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# SEMIOTIC *ENARGEIA*: A TRIBUTE TO UMBERTO ECO*

## I. Introduction

In this tribute I would like to recall and synthesize a set of exchanges with Umberto Eco from the time when he welcomed me to Bologna in 1981—in order to write out a part of my doctoral thesis,[1]—to the dialogue of 2009 that appeared in *Il Protagora*,[2] and spanning the long years of my partnership with the Drama, Art, and Music Studies (DAMS)[3] at the University of Bologna, the International Center of Semiotics and Linguistics at the University of Urbino,[4] and the International Center for Semiotics and Cognitive Studies at the University of San Marino. These remarks bear principally on the semiotics of the relations between language and perception.

In his lecture "Spazialità e testo letterario," dedicated to *Prose of the Transsiberian* by Blaise Cendrars, Umberto Eco underscores the importance and difficulty of this issue.[5] He traces it back at least as far as the philosophical legitimation of the autonomy of plastic arts in relation to language accomplished by Lessing in 1766 in the resounding publication of his *Laocoön: An Essay on the Limits of Painting and Poetry*.[6]

> The question of knowing how literature, or, more generally, linguistic expression, represents the visible is one of the most complex. Difficulties appear if one revisits the distinction introduced by Lessing in his *Laocoön* between

* Translation from the French by Corbin Casarez and Joel Stenftenagel.

> temporal arts and spatial arts. It is easy to say that painting can represent space and not time, whereas linguistic expression can represent time and not space. But we should already take into consideration in this regard the distinction introduced by Genette between the spatiality of the signifier and the spatiality of the signified, and add to it the one between the temporality of the signifier and the temporality of the signified.[7]

This problem of the connections between verbal and visual semiotics is a multilayered one that leads from literary and aesthetic criticism to the deepest levels of human cognition. I would like to sketch its trajectory. First, I will proceed from classical rhetoric to contemporary sciences, and then I will return to the origin of structuralism.

## II. Description, Hypotyposis, and Ekphrasis

The first place where perception and language meet is obviously in verbal description of the visible. Eco summarizes the issue thus in his text on Cendrars: "How is space represented in words? This problem has a history of its own, and the rhetorical tradition classifies the techniques of the verbal representation of space (as of every other visual experience) under the heading of hypotyposis, or '*evidentia*,' which is sometimes considered the same as, and sometimes judged to have affinities with, '*illustratio*,' '*demonstratio*,' '*ekphrasis'* or '*descriptio*,' '*enargeia*,' etcetera."[8]

We know that the Greek ekphrasis (for example, in *Imagines* by Philostratus, *Descriptiones* by Callistratus, and so forth) is, like hypotyposis, one of the rhetorical methods of poetic and literary description of a work of the plastic arts or of a visual scene. It is a detailed and vivid presentation, so detailed and so vivid that it manages to bring what it describes into view. The detail is essential because it *individuates* and produces *the referential illusion*. As Eco notes, ekphrasis is "a technique for animating a description and rendering space visible as the place where things are produced."[9] Without a process of individuation, a text would not be able to take over a figurative dimension. Ekphrasis rests on a *periegesis*, a step-by-step progression that allows us, while traversing the visible realm through the temporal course of the gaze, to transform the spatial synchrony of the gaze into the temporal diachrony of the text. The "vivid" quality is just as essential since *enargeia* relates to illumination.

In his beautiful text "In the Name of Hypotyposis," given at the Cerisy Colloquium "In the Name of Sense," which was dedicated to Umberto Eco,[10] Herman Parret dealt in depth with the definitions of hypotyposis that have been considered the classic ones since antiquity (Hermogenes, Longinus, Cicero, Quintilian). For Dumarsais, "hypotyposis means image, or painting,

and . . . it comes about 'when, in descriptions, one depicts facts that are spoken about as though what is described were genuinely before our eyes; the speaker displays, as it were, what he recounts.'"[11] For Pierre Fontanier, "*Hypotyposis* paints things in a manner so vivid and energetic that it puts them somehow before one's eyes, and creates an image, a picture, or even a living scene from a story or a description."[12] It is a matter, then, as Parret insists, of "making one see" with words by means of stylistic rhetorical techniques of amplification and intensification. As Barbara Cassin says, likewise, in ekphrasis discourse can not only "say what it sees" but also "make one see what it says."[13]

