

the
MANY FACES
of
BEAUTY

edited by
VITTORIO HÖSLE



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BEAUTY IN NATURE BOTH IN ITS LAWS AND ITS ENTITIES

DIETER WANDSCHNEIDER



Whoever declaims the beauty of nature, suggests Theodor Adorno, verges “on the edge of poetastery,” of kitsch. Nevertheless, admits Adorno, it is true to say that “the countryside of Tuscany is more beautiful than the surroundings of Gelsenkirchen” (Adorno 1993, 110, 112). We love beautiful sunsets, beautiful landscapes, beautiful flowers, beautiful butterflies, beautiful people, and we know what we mean thereby. It becomes difficult, however, to verbalize this. The beauty of nature, Adorno continues, is “aloof . . . in relation to determination by spirit” (407). The science of nature in particular offers no help. Its objects are theories about nature but not about the beauty of nature. The new scientific interest in the biological function of beautiful natural forms, for example, in the feathers of birds, does not lead to a theory of beauty, either, but rather uncovers functional connections in the events of nature. The concept of beauty is already presupposed, and is thus not an element of the scientific theories but an “externally” undertaken evaluation. Also, the theories themselves can be judged “externally” in this way: We speak, for instance, of “beautiful” theories and mean thereby particularly “elegant” theories, that is to say, ones that are extraordinarily comprehensive and, nevertheless, in a way “simple.” But why then do we call them *beautiful*? Here, too, we know what we mean. But first, in order to grasp this conceptually, it will be necessary to dwell on the concept of beauty.

It is certainly important to be aware that terms, especially those that involve a central human interest, are not fixed in meaning but are subject to historical change. That is especially true for the aesthetic concept of nature, for this substantially depends on the relationship of humans to nature (Adorno 1993, 102). The history of the concept of natural beauty is not the subject of my investigation. For that, I refer listeners to the excellent and instructive study by Jörg Zimmermann, “On the History of the Aesthetic Concept of Nature” (1982). In the following, I instead limit myself to some paradigmatic positions—above all, those of Kant, Hegel, and Adorno.

ON THE CONCEPT OF BEAUTY

Plato connected the concept of beauty with the concepts of truth and goodness (see, e.g., *Republic* 517b–c, and *Timaeus* 29a–e). The beautiful, accordingly, is whatever is to be judged absolutely positively, whatever is free of deficiencies. As such, however, it cannot be anything sensuous, but must possess an ideal character and is therefore only mentally ascertainable. That this mental dimension time and again appears in sensuous contexts—for instance, in the shape of a beautiful flower—does not contradict this claim: Something is beautiful in our evaluation, thus in a mental perspective. The flower only *is* beautiful, but it itself is not able to pass judgment on itself, and that means that it is not able to conceive of the ideal as such appearing in it.

If the beautiful possesses an ideal being, then that by no means implies that it requires *conceptual* recognition. It simply *pleases*. Kant attributes this aesthetic judgment, as is well known, to a “mind condition,” which is based on “the free play of imagination and understanding.” The ideal content of the beautiful presents itself, as it were, in such a way that understanding does not have to forge ahead to recognition by intricate conceptual conclusions; instead, imagination works in tandem with understanding. This “harmony of the cognitive abilities” triggers “desire” and thus “pleasure” (Kant 1799, 29), which is captured by Kant in the well-known formula, “*Beautiful* is what pleases universally without a concept” (32). Essential here is “the relationship to desire and nondesire” as the criterion of the “judgement of taste” (31).

This should have a universal character, according to Kant, as a result of imagination and understanding not being private, but rather being universal conditions of human subjectivity and “therefore also valid” in-

stances “for everyone, who is determined to judge by the combination of understanding and the senses” (32). Beauty is thereby the expression of a “*necessary pleasure*” (68; emphasis in the original). Therefore, the foundation of aesthetic judgment on the basis of a “mind condition” is, following Kant, not to be understood as subjectivist, because he presupposes a uniformity of the cognitive abilities of human subjects or, as he expresses it, of “the public spirit” (§20 ff.).

But how does that harmony in “the free play of the abilities of cognition” become possible when grasping a beautiful object? What is essential, according to Kant, is that its sensuously perceptible structure exhibits a certain *expediency* (61). A symmetrical figure, for example, is intuitively graspable due to its holistic, regular structure and is therefore considered beautiful (70)—certainly a still quite simple aesthetic taste, which Kant also immediately criticizes, since such a regularity means a conceptual constraint, which impairs the free play of the abilities of cognition (71 f.). Only when imagination succeeds “in playfully providing food for the understanding and giving life . . . to its concepts” (206) is, for Kant, the predicate “beautiful” really appropriate—a characterization that remains very indefinite and metaphorical.

