’ or ‘non-ego’, posited by the I itself. Schelling, however, envisaged nature as a vital process from whose activity the consciousness of the ego and the mind emerges. Whereas Fichte asked how the self gets at nature, Schelling had the problem of how nature finally arrives at the I.

At the beginning of his development away from Fichte, Schelling envisaged Naturphilosophie as being of equal status with transcendental philosophy; from 1801 onwards, however, Naturphilosophie became primary for Schelling and independent from it. He claimed that we cannot grasp nature by merely investigating her products as they present themselves to our experience. This would be to see nature merely as an inanimate object, as natura naturata. Nature as ‘productivity’, or ‘absolute activity’, in its ‘infinite becoming’ requires studying her as natura naturans, as a subject, a productive process which eventually gives rise to mind and crystallizes in its products (Schelling [1799] 1856-61, vol. 3: 284). This view eventually flowed into a critique of Newtonian mechanical physics taken as the paradigm of modern science. Mechanism starts from material bodies which are supposed to have the property of attracting and/or repulsing each other. Yet, in order to conceive nature as an entity that is able to produce the self and the objects in like manner, it is necessary to give attraction and repulsion a more basic status and to take them as defining properties from which material objects and also consciousness are derived. Schelling did not attack the experimental and empirical side of science but its premature objectivism which leaves out the subjective element in nature and its developmental aspect.

In carrying out his programme Schelling was influenced by the experimental physicist and founder of electrochemistry, Johann Wilhelm Ritter (1776–1810), and influenced him in turn. Ritter pleaded for a strong connection of galvanism and chemistry and saw the living organism as a system of nested galvanic chains. When he found that the galvanic process is not necessarily bound to organic material, he considered galvanic action to be the key to the activity of the whole universe.

Hegel was the other post-Kantian idealist who occupied himself with Naturphilosophie. He was decisively stimulated by Schelling before he came to work out a fundamentally different system. For Hegel, nature as the realm of the idea in its otherness is not to be grasped as an evolutionary process but as a conceptual development of the idea on the way to self-knowledge.

3 Major doctrines of Naturphilosophie
Schelling’s *Naturphilosophie* set the tone for many similar undertakings. Although these attempts sometimes differ very much in detail from each other, we can distinguish several recurrent tenets. First, and foremost, there is the view of the ‘unity of mind and matter’. Schelling and many *Naturphilosophen* argued that nature is animated, that there is an original unity or ‘identity’ of nature and mind which allows us to infer nature’s laws from the laws of the mind and vice versa: ‘The system of nature is at the same time the system of our mind’ and ‘Nature must be visible spirit, and mind invisible nature’ (Schelling 1797: 39, 56). This view was primarily directed against both Cartesian dualism and eighteenth-century materialism. It had a great impact on the Romantic movement, both in literature and science. Hans Christian Ørsted, for example, who discovered electromagnetism in 1820, claimed that all objects are materialized ideas. And according to the biologist Lorenz Oken, it was the task of *Naturphilosophie* ‘to show that the laws of the mind are not different from the laws of nature but that both represent each other. Philosophy of nature and philosophy of mind range, therefore, parallel to each other’ (Oken 1843: §13). Later, one of the sharpest critics of *Naturphilosophie*, Hermann von Helmholtz saw the principal error of this movement precisely in the mingling of the necessary laws of nature with the spontaneous activity of mind. A last remnant of the identity view of nature and mind can be found in the dual aspect view of mind and body as it was embraced by a large number of physiologists, psychologists and many philosophers up to and including Rudolf Carnap’s *Der Logische Aufbau der Welt* (*The Logical Construction of the World*) (1928).

A second doctrine is the prevalence of the organism as an explanatory model. For Schelling (as for Kant), mechanical explanations of nature have to be supplemented by organic ones. It is not possible, Schelling claimed, for the universe to be simply a causal mechanism as its organic structure is logically prior to its mechanical one. ‘One and the same principle’ is at work in both organic and inorganic nature which binds all of it ‘into a general organism’ (Schelling [1798] 1856-61, vol. 2: 350). Organisms are causally self-contained, they are their own cause and effect and they are self-movable, whereas causal mechanisms can only be moved from the outside and are therefore essentially passive. Carl Friedrich Kielmeyer, who decisively influenced Schelling in his organic thought, explained the organism in terms of three organic forces: irritability, reproduction and sensibility (Kielmeyer 1793). Irritability is organic activity or movement, sensibility is organic receptivity or sensation, and reproduction refers to the metabolism, to growth and procreation.

A third related doctrine of *Naturphilosophie* is the unity of nature and its forces, and thereby also of science. There was a strong tendency to exhibit nature in all its different aspects as a development from a small number of fundamental forces. Ørsted, whose dissertation had examined Kant’s *Metaphysical Foundations of Natural Science*, had claimed that there is a ‘unity of all the forces’ of heat, chemistry, electricity and magnetism and that ‘the former physical results [Kenntnisse] thus combine into a physics of one piece’ (Ørsted 1803: 209). Similar claims have been made by scientists such as Faraday, Mohr, Grove, J. R. Mayer and others, which eventually led to the establishment of the energy conservation principle. The inorganic as well as the organic realms were seen as directed by the same principles, so that there is no essential difference between them. This does not mean that nature reduces to mechanism, but that the inorganic world has to be conceived as the product of an inherent organic natural process. *Naturphilosophie* developed the tendency to impose the organic categories found in the study of nature even on culture, society and the state. In this sense, it also helped to prepare the ground both for the later materialist and naturalist movement as well as for organic conceptions of the state and society.
In viewing nature as a unity, the movement of Naturphilosophie was also influenced by Goethe’s search for an underlying idea of the organic and inorganic realms of nature. In morphology, he argued that all plants are modifications of one primordial plant, the Urpflanze, and that all plant organs were variations of a single fundamental organ, the leaf (see GOETHE, J.W. §3).