An oft-cited example of hypotyposis is the famous description of the creation of Achilles's shield by Hephaestus in Book 18 of Homer's *Iliad*.[14] Eco refers to it, and Lessing devotes to it some very beautiful pages that I have analyzed in *Morphologie et Esthétique*.[15] But the hypotyposis that I personally prefer is that of *King Lear* (4.6), where Edgar (disguised as a fool, "poor Tom") guides the steps of his father Count Gloucester (who has been blinded) over the plain, causing him to see the spectacle that one would see in the distance from the height of one of Dover's vertiginous cliffs ("the dread summit of this chalky bourn"), a fake precipice rendered visible so well that Gloucester, in pain, jumps in order to commit suicide, only in fact falling from his own height to the ground.

But as successful and efficacious as an ekphrasis can be, the theoretical problem that it poses is insoluble, for every lexeme denoting things, actions, events, or states of affairs is, no matter how concrete it might appear, the name of an abstract conceptual category, whereas, in contrast, every perception is individuated, preconceptual, and intuitive. The rhetoric of referential illusion is a substitute for individuation but it cannot be anything other than an illusion. Right from the (very superficial) level of descriptions, one encounters an unbridgeable gap between textual and visual semiotics.

## III. The Circle of the *Ut Pictura Poesis*

### *1. The Expression of the Intelligible*

The possibility of a movement going back and forth between the textual and the visible corresponds to a classical conception of description: that of the *ut pictura poesis* ("as is painting, so is poetry"), which rests on the idea that texts and figures have a similar expressive function, that of expressing the intelligible. The expression *ut pictura poesis* has its origin in Horace's *Ars poetica*.[16] Horace was speaking of the primacy of painting, comparing it to poetry. In the Renaissance and the Classical age, the formula was reintroduced, albeit inversely: it is literature that takes precedence and painting

that is subordinate. But the idea remains the same, that of "comparison" (of the "paragon") and even of "sisterhood" between poetic and figurative arts.[17] Elisabeth Décultot has analyzed "the classical age of description" very well as "a universe where one passes without difficulty from the system of plastic signs to the system of verbal signs. . . . In classical semiotic thought, describing a statue is a matter of tracing back from the work of art to the idea that has governed it, in order then to reformulate this idea by means of verbal signs."[18]

"Ideas," that is to say, mental contents, thus constitute a *common* conceptual dimension "of different art forms."[19] This can be taken quite far. In the classical *ut pictura poesis* comparison is between painting (thus the visual signifier) and language. But if one prioritizes in poetry metric character, rhythm, melody, sonorous clarity, cadence, caesurae, and rhyme—in other words, the *auditory* figures—one could substitute the auditory for the visual and develop the variant *ut musica poesis*. As Laïla Ghermani has shown, the Elizabethan George Puttenham wanted to bestow upon vernacular poetry the pedigree of the court, as Du Bellay had previously done with French.[20] In order to do this, he rethought the *ut pictura poesis* and redefined the conception of *enargeia* for prosodic effects "reaching no higher than the ear and forcing the mind little or nothing."[21] True poetry is no longer words conveying ideas but is now an emotional, expressive mode of affect, feeling, and passion, a technique for polishing and mirroring the language associated with the aesthetics of courtly power that Baldassare Castiglione—immortalized by his friend Raphael—had spread right across Europe through *The Book of the Courtier* in 1528. To that end, Puttenham uses the Greek term *exergasia* and the Latin *expolitio* to designate the polishers of the statuary marbles and porphyries. It is amusing to see that the classical *ut pictura poesis* was so pregnant that its elements became terms of discursive rhetoric, meaning to repeat the same idea by means of different utterances.

All signifying modes communicate with one another and become intertranslatable through ideas (the intelligible—abstract and disembodied metasignifieds). Ideas function somewhat like money. They are a general, indefinite, socially exchangeable equivalent, a circulating and shared exchange value. But, as in economics, there is a circle here: the circle of the *ut pictura poesis*, which explains, as Umberto Eco emphasizes, that every definition of hypotyposis is circular.