In the wake of Kant, Hegel undertook to newly determine the concept of beauty in the frame of his idealistic system project. Kant had characterized the beautiful on the basis of a “mind condition”; Hegel, however, undertakes an *ontological* determination. Hegel’s famous dictum, that the beautiful is the “sensuous shining of the idea” (Hegel 1969, 13:151; see also 13:389 f.), first emphasizes its *ideal* character. But what is “the idea”—“idea” in the singular, not a plurality of “ideas,” as in Plato?

In Hegel, *idea* stands for the complete system of logic in its entirety, namely, in an unsurpassable totality. This—Hegelian—logic is not the familiar formal logic, for its calculus is based on axioms, thus on basic assumptions, which can be selected in one way or another and thus contain a conventional element and, concomitantly, a foundational deficit. In contrast, Hegel’s “idea” is to be thought of as independent of such positing. It is to be understood as a *fundamental logic*, which is not exhausted in formal determinations but instead contains the absolutely complete system of logic and, concomitantly, its own foundation.¹ Thus, by way of its self-grounding—or in current parlance its “ultimate foundation” or *Letztbegründung*—the foundation deficit of formal systems is overcome such that, in principle, ultimate completeness is attained. This system of logic, which is complete in itself, is the Hegelian *idea*. It is, as it were, that

which is self-justifying, existing on the ground of itself and in this sense the absolute, the divine.

But what does that have to do with the beautiful? Following Hegel's dictum of the "sensuous shining of the idea," the beautiful is the coming-into-appearance of the idea in a sensuous medium, a reflection, as it were, of the divine in earthly things.

To come closer to this problem, I would like to clarify it by a familiar example: the shape of a bloom, perhaps that of a rose. Why do we find this *beautiful*? The sight of the bloom presents a certain symmetry, apparently quintuple-like, certainly not in the clear, geometrical form of a crystal but multiply nested and offset in the arrangement of the petals. They themselves are of a silky, aromatic delicacy, produced by the rose from materials that belong to the earth in which it is rooted. Certainly, nothing of this can be presumed in view of the earthy stuff per se, which is shapeless, muffled, dirty, and raw. The fact that out of this the ethereal formation of a rose bloom arises in its symmetry, delicacy, and coloration must seem like a miracle or a mystery—think of Rilke's "rose, oh pure contradiction." Thereby, in the rose appears a secret inherent in the earth: The fact that this earthy stuff contains the possibility of the bloom testifies that it is in truth more than amorphous dirt. Admittedly, the gene information of the rose is here the underlying formation principle, which draws these forms from the earth. But the gene molecule likewise consists of just these materials stemming from the earth.

All this becomes obvious in the bloom. What comes into appearance is thus much more than the rose bloom itself: The formation drive inherent in nature becomes visible, producing highly complex structural forms, which are understandable for us only by analogy to some ingenious engineer who transforms reality by utilizing his knowledge of the laws of nature. These laws of nature, however, are the *logic* ruling the being of nature, and thus—in the sense of Hegel's idealistic view—the *ideal principle* underlying nature. Understood in this way, the beauty of the bloom appears as the manifestation of the ideal ground of nature; the bloom exemplarily manifests far more than its bare existence.

One could object that the roots and the thorny stem of the rose seem to be of equally admirable purposefulness, the basis of which would be, again, the laws of nature. Thus, those parts of the plant, no less than its flower, also seem to represent the ideal principle of nature. Nevertheless, we do not call them *beautiful*.

This objection is natural and in a certain sense correct. What it ignores, however, is the completely different mode of appearance of the different parts of the plant. Perhaps I can express it briefly: All these equally represent that ideal principle—the lawfulness underlying nature—but the bloom also manifests it, so that it becomes immediately obvious. This difference is rightly recognized by Adorno “in the extent to which something not made by humans *speaks*, its expression. What is beautiful in nature is that more appears than is literally present” (Adorno 1993, 111; emphasis added). Surely, biological research brings to light the ingenious construction of the plant parts, but in the rose bloom to a certain extent this comes to appearance in itself. Though stemming from the earth, it presents itself as something completely different from that, for even in its material being it still lets that ideal principle underlying it shine through. This—to recall Hegel—sensuous shining of the ideal is what we experience as the *beauty* of the rose.