Another doctrine of Naturphilosophie concerns the developmental aspect of nature. Instead of viewing nature and its parts in static terms, Naturphilosophie tried to conceive of it as the outcome of an evolutionary graduated succession. Very often this process was seen as being initiated and maintained by a polar antagonism of forces. Models for conceiving this process were either taken by way of analogical reasoning from some philosophical source (Kant’s Metaphysical Foundations, Fichte’s idea of the self determining itself by positing the I and the not-I at the same time) or some scientific theory of the time (magnetism, galvanism, electricity, chemistry, physiology). Other sources included Goethe and HERDER who also held influential theories of development. In all this, the concept of polarity played a prominent role and was seen as the continuous principle for every development and activity. Oken, for example, viewed living organisms as governed by two opposing processes: an individualizing one which increases the organism’s vitality, and a universalizing one that leads to death and is a drive to the absolute (see ABSOLUTE, THE).

See also: ROMANTICISM, GERMAN, §6; GERMAN IDEALISM

References and further reading


nia Press, 1967. (Attempt to carry out the programme of early Logical Empiricism to reduce all concepts to elementary experiences. Gives a solution to the mind-body problem in terms of a double-aspect theory that is reminiscent of the Spinozism of Naturphilosophie.)


Esposito, J.L. (1977) Schelling’s Idealism and Philosophy of Nature, Lewisburg, PA and London: Associated University Presses. (Short account of Schelling’s philosophy of nature. Usefull chapter on Schelling’s contemporary critics and on his influence on nineteenth-century America.)


Fischer, K. (1902) Schelling’s Leben. Werke und Lehre (Schelling’s life, work, and doctrine), Heidelberg: Winter, 3rd edn. (Elaborate and vivid account of Schelling’s life and work. Sometimes dated but still valuable, with a wealth of information.)

Frank, M. (1985) Eine Einführung in Schellings Philosophie (An introduction to Schelling’s philosophy), Frankfurt: Suhrkamp. (Short but useful introduction to Schelling’s work which puts stress on his Naturphilosophie.)


Hasler, L. (ed.) (1981) *Schelling. Seine Bedeutung für eine Philosophie der Natur und der Geschichte* (Schelling: his significance for a philosophy of nature and history), Stuttgart: Frommann-Holzboog. (Includes essays on Schelling’s relation to the sciences of his day and on his philosophy of history.)


*Kant, I. (1781/1787) Kritik der reinen Vernunft, Riga: Hartknoch; trans. N.K. Smith as The Critique of Pure Reason, New York: St Martin’s Press, London: Macmillan, 1964. (Explanation and justification of the a priori forms of reason that constitute the basis of any theoretical knowledge. Kant’s doctrine of the spontaneity of the subject and the autonomy of reason was especially relevant for Naturphilosophie.)

*------ (1786) Metaphysische Anfangsgründe der Naturwissenschaft, Riga: Hartknoch; trans. J. Ellington as Metaphysical Foundations of Natural Science, Indianapolis, IN: Bobbs-Merrill, 1970. (In his metaphysics of nature, Kant formulates the principles that specify the transition from the critique of pure reason to actual empirical science. His dynamic definition of matter from attractive and repulsive forces was important for Naturphilosophie.)

*------ (1790) Kritik der Urteilskraft, Berlin: Lagarde; trans. J.C. Meredith as Kant’s Critique of Judgement, Oxford: Clarendon Press, 1952. (In a way, the cornerstone of Kant’s philosophy. Tries to show that the realms of nature and freedom, of causality and teleology are compatible. The second part, ‘Critique of teleological reason’, became especially relevant for Naturphilosophie.)


*Kielmeyer, C.F. (1793) Ueber die Verhältnisse der organischen Kräfte unter einander in der Reihe der verschiedenen Organisationen, die Gesetze und Folgen dieser Verhältnisse (On the relation of the organic forces to each other in the series of the different organisms, the laws and the successions of this relation), Stuttgart and Tübingen: Heerbrand; repr., intro. K.T. Kanz, Marburg: Basilisken-Presse, 1993. (Living systems fulfil three main functions: sensation, motion and self-preservation. Organic forms differ from each other by the different amount in which these functions are fulfilled. A concise statement of the problem situation at the end of the eighteenth century.)

Knittermeyer, H. (1928) Schelling und die romantische Schule (Schelling and the Romantic movement), Munich: Ernst Reinhardt. (Lengthy account of Schelling’s Naturphilosophie and of the ideas of many of his followers, especially from philosophy.)


Philosophy of Nature as Introduction to the Study of that Science, Cambridge: Cambridge University Press, 1988. (Schelling’s major work on Naturphilosophie aiming to overcome the split of mind and nature, of subject and object. Follows Kant in constructing matter from expansive and contractive forces.)

*------ (1798) Von der Weltseele, eine Hypothese der höheren Physik zur Erklärung des allgemeinen Organismus (On the world-soul: a hypothesis of higher physics in order to explain the general organism), Hamburg: Perthes; repr. in Sämtliche Werke, ed. K.F.A. Schelling, Stuttgart 1856–61, vol. 2, 345–583. (Explanation of organic nature in terms of a general dualism of opposing forces.)


------ (1994) Wetenschap en intuïtie: Het Duitse romantisch-speculatief natuuronderzoek rond 1800 (Science and intuition: German Romantic and speculative natural science around 1800), Baarn: Ambo. (Balanced and authoritative account of the impact of Naturphilosophie on science and vice versa from about 1790 to 1830. Includes vivid and expressive accounts of central and marginal figures of the time. Helpful annotated bibliography.)


MICHAEL HEIDELBERGER