## *2. The Topicality of the Problem*

The circularity comes from the fact that one uses the plane of content ("the intelligible") in order to make heterogeneous planes of expression

communicate with one another. The problem is particularly profound, and if we permit ourselves to skip ahead a few centuries, we note that it is still unresolved and that today the classical point of view persists in a certain philosophy of mind. This approach posits that there are abstract mental contents of a *propositional* format on which propositional attitudes operate.[22] "To see" *p*, "to draw" *p*, "to understand" *p*, "to say" *p*, "to think" *p*, and so forth thus communicate with one another via the invariant propositional content *p*. In more cognitive terms, the idea, investigated at length by Jerry Fodor and Zenon Pylyshyn, for example, is that mind is *multi*modal and that the different modalities (perception, action, and so on) can communicate with one another through the abstract, *a*modal representations that are the propositions.[23]

It is certainly normal to accept, as cognitivists such as Ray Jackendoff have done, that there is a deep cognitive level where the different types of information can communicate: "There is a single level of mental representation, conceptual structure, at which linguistic, sensory, and motor information are compatible."[24] We will return to this later. But the broader issue is knowing how the conceptual structure is *formatted*. It has no reason to have a propositional format. More and more specialists consider that it comes under a *schematizing mental imagery* whose structures are closer to perceptual structures than linguistic ones.

As I have often insisted, the cognitive neurosciences seem to show that the "propositionalist" conception is not compatible with the experimental data.[25] For example, during a renowned Colloquium—"Motivation in Language," which was organized by Massimo Piatelli-Palmarini in 1990 at the International Center for Semiotic and Cognitive Studies directed by Umberto Eco and Patrizia Violi in San Marino—a particularly lively debate pitted Jerry Fodor and Gerald Edelman against each other on this question. The theoretical problem encountered here is critical and divides the contemporary cognitive sciences. It is not our purpose to tackle it here but let us say that it inherits the split between phenomenology and analytic philosophy concerning the conception of mind. We are familiar with Michael Dummett's beautiful geographical analogy comparing this split to the separation of the Rhine and the Danube, two great rivers whose sources converge but whose courses diverge. In the analogy the common sources would be post-Bolzanian logic and Brentano's psychology.[26] When one passes from the mental to its implementation, analytic philosophy finds itself on the side of symbolic and computational conceptions of cognition and phenomenology on the side of the cognitive neurosciences.[27]

Certainly we know from brain imaging that there are conceptual contents in the prefrontal cortex. When one sees the image of a cat, draws a cat, hears the word "cat," or says the word "cat," the same region of the prefrontal

cortex is active, in addition to visual, motor, and auditory areas. But the broader issue is that the different areas process the formatting of the information in a *specific* way, without sharing a common propositional format. Communications pass between the different areas through *changes of form*.

What is more, the "propositionalist" theory is not only neurocognitively erroneous but also semiotically insufficient. The subtle Hjelmslevian fourfold model—content/expression and form/substance—is here reduced to a mere binarism between an amodal content and different modes of manifestation, that is to say, a plane of *universal* mental content without any proper plane of expression, and planes of expression without *specific* planes of content.[28]

## IV. The Expressivity of Figures

The *ut pictura poesis* is primarily concerned with the expression of mental contents (ideas) by signs in the domains of poetic and figurative arts. However, besides this expression of the intelligible, other kinds of expressivity, particularly for visual signs, have been thought up and commented on abundantly since the Renaissance in Italy, then the seventeenth century in France, and then in Germany in the eighteenth and nineteenth centuries. As signs, visual signs continue to be conceived of as a mode of expressing the invisible by means of the visible—but the invisible is no longer necessarily the intelligible (ideas, mental contents). As Kant said in §59 of the *Critique of Judgment*, the process of symbolic hypotyposis generally consists in presenting in a sensible intuition that for which no sensible intuition is given.[29] It renders visible not only ideas but also sentiments, as if they possessed *schemata*.