THE BIOLOGICAL FUNCTION OF THE BEAUTIFUL

Beauty, accordingly, is a coming to light of an ideal in a sensuous medium, which as such can be grasped only *mentally*. Is the perception of the beautiful thus a privilege of humans, which remains denied to animals? In opposition are the arguments of evolutionary biology that award the beautiful a positive selection value concerning the choice of a sexual partner, as has been already outlined by Darwin.² This view is increasingly influencing discussions in aesthetics (e.g., Richter 1999; Menninghaus 2007). Here, I will outline only briefly the principal relevance of this view to our topic. (For a more detailed treatment, see the essay in this volume by Christian Illies.)

The question of how, for instance, the sumptuous colorfulness of a bird’s plumage is to be evaluated under a functional aspect inevitably poses itself in terms of evolutionary biology. For if such developments are functionless, then they at least imply a vital additional expenditure and thus a disadvantage in terms of selection for the organism. If they are dysfunctional at all—say, by virtue of the fact that multicolored plumage has a signal effect for enemies—then the disadvantage is even greater. Given such allegedly negative selectional value, we can infer that such formations should not exist any more. Why, then, do they still exist?

Drawing on Darwin's considerations in his work *The Descent of Man, and Selection in Relation to Sex*, a reorientation in thinking about this question has been taking place for the past thirty years or more. According to this line of thought, the colorfulness of a bird's plumage is neither functionless nor dysfunctional, but rather of substantial importance for the choice of a partner and thus for sexual reproduction. The magnificent finery of the male impresses the mating-ready female, signaling to the potential partner his health and fitness for survival and thus reproductive success and the continuing of the individual genome. Something similar applies to the singing of birds, which can be interpreted, as Klaus Richter notes, as a "demonstration of [their] vital power" (Richter 1999, 286). In this sense, Darwin already had awarded a "sense of beauty to animals."³ In terms of evolutionary biology, the scientific consensus today is that this was the phylogenetic origin of the aesthetic sense. Thereafter beauty has a substantial function, that is, in the framework of sexual selection. For this reason, "beautiful" individuals develop in the course of evolution, as well as those who respond to their beauty and let themselves be impressed by it. In Adorno's view, this purely functional aspect of natural beauty is "the horrifying dimension" of the biological sway in which all that is alive stands (Adorno 1993, 105).

Humans undoubtedly have phylogenetic roots, which continue to work in us. This—according to the thesis of evolutionary biology—therefore also applies to humans' sense of beauty. A beautiful woman, a beautiful man: such predications are essentially biologically motivated. Central in this connection are characteristics that signal youth, health, power, and reproductive success: for example, smooth complexions, symmetrical body forms, pronounced female and male deportment, lack of behavioral abnormalities, and an absence of deviations from the norm of the species.

So far, only the ideal of beauty as it relates to reproductive success is addressed. The evolutionary-biological thesis, however, goes further. What humans understand, for example, by a beautiful landscape was, for instance, the savannah: wide-ranging, open, but with isolated groups of bushes and trees. A landscape of this kind offered favorable survival conditions. Spaciousness made it possible to recognize approaching enemies early, and at the same time the bushes and trees grant cover against them (Eibl-Eibesfeldt 1998, 24).

Beauty is interpreted here in terms of evolutionary biology, as in the case of partner selection, and that means in a functional way. A certain

combination of characteristics in a potential sexual partner signals reproductive success and is therefore noticed as attractive. A landscape appears attractive because it favors survival. Such preferences have developed for higher animals in the course of evolution and have affected their behavior. Beauty, understood in this way, is not anything mental, but instead it directs the behavior of higher animals, among them humans. In other words, in this scheme humans have no privileged position and the perception of beauty would consequently not be limited to humans, since it does not require those mental abilities that only humans possess. Is Hegel's characterization of the beautiful as the "sensuous shining of the idea," which is only mentally perceptible, thus obsolete?

As I have suggested, the biological function of the beautiful is certainly effective for humans, particularly with reference to the selection of a partner. At least in terms of sexuality, beauty also has a biological component as a phylogenetic inheritance that humans carry in themselves and that cannot be neglected. Nevertheless, in the case of humans the question of the sense of beauty is surely more complex. Humans, and only humans, possess spirit, and in a spiritual perspective everything appears in a new light. Winfried Menninghaus argues: "If the human body can be understood as the continued mutation of the body of an ape, then the same must apply as well to mental abilities and dispositions" (Menninghaus 2007, 216). But this is absurd. In that case, evolutionary stages would be flattened.