### *1. The Figures of Pathos*

Let's take *Laocoön* as an example. The debates on this sculpture group, which Michelangelo called "a miracle of art," were considerable and led to thinking of the plastic arts no longer as an expression of intelligible ideas, but, rather, as sensible externalizations of internal emotions and passions.[30] This calls to mind the discussions that took place at the behest of Jean-Baptiste Colbert at the Royal Academy for Painting and Sculpture in Paris between 1667 and 1676, during the *grand siècle*. Their purpose (especially the sessions of May 2nd 1676 and August 2nd 1670) was to clarify what made *Laocoön*—"a work preferable to all previous efforts in painting and sculpture," according to Pliny—a masterpiece.[31] Michel Anguier explained that "by means of the agitation and movement of muscles and veins" one

was able to "become acquainted with the emotions and passions of the soul."[32] They returned to "the illustrious Monsieur Poussin," who was intimately familiar with the *Laocoön*, "which he declared the most skillful of all the sculptures of Antiquity," and Monier described the sculpture (the face, muscles, veins, strength, suffering, bite marks, and so forth), taking up the idea that the sculptures "make us see not only the external form of his body parts, but even the life and spirits that animate them and cause them to act."[33] "This noble figure . . . [enables] us to see the evil that he [Laocoön] suffers in his soul and body by means of the signs manifest in his face and everywhere else."[34]

It was a question of putting the exteriority of the visible no longer in the service of the intelligible, but, rather, in the service of an impassioned interiority, and the *Laocoön* thus became the greatest *exemplum doloris* in the history of art, what Aby Warburg later calls a *Pathosformel* when he speaks of shapes expressing suffering via "a grammar of gesture."[35]

## *2. The Figures of Exemplarity*

One aspect of the dispute between Winckelmann and Lessing bears on the expression of corporeal violence in the works of the Rhodes sculptors Agesander, Polydoros, and Athenodoros. The nature of this violence closely resembled that of the *terribilità* figures of Michelangelo, who took part in the excavation of the *Laocoön* on the night of January 14th 1506 in the Gardens of Maecenas, near the "*cisternae capaces*" of Trajan's Baths on the Esquiline Hill—an experience that had an enduring effect on him. For Lessing, this violence expresses suffering in a realistic and natural fashion. For Winckelmann, in contrast, despite extreme suffering, the attitude of the priest of Apollo expresses absolute mastery of the self, the force of will, the grandeur of the soul, the triumph of the spirit over physical pain—in brief, a "noble simplicity" and a "calm grandeur" ("*eine edle Einfalt und eine stille Grösse*").[36]

## *3. The Perfection of Mimesis*

But there is another kind of expressivity of an entirely different order, which is that of a *perfection* of the manifestation itself. It is no longer a matter of a semiotic reference of figures to meaning, but, rather, as in the aesthetics of beauty and the sublime, of an infinitization of the subjective impact of the figurative signifier itself. This thesis is rather strongly present in Winckelmann, for whom the plastic perfection of line and contour contains *in itself*—that is to say, without semiosis—an *idealizing* expressivity. The idealization rests, on the one hand, on the "perfection of lines" and, on the

other hand, on a schematization that erases the excessive singularity of contingent individual details in order to aid in the constitution of an ideal type that is *simultaneously* exemplary and irreducibly singular. The problem of the unbridgeable gap between the generic concepts and the singular percepts is thus resolved by Winckelmann in thinking artistic beauty as an idealizing sublimation, as the materialization of a type. Ideal beauty is nature on the one hand spiritualized by "images conceived by intellect alone" and on the other hand individuated in the radical and unique singularity of models.

An elaboration of this problem, which corresponds to the staggering subjective experience of beauty and the sublime, would lead us to *mimesis*.[37] One passes from the representation of an interior reality to a *hypoiconic presentation* mimicking the external appearance. We will return to this quite delicate question of the presentation of appearance. But what is perceptually enigmatic in mimetic aesthetics is that the effect of idealization is infinitely unstable, where even an infinitesimal displacement of lines would be enough to cause the viewer's wonderment to dissipate. An infinitization of meaning can result from mimetic hypoiconicity, especially if one considers the hypoicon's property of being an iconic sign lacking semiosis, mimicking its object in order to present *virtual* realities in a visual fiction. There are numerous artistic periods that have utilized this fictional, hypoiconic impetus: Greek, especially Hellenistic, sculpture (Lysippos, Scopas, Praxiteles, Leochares, Antigonus of Karystos, and the schools of Pergamum and Rhodes, inter alia); the Italian Renaissance perspective, following Brunelleschi's *travoletta* ("tablet") (circa 1415: aiming to render indistinguishable the actual appearance of the Florence Baptistery through the doors of the Duomo and its perspectival representation); drawing as a "divine sign" in the work of Raphael or da Vinci; the Dutch and Flemish still life paintings and vanitas (Jan de Heem, Pieter Claesz, and Willem Kalf, inter alia); the perfect precinematographic realism of painters of the second half of the nineteenth century (in England the pre-Raphaelites like John Everett Millais, John William Waterhouse, and Lawrence Alma-Tadema, in France Jean-Léon Gérôme and Jules Bastien-Lepage, and in Italy Cesari Maccari, inter alia); hyperrealism (Richard Estes, Don Eddy, and Mauro David, inter alia); and, today, the computer-generated images and virtual reality of films (for example, *Avatar* and *The Lord of the Rings*, inter alia) and games (for example, *Myst: Riven*, *Exile*, etc.).

## V. A Critical Problem: *Darstellung* and Primary Iconsim

Hypotyposis and ekphrasis have led us to the expression of an interiority, and then to the problematic of the mimetic presentation of appearance. Leaving cultural aesthetics for natural aesthetics, we now want to *jump over*

*many theoretical levels* and throw ourselves into a *foundational* problematic. It is a matter of reformulating the question of the describability of the visible as a general, and difficult, semiocognitive one within the framework of links between Eco and Peircean semiotics; and returning, in this context, to discussions presented in one of my papers from the Colloquium "Au Nom du Sens" honoring Eco.[38] Our guiding thread will be the affirmation from *Kant and the Platypus* concerning the existence of presemiotic forms of reality: "There is something in the continuum of experience which imposes limits on our interpretations."[39]

## *1. The Dynamic Object and the Two Infinites*

Semiotically speaking, the problem can be linked back to Peirce's *dynamic object*. Relative to the semiotic triangle of the representamen (somewhat like the Saussurean signifier), the interpretant, and the object, the Peircean concept of the object possesses several meanings. It is the object as a *terminus a quo* for meaning, the referent-object as a *terminus ad quem*, and the *immediate object* (somewhat like the Saussurean signified), which is the object such that it is represented by the representamen and interpreted by the interpretant—that is, such that it is put into perspective by the sign. In general, semiotics is quite distant from truth-conditional referential semantics in which the denotation (Frege's *Bedeutung*) and truth values are fundamental to the constitution of meaning. Semiotics is antireferential. For example, in *A Theory of Semiotics* Eco eliminates the referent, dereferentializes it, and treats it phenomenologically as the correlate of a subjective experience (for example, perception).[40] Semiotics is interested in the immediate object, defined by Eco in the following way in *Semiotica e filosofia del linguaggio*: "The Immediate Object is the way in which the Dynamic Object is given by the sign."[41]

The immediate object is a perspective on the dynamic object. Moreover, one need not believe that this problematic distinguishing the object from the set of perspectives that intend it is unique to semiotics. It is encountered in very many, extremely heterogeneous domains. For example, in his theory of perception by "adumbrations" (*Abschattungen*) Husserl explains that the object perceived in external, three-dimensional space is only a noematic pole giving unity to the infinity of two-dimensional adumbrations of this object. In a wholly different register, that is, in quantum physics, the object is nothing but the principle of identity unifying the different measurements made of the object: each measurement extracts a type of information (but two measurements can be incompatible with one another).

But even dereferentialized the dynamic object remains an *external limit* of semiosis, the status of which remains quite ambiguous and poses

a major theoretical problem. In effect, one can consider it as an inaccessible reality "in itself," a *terminus ad quem* which makes the interpretant follow different perspectives to its place, form representations, and emit signs. This is the *ad quem* and "noumenal" aspect of the dynamic object as an extrasemiotic *horizon* of knowledge that serves as an asymptote for unlimited semiosis. If one considers semiosis a process analogous to language and, as such, *aspectualizes* it, one could say that this version of the dynamic object corresponds, relative to the indefinite process of semiosis, to the *final* aspect. It seems that it is this conception that had in the beginning prevailed for Eco regarding the interpretive and cultural semiotics that he developed in *The Open Work*, *A Theory of Semiotics*, and *Lector in fabula*, in which he insists on the infinity of possible interpretations of the text, the role of the reader-interpreter as cooperating with the author, and an aesthetics of reception.[42]