At that moment, however, when spirit arises on the evolutionary stage, the biological no longer prevails with the unrestricted power it has in the context of natural selection. From now on, spirit moderates and modulates it according to its own—mental—standards (Wandschneider 2005b, 201 ff.). This becomes paradigmatically visible in the development of technology, the goal and triumph of which is the freeing of humanity from natural constraints. Think, for example, of medicine, which, in its fight against diseases, directly counteracts natural selection. But even the sexual sense of beauty gains completely new perspectives in the horizon of spirit. The biological remains the basis but appears transformed in multiple ways, in which biography, education, and other factors play important roles. Erotically attractive is, in one case, for instance, the self-conscious girl with the cat's eyes, and in another case the boy with the lively nature and the crooked teeth. The purely reproductive aspect thereby tends to take a back seat, and its place is taken over by a

variety of ideals that have their origin in mental structures, corresponding to their essentially historical character. Landscape that was attractive as a result of survival instincts was not aesthetically discovered, in the nonbiological sense, at least in the Occidental consciousness, until the Renaissance (e.g., Zimmermann 1982, 126), and only in the eighteenth century did the concept of the beauty of nature become “explicitly an issue” (119).

The biological function of the beautiful thus exerted a causal effect on behavior, while the qualification of “beautiful” expresses our mental evaluation of the same. The so-called biologically “beautiful” is, as a perception pattern, also only a determinant of behavior. Admittedly, the mating behavior affected thereby is essentially linked with the continuation of the gene pool and so is indeed biologically more important than, for instance, reactive flight triggered by the perception of a bird of prey.

Thus, *beautiful* in a nonfunctional sense would be only an ideal structure, which as such does not trigger a causal effect. Significantly, Kant characterizes the pleasure connected with the beautiful as *disinterested*, which thus excludes the effect of the pleasant and therewith all physiological and behavior-biological agencies (Kant 1799, §2). Menninghaus’s verdict, according to which Kant’s view of the judgment of taste becomes “almost brilliantly confirmed by Darwin’s theory,” must also be called absurd (Menninghaus 2007, 219), even if Darwin’s arguments opened up new perspectives on Kant’s aesthetics (Hösle and Illies 1999, 139). Darwin himself was convinced that “no animal is able to admire such scenes like the sky at night, a beautiful landscape, or refined music” (Darwin 1895, 120). Nevertheless, Menninghaus admits, the “aesthetic desire for beautiful animals and plants is not at all solely—or at best secondarily—the trace of past eating experiences and practical usefulness for human survival” (Menninghaus 2007, 230). Vittorio Hösle and Christian Illies have pointedly formulated that view in this way: From Darwin’s theory it does not at all follow “that the classical transcendental principles should be defined in a naturalistic manner”; these principles are instead “compatible” with a theory according to which the highest-ranking ideal instances, “the good, the true, and the beautiful, exist in themselves and were simply unfolded in reality by the mechanisms of evolution” (Hösle and Illies 1999, 138).

In short, Hegel’s interpretation of the beautiful as the sensuous coming-into-appearance of the ideal has in no way been rendered obso-

lete by biological functionalization in the sense of a phylogenetic mechanism; instead, Hegel's interpretation is elevated insofar as it takes the mental nature of the spiritual essence, the human being, into account. Thus, with good reason, that "sensuous shining of the idea" can be taken to underlie the concept and criterion of the beautiful, including the beauty of nature.

MANIFESTATIONS OF THE BEAUTIFUL IN NATURE

Crucial for us, therefore, is the *ideal* that appears in natural phenomena. How that is to be understood has already been addressed in the example of the rose bloom. Now, however, let us consider an example from *inanimate* nature; think, for instance, of the unbelievably polymorphic and nevertheless symmetrical structure of a snow crystal, or snowflake. The ideal character of the symmetry is obvious insofar as it represents a mathematical—a group-theoretical—structure (see Weyl 1955). But what is fascinating about it? What we intuitively grasp in the symmetry can be characterized as an identity in nonidentity: For instance, if the snow crystal is turned at an angle of 60 degrees, then precisely the same image appears that we saw before it was turned. The turn is a change, and with multiples of the rotation angle of 60 degrees it nevertheless leads again and again to the same sight. In addition, there is the inexhaustible variety of individual snow crystals, which Thomas Mann describes as follows: "Among the myriads of enchanting stars in their barely perceptible, secret, minuscule splendor, not intended for human eyes, no two were alike; an endless delight in invention reigned there in the subtlest modulation and embellishment of one and always the same basic design, the equilateral-equiangular hexagon" (Mann 1986, 677). This entanglement of difference and identity in one and the same object, or in objects of the same kind, has something fascinating about it and constitutes the attraction of symmetry—an intellectual attraction, which rests on the fact that here in a material object a mathematical state of affairs, precisely an ideal, gains visibility and so appears as beautiful—a geometrical and thus still very simple form of beauty.