But the dynamic object can just as well be considered a pure *terminus a quo*, a *pre*semiotic origin situated on the side of internal experience, this version of the dynamic object corresponding, relative to the indefinite process of semiosis, to the *inchoative* aspect. Then it becomes the concept of an undifferentiated continuum used by many semiotic theories. Whether Peirce, Saussure, Hjelmslev, or Greimas, the semioticians have in common an originary synechism. It seems that this is a variant of the synechological conception that prevails for Eco in *The Limits of Interpretation* and *Kant and the Platypus*.[43]

One could then say that, according to a sort of *coincidentia oppositorum* of the asymptotic limits of semiosis (retrograde and anterograde), Peirce conceives the dynamic object as simultaneously phenomenal and noumenal, initial and final, *a quo* and *ad quem*, presemiotic and postsemiotic, as an origin and a horizon. These identifications complete the circle in which the Peircean unlimited processes of semioses and inferences are produced. Peirce's radical *antiintuitionism* seems to be the consequence of this coupling of two horizons.

## *2. The Lines of Resistance of Being*

It seems that Eco does not share this Peircean pansemiotism, that he breaks the circle, and that it is rather as a presemiotic, phenomenal *a quo* instance that the dynamic object operates for him in *Kant and the Platypus*. As Patrizia Violi has deftly shown in her paper given at Cerisy, when one passes from the referent to the dynamic object, one arrives at an antepredicative and prejudicative structuring of the phenomenal world which is a condition of the possibility of meaning.[44] This instance is a protosemiotic *continuum* that Eco beautifully called the "pulp" of matter.[45]

The fundamental point is that the underlying continuum of meaning *is not amorphous* and is even, on the contrary, *a morphogenetic principle*. It is prestructured, and it is on such prestructuring that the possibility of semiotization is founded. In other words, it is necessary to reformulate the traditional semiotic synechology: the continuum is not amorphous but morphogenic. The dynamic object possesses a "morphological" structure (we will return to this point in detail later) that does not result from the interpretation of the representamen by the interpretant.

In his 1996 paper "Il referimento revisitato" Eco speaks of "the lines of resistance of being."[46] He explains that the continuum of content is articulated, and he introduces a beautiful analogy. "In the magma of the *continuum* there are lines of resistance and possibilities of flow, as in the veins of wood or marble, which make it easier to cut in one direction than in another."[47] It is interesting, by the way, to note that this quite charming metaphor was used by one of the greatest mathematicians of the twentieth century, André Weil, who explained in a letter to his sister Simone Weil, dated February 29th 1940, that:

> Mathematics . . . is nothing other than an art, a kind of sculpture in an extremely hard and resistant stone (like certain porphyries employed, I believe, by sculptors). . . . The mathematician is so subjugated to the thread, to the counterthread, to every curvature, and even to every accident of the subject matter he is working on, that this confers on his work a kind of objectivity. But the work that it becomes . . . is a work of art and is thereby inexplicable.[48]

Eco summarizes well what these "lines of resistance" mean. "To state that there are lines of resistance merely means to say that being, even if it appears only as an effect of language, is not an effect of language in the sense that language freely constructs it. . . . Language does not construct being *ex novo*."[49] As Patrizia Violi explains, the continuum is not radically extrasemiotic, but, rather, presemiotic or protosemiotic. It is not yet as such a semiosis but it is already an originary principle of organization for meaning: "The continuum ceases to be a totally extra-semiotic, numinous mystery by becoming an at least partially semiotized object insofar as it manifests lines of force which fix, so to speak, parameters for the organization of meaning; the object, the continuum, being, are no longer either a totally impenetrable and opaque limit of meaning or a pure linguistic construction."[50]

### *3. Negative Realism*

Eco is very careful not to turn his thesis about "the lines of resistance of being" back into some kind of externalist "old guard realism," postulating—as

was done in medieval philosophy (by Thomas Aquinas, for example)—that the external world is a transcendent "in itself" world and that knowledge is an *adequatio rei et intellectus*. This would take us back to the transcendent conception of the dynamic object as a "thing in itself." Nor is this presemiotically structured being that of the sciences such as physics, chemistry, or biology. This would involve returning to the objectivist conception of the dynamic object.