The same can also be said of musical harmony, which is likewise based on mathematical relations and which already was seen as fascinating at the time of the Pythagoreans, among whom Plato included

himself. In the simplest case of an octave, the aesthetic attraction is that two different tones—different by the distance of an octave—are “compatible” in a certain way and result in *one*, a “harmony”; here also we see a form of identity in nonidentity.

For a completely different example, take the clear evening sky after sunset, shining in the spectrum of colors. Why do we experience this as beautiful? Is it the play of colors, its cloudless purity, the slow passing away of light? What transpires here is, of course, not the normal climatic situation. Normally, clouds are, in the daylight, unspectacular, interwoven with gray or blue, in a random distribution without recognizable rule. In contrast, the celestial, continuous spectrum of colors in the evening sky comes across as the visualization of a hidden cosmic principle. This pure, uninterrupted continuity in the transition of colors seems groundbreakingly improbable from the perspective of the normal processes of nature and to that extent may appear incomprehensible, like a transfiguration of nature, a regularity that is cleansed of all of the contingency that normally adheres to matter; or like a consciously staged spectacle, revealing the hidden, internal principle of nature and thereby the ideal underlying it. Nature is here episodically revealed as a quasi-mental or spiritual power to the extent that it makes visible in the material world its immanent ideal. And it is precisely this that we experience as *beautiful*.

A completely different aesthetic effect is found, for instance, in a mountain landscape. The sight of lofty mountains is in a sense sublime. In Kant’s famous interpretation, this is based on the way in which these forms of nature exceed all human measure (Kant 1799, §28 f.). Consequently, the impression of the *sublime* differs from that of the beautiful: The latter is by virtue of its well-proportioned measure particularly appropriate for sensuous apprehension—think, for example, of the so-called golden section or golden ratio in geometry.⁴ In contrast, the sublime works by its boundlessness, which as such is no longer understandable. Against this excess of nature, humans are tiny, nearly lost. But, and this is the Kantian punch line, even this excess is terrestrial and thus finite. The human being, however, is able to think the infinite (116). As a rational being, therefore, he knows himself to be absolutely superior to nature, with very real consequences: Consider the ways in which technology has freed humanity from natural constraints on a global scale. The sight of sublime nature thus becomes, *ex negativo*, the mirror of the human spirit in his ideal power, which exceeds immeasurably every

manifestation of the sublime in nature. Kant's theory of the sublime, for Adorno, "anticipates that spiritualization of the beauty of nature" which is then directly intended by art (Adorno 1993, 143). The aesthetic effect of the sublime is based on this spiritual dimension, which is set free by the sight of great natural forms.

For organic nature, Ernst Haeckel's monumental collection of images in *Kunstformen der Natur* (*Art Forms in Nature*) is instructive: What immediately catches the eye when paging through the illustrations is the incredible variety of symmetrical structures in the organic, for example, in radiolarians, jellyfish, and so forth. What was said about symmetry applies here as well, but with the nub that it is not simply the geometry of physical molecular patterns that displays symmetry, but organic growth. Thus, a far more mysterious power becomes visible. How does it come about that these forms are experienced as beautiful by Haeckel and by us?

First, we must acknowledge that higher animals other than humans are able to grasp symmetrical structures. Empirical investigations show that when given a choice, such animals prefer symmetrical patterns (Richter 1999, 220 f., 242). This is obviously due to the aforementioned regularly returning identity in symmetrical arrangements, which is thereby clearer and can be grasped more quickly than an irregular ensemble and thus offers a perception advantage for the direction of behavior.

Yet the beauty of organic-symmetrical forms of nature that we sense cannot be based on a functional advantage of this kind, because for us it is not in any way related to a functional connection. Also, symmetry as such is likely not crucial here. What affects us in Haeckel's *Art Forms in Nature* much more strongly is surely the organic production of such quasi-mathematical forms. We do not simply admire the rotation symmetry of the outlines of a medusa, but we also admire the seemingly fantastic organic structure that tenderly shimmers through. The fact that this apparently vulnerable creature develops strictly regular forms in the rough environment of the sea and is able to preserve itself therein seems, once again, like a miracle. Nature, ever violent, thus reveals powers that we, as with the rose bloom, would more readily assign to a gifted engineer or artist. At the same time, it becomes obvious that nature has the capacity to discipline and to convert these internal powers into highly artificial constructions; it is able, in other words, to also create as a spiritual being. Such an appearance of quasi-ideal structures in the realm of material nature must time and again engender surprise, admiration, and perhaps

even bewilderment—not least because therein we sense our own origin, the immanent possibility of the spiritual in the material. It is this ideal essence underlying nature that sensuously reveals itself in these delicate and at the same time extremely complex organic beings and that is experienced as *beautiful*.