As Eco explains in a note from 2012 in the journal *Alfabeta*, he wants to criticize "the hermeneutic primacy of interpretation" and the Nietzschean thesis that "facts do not exist, but only interpretations." His realism concerning "a firm ground for being" is, he insists, a *negative* realism, logically analogous to Popperian fallibilism.[51] Just as for Popper scientific assertions are not absolutely verifiable but only falsifiable (that is, confirmable only until a potential invalidation), so one cannot validate an interpretation as correct but, on the other hand, one can invalidate it as false. There is therefore in Eco the recovery of a certain non-Peircean intuitionism, but which is no realism at all, be it metaphysical or positivist.

### *4. Primary Iconism and Perceptual Schemata*

In order to clarify these ideas it is especially necessary to elaborate the delicate concepts of *ground* and *primary iconism*.[52] "The Ground" is, as Eco states repeatedly in *Kant and the Platypus*, "an instance that seems to constitute the initial moment of the cognitive process," and "primary iconism" is "the lower threshold of semiotics," the "material bases of signification" being "the first manifestation (not yet cognitive and certainly not mental) of primary iconism."[53] In particular, such a "firstness" in Peirce's sense represents qualia as "qualities of feeling" but does not reduce to them.[54]

It is with the firstness of ground and primary iconism that one finds in Eco the possibility of articulating semiotics in relation to the presemiotic instance of perception as a correlation between the lived experiences of a subject and the phenomenal world. Sensory appearance is not a sign referring to a noumenal thing in itself or an underlying physical objectivity. As with Husserl, it is a givenness, a presentation (*Darstellung*). To know whether the perceived object is passively given or actively given (constituted) is another problem. What is essential is that it be presented presemiotically in its presence, that it link the dynamic object to the subject through an *a quo* phenomenality, and individuate this dynamic object, producing an infinity of possible immediate objects that aim, from different perspectives, at an *ad quem* referential horizon.

For Eco, the link between meaning and perception passes also through the concepts of abstract *type* and of *scheme* (in the sense of Kant's schemata

of empirical concepts): the abstract type is the unity that permits a highly diversified set of concrete occurrences—tokens, or *Beispiele* in Kant's terms—to be conceived in accordance with rules. (Eco speaks, as Kant does, of "subsuming under rules.") Using types enables one to subsume under concepts (for Kant, this is the synthesis of the recognition of the manifold of intuition in the concept), to represent sense data in conformity with concepts. Perception is situated at the lower semiotic threshold. Of course it causes a number of inferences to intervene, but, contrary to Peirce, for whom there exist only inferences, Eco figures that there exists a noninferential firstness in perception. If perception is considered semiotic, then it is a matter of a "*semiotics without signs*" (similar to Kant's use of "purposiveness without a purpose" regarding biological organisms in the *Critique of Judgment*), where the standard semiotic processes of interpretation are replaced by cognitive processes of the schematic use of abstract types. This non-"sign-like" character evidently comes from the fact that here we introduce the lived experience of subjectivity.

Thus semiotics as a nexus of signs originates in lived experience and, in a way, Eco introduces beneath signs—which are social conventional contents—a *subjective* phenomenological ground for semiosis in operations of using abstract types, which make the link between perception and language. Therefore language cannot be considered autonomous.

In my view it is essential to grasp the point that primary iconism is in itself a *differential principle* on which semiotic differential features are based. In other words, there are not only qualia at the level of firstness but also *qualitative spatiotemporal discontinuities*. It is in this sense that we interpret the fact, emphasized above, that the continuum is a morphogenic principle. Differences of content semiotize more primitive *perceptual* differences. We will see that it is ultimately a matter of expanding *transcendental aesthetics*.