Vittorio Hösle has extended the meaning of the beauty of nature into the realm of morals: The laws of nature confirm that nature is more than hollow materiality. As stated above, they are to be understood as the ideal essence of nature and, since they were not made by humans, “could be said to mirror something absolute,” which justifies the intrinsic value of nature. Insofar as this ideal shines through also in the beauty of nature, we can speak, with Hösle, of a “feeling for the beauty of nature” that is to be understood as instinctive recognition of such an ideal-founded “intrinsic value of nature” (Hösle 1997, 355). Beautiful, radiant nature is thus at the same time discovered to be a good, which should be retained and held sacred (Wandschneider 1993).

BEAUTY ON THE LEVEL OF THE LAWS OF NATURE

An *ideal essence* of nature? In an age that is hostile to metaphysics that may sound strange. Yet, aren’t material processes determined by the laws of nature, that is, by something not of material but of logical character? The laws of nature are, as it were, the logic underlying nature. Philosophically this is explainable only within the framework of an idealistic interpretation of nature (Wandschneider 1985). In a Christian perspective this corresponds to the concept that nature is of divine origin—think, for instance, of Kepler’s idea of a divine world harmony, which expresses itself in the well-ordered orbits of the planets,⁵ or in Einstein’s conviction of the divine character of the order of nature.⁶

Nature has, accordingly, an ambivalent status. On the one hand, it is characterized by spatiotemporal extension, materiality, and dynamic relations (“forces”), which constitute its reality. But this, on the other hand, is constantly determined by regularities, which as such have an ideal character. “Ideal” means that the laws of nature themselves are not of a spatiotemporal and material-dynamic kind. For example, the law of a falling stone on its part cannot fall; the law of electricity on its part is not electrical. As regularities, they are instead to be grasped only logically. They are of ideal, not material, being. The spatiotemporal-material reality thus

is one side, the ideal underlying and determining it the other. Both together constitute the being of nature. The natural sciences have to do with both: in their experiments, scientists deal with the reality of the natural processes, while they strive for knowledge of the regularities underlying these processes and thus the ideal essence of nature. This is the exclusive subject of their theories.

Now, theories also assume a real form. In the mathematized natural sciences this is realized by perceptible expressions of formulas on paper (or differently realized), in which the regularities of nature find their expression. Certainly, the shape of such theories can be quite varied. If one were to try to capture the process of a falling stone, for instance, by determining its respective positions in intervals of seconds, then not only would that be a very inaccurate representation of the process, because the intermediate values would be missing, but one would also have an obscure table with numerical values of the places and coordinated times, which could hardly be called a theory (from the Greek *theorein*, “to see”) because it practically gives no insight into the procedural structure of the process. Only the well-known law $s = gt^2/2$, which presents the correlation of places and times in the form of a functional expression, makes the relationship of space and time values visible and is not limited to a few such value-pairs but covers the entire continuum. Only in the form of the functional expression does the ideal that determines the process come to light; only by this is “the essence” of the falling process grasped. This form of the theory is simpler and at the same time more efficient than a frugal, unclear value table. In contrast, it is an elegant, beautiful theory.

The law of falling bodies, for its part, is again only a special case of Newton’s more general law of gravitation. Not until Newton did one understand that the falling of a stone and the orbital motion of the planets, different natural processes, obey the *same law* and in that sense resemble one another. The law of gravitation is much more comprehensive and thus has more explanatory power than the law of falling bodies, although it, too, has a simple form. This connection of simplicity and explanatory power has been emphasized again and again as a characteristic of a *beautiful theory*.⁷ How is this to be understood?

What the perceptibly realized formula of a physical theory expresses are laws of nature, that is, logical relations that determine natural processes. In the externally visible shape of a theory, thus, something of the ideal essence of nature shines through. All theory strives to express a

maximum of logical connections in as simple a form as possible. That is the characteristic of an *elegant* theory, where the methodical perspective is determining: namely, the particularly skilled or even sophisticated procedure of the scientist concerning the design and development of a theory. From the point of view of nature, however, we perceive the elegant theory as beautiful insofar as in its perceptible shape, the internal, ideal regularity of a wide range of phenomena comes to light. In this sense, the deeper motive of all natural science is the beautiful theory, in which something of the ideal essence of nature shines forth. In that sense, the scientist resembles the artist: Both are actively creative, and both seek—each in different ways—to approximate the ideal basis of being. The great chemist Justus von Liebig speaks of creative work as the “poetry of the natural science” (Liebig 1893, 265). Similarly, the great mathematician Karl Weierstrass suggests: “A mathematician who is not also something of a poet will never be a consummate mathematician” (Weierstrass 1883).

To this corresponds the creative fantasy of science in search of ever more simply formed, and at the same time more comprehensive, theories. A fine example is the Hamilton-Jacobi theory, in which an entire physical discipline, that of mechanics, is contained in the (double-) formula of the Hamilton differential equation. Other outstanding examples are Einstein’s relativity theories, with $E = mc^2$ as “the formal icon of the twentieth century” (Krohn 2006, 11), as well as the “geometrization” of gravitation, with which Newton’s theory of gravitation is recovered and then again surpassed; or quantum mechanics, in which Carl Friedrich von Weizsäcker, for instance, beholds “the simple beauty” that is characteristic of a “completed theory” (Weizsäcker 1985, 321); or, in current elementary particle theory, so-called string theory. In this sense, Wolfgang Krohn’s dictum becomes plausible, namely, “that the exploration of reality and the representation of knowledge are deeply impregnated with aesthetic functions.”⁸

In relation to the stated aesthetic meaning of symmetrical structures, it is interesting that the symmetry concept is also of fundamental relevance for a deeper understanding of the laws of nature, and thus of the theory of beauty. Plato, in his great, Pythagorean-inspired dialogue *Timaeus*, which contains his philosophy of nature, tried to ascribe to matter mathematical symmetries and thus an ideal, which, insofar as it becomes visible, is revealed as “beautiful” (see *Timaeus* 53c ff.). This thought was taken up by Werner Heisenberg in regard to the theory of elementary

particles, with an explicit reference to the Platonic concept: “‘In the beginning was symmetry’, that is surely more correct than Democritus’s thesis ‘In the beginning was the particle.’ The elementary particles embody the symmetries, they are their simplest representations, but they are only a consequence of the symmetries” (Heisenberg 1973, 280). The logical background here is the theorem of Emmy Noether according to which symmetries in the mathematical formulation of the laws of nature are connected with the preservation of fundamental physical quantities—for example, the total energy of a system, its total momentum, and so on.⁹ Here, symmetries concerning the laws of nature are to be understood in such a way that these are invariant in relation to certain transformations, for example, shifts in time, space, or other operations.

Here, too, it is clear that symmetries, thus ideal structures, constitute the properties of wholeness; also, invariance against transformations is a form of identity in nonidentity. The spatiotemporal real is isolated and separated. An ideal structure is, as it were, held together, clamped together as a totality, by virtue of the identical contained in symmetry. Symmetry is an ideal that governs and determines the material throughout. Therewith the ideal principle of the law of nature is addressed, and the scientific theory seeks to give it adequate expression. It is in principle, time and time again, the search for the *world formula* that plagues researchers, and this means the search for the *beautiful* theory, which in the shape of a perceptible formula brings forth in a pure way the ideal essence underlying nature.¹⁰

BEAUTY OF NATURE AND BEAUTY OF ART

These considerations concerning the beauty of nature are complemented by a glance at their opposite: the beauty created by human beings in works of art. The criterion of beauty applied here to natural phenomena has taken as its basis Hegel’s characterization of the beautiful as “the sensuous shining of the idea.” Yet Hegel himself has devalued natural beauty in relation to artistic beauty, because nature—in any case nonhuman nature—is nonspiritual, whereas art is a form of the mental comprehension of the absolute, and as such seeks “the beauty *born and again-born from spirit*.”¹¹ Crucial, therefore, is the spiritual achievement that lets something of the idea (in Hegel’s sense) appear in the figuration of the

sensuous material. Now, precisely in the idealistic understanding, “the idea” underlies nature, manifesting itself, as stated, in natural phenomena in varying degrees of clarity. If nature is experienced as beautiful, then an anticipation of that ideal has appeared, which art then strives to grasp with its creative means. The beauty of nature has indeed been a generating impulse of artistic work, from the visual arts to poetry. In Marcel Proust’s epochal work *Remembrance of Things Past*, according to Adorno, the smell of village whitethorn hedges counts “as one of the arch phenomena of aesthetic behavior” (Adorno 1993, 100). Goethe was fascinated by the regularity in the structure of crystals, and as a result of his Italian journey, the beauty of the Mediterranean landscape became a formative influence on his entire oeuvre.

Through pictorial means, the painter seeks to reproduce the attraction, for example, of a beautiful landscape, which he could capture only insufficiently in words—and that reproduction certainly cannot be a bare copying. Mimesis, for Jörg Zimmermann, is understood “as an aesthetic visualization” (Zimmermann 1982, 127), or, in Adorno’s pointed expression, not as an imitation of nature but as an “imitation of the beauty of nature” (Adorno 1993, 111, see 113). And that is, in Hegelian terms, precisely a matter of letting “the idea” appear.

Its realization in a work of art is a highly complex creation process, which, according to Heidegger’s interpretation occurs in the form of “strife” and “internal conflict” in opening up the natural, which is also steadily closing itself off (Heidegger 1960, 51). This laborious mental process of producing art, just like its reception, constitutes the work, pulls the beholder into this struggle, and so “the work opens a *world*” (44). “An *aesthetic idea*,” as Kant expresses it, opens to the mind “a view onto an unwieldy field of related ideas” (Kant 1799, 195). And just by that, as can be supplemented by Hegel, “the work of art ranges higher than any natural product, which has not made this passage through the mind” (Hegel 1969, 13:48). It is “the satisfaction of spiritual production” for the artist as well as for the beholder. The painted landscape does not please us “because it is so natural but because it is so naturally *made*” and, as such, is “a production of the spirit” (13:216).

What is at play here is not a *repetition* of the natural original. If this is taken as a model, then, as Hegel continues, it is “not because nature made it so or so, but because it made it *rightly*; this ‘rightly,’ however, is something higher ranking than what exists.”¹² What expresses itself therein

is the idea of something exceeding the earthly finite, which is felt as divine. The experience of nature here gains a catalytic function. Thus, nature is not simply the ensemble of the objects of experience, but is also felt as “shining from within” (Adorno 1993, 110). Adorno reminds us of Walter Benjamin’s concept of *aura* (408): Nature radiates something—delight, melancholy, or peace. “Thus perceiving the aura of nature,” means, as Adorno notices, “through nature becoming aware of what essentially constitutes a work of art”: an “objective meaning, to which no subjective intention measures up” (409). Bare desire here is nothing, but the experience of aura, intense sensing, is everything. Adorno is surely right in recognizing in this the common root of the beauty of art and the beauty of nature (408 f.).

But only works of art, to Adorno, achieve then what nature cannot: “They open the eyes” (Adorno 1993, 104). If the language of nature is mute, then art strives “to bring the mute to speaking” (121), for the beauty of nature seems to say more than what it is itself: To snatch this “more” from its contingency is “the idea of art.” In the production of this “more” in works of art, Adorno continues, “they transcend the phenomenal world,” producing “their own transcendence”; and in this procedure, and only in it, they are “a spiritual being,” a script, as it were, with hidden, “covered,” enigmatic meaning (122).

Adorno, permanently opposed to Hegel’s “sensuous shining of the idea,” is at last not able to close his eyes to the insight that art aims for something that can be grasped only in a spiritual way—a “transcendence” of the reality, an ideal. And so what appears in this merely fleeting moment has the sense of an “*apparition*” (emphasis mine), an “appearance in the heavens” (Adorno 1993, 125). Adorno evasively employs the French word in order to avoid the concept of beauty, being afraid of its bourgeois-harmonic misinterpretation. But what is “appearance in the heavens” other than a shining-through of an ideal in the sensuous sight, therefore Hegel’s “sensuous shining of the idea”?

In short, for the spiritual eye, something of the hidden ideal essence of nature, what Hegel calls *the idea*, the divine, comes to light in the beauty of nature. In the beauty of art the self-conscious spirit has precisely this as his object and discovers thereby his own ground. The beauty of nature is a more naive, more unreflected beauty, but again and again it has been a stimulus, eliciting the production of art, which turns it into the spiritual, thereby awakening an inkling of participation in the divine.

NOTES

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1. See Wandschneider 1995, chap. 6.3; Wandschneider 2005a.
2. Darwin 1875, esp. chaps. 3, 16, 19, 20; Höhle and Illies 1999, chap. 3.2.
3. Darwin 1875, 118 ff.: see also chaps. 16, 19, 20.
4. Instructive in this context is Höhle 2008.
5. Weizsäcker 1962, 131 ff.; Heisenberg 1980, 198 f.
6. Einstein 1972, 18, 171; see also Born 1969, 114, 160 f.
7. Weizsäcker 1971, 127; Heisenberg 1989; Greene 2000, 198 ff.; see also Paul Dirac, Archibald Wheeler, and Albert Einstein as quoted in Davies 1986, 283 f.
8. Krohn 2006, 35; see also McAllister 1996.
9. For details, see Mittelstaedt 1970, 127 ff., 218 ff.
10. Heisenberg 1973, 280 f.; Heisenberg 1977, 110.
11. Hegel 1969, 13:14 f., emphasis in original; see also 13:48 f. For a detailed discussion, see Berr 2009.
12. Hegel 1969, 13:217; Berr 2009, esp. chap. 3.4.

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