## *5. Perception and the Semiotics of the Natural World*

For my part, Eco's conception of the connections between perception and Peircean semiotics resonates with the innovation in *structural*—that is, no longer Peircean—semiotics I attempted to advance in the 1970s, following René Thom.[55] In particular, this concerned what Greimas called the *semiotics of the natural world*. For Greimas, as for Hjelmslev, the link between the perceiving subject and the natural world emerges from a semiotics that is both figurative and exteroceptive.[56] The perceptual structures were thus conceived as figures from the plane of expression of this semiotics. And since there could not be a plane of expression in semiotics without a plane of content, the alternative was straightforward. Either perception was radically

*extra*semiotic and dealt only with nonsemiotic objects of perception, or it was semiotic but only *intra*semiotic, dealing only with signs and a plane of expression and breaking with all phenomenology of perception. Therefore it was not possible for there to be presemiotic or protosemiotic perception.

This decoupling of semiotics and phenomenology and/or cognitive psychology came from the fact that structural semiotics was intended to be a subjectless social science (even if it evidently studied the narrative subjects and the discursive agents in texts). In effect, if one excludes all reference to lived experience, then perceptions must become social conventional signs. With regard to the semiotics of the natural world, there was thus a convergence between structural semiotics and Peircean semiotics in the rejection of all phenomenology of perception and all qualitative macrophysics of the world.

## *6. The Morphodynamical Response to the Antinomy of Structure*

In a certain sense everything that I have done in semiotics has consisted in rearticulating structural semiotics, the phenomenology of perception, and a scientific theory of natural morphologies like Thom's in terms of one another. In the 1970s such a project met with strong resistance but it seems that things have developed favorably since then.

It was in order to resolve the *dialectical antinomy of structure* that Eco spoke in the following way in *Trattato di semiotica generale*: "Is structure an object insofar as it is structured, or is it rather the set of relations which structure the object but which can be abstracted from the object?"[57] In order to resolve this antinomy, I have developed the following ideas:

1. The semiotic process of meaning is not autonomous. It is rooted, on the one hand, in the morphological structuring of the natural world and, on the other hand, in the embodied perception and action (vision, kinesthesia, proprioception, behavior in the ethological sense, and so on).
2. The dependence of meaning in relation to the natural world can be grasped only if this natural world is the result of a morphological organization to which we, as an animal species, were able to adapt ourselves ecologically (in Gibson's sense) and ethologically as an *Umwelt*. Accessible to animals, such organization is synthetic, perceptual, dynamic, and morphological in a Gestaltist sense. The theoretical consequence of this is that structural approaches become dependent on theories of form in the dynamic, morphological sense.
3. The structural concept of form must be replaced by a *genetic* concept of form as an emergent self-organization. The response to the dialectical antinomy of structure is that *form is the phenomenon of the organization of matter*, which is to say, the phenomenon of substance.

## VI. Transcendental Morphological Aesthetics

We can now reformulate the components of our architectonic in the context of Eco's semiotics. Indeed, I have been arguing since the beginning that the "continuum" invoked by semiotics is not only structured morphologically but is even *a transcendental form of intuition conceived as a condition for the possibility of meaning*. In my view, as a "lower threshold" for semiotics, the dynamic object is a dynamic form. It is not merely a continuum; it is a continuum susceptible to being *segmented* by qualitative discontinuities. And semioses emerge from this segmentation. Let us examine the various components of this architectonic.

### *1. The Morphogenic Continuum*

As I have insisted, the continuum as a presemiotic *a quo* instance of meaning is *morphogenic*. It owes this critical property to the fact that it is capable of being segmented. It is not divided in this or that specific way a priori but it is divisible a priori. Segmentability is for it a *synthetic a priori* property, like the fact, according to Kant, that space is intuitive because it can be broken into parts. As Husserl explains at length in several of his texts, in particular *Thing and Space*, it is part of transcendental aesthetics.[58] And just as Peircean firstness is an aspect of transcendental aesthetics, one could also say that the segmentability of the continuum pertains to this firstness.

### *2.* Erscheinung *and Morphological Firstness*

If all morphology is segmentation filled with qualities (qualia), then segmentability is a morphogenetic principle and thus, as we will see, a major component of firstness. Moreover, I would say that phenomenality qua "appearing"—precisely as *appearance* (*Erscheinung*) and not *phenomenon* (*Phänomenon*), which tended to be categorized and determined by categories (Kant), by the correlation of noetic syntheses and noematic poles of unity (Husserl), or by dyadic processes (Peirce)—is identified with this morphological firstness.

### *3. The Interface between Two Kinds of Science*

Conceived in this way, phenomenality is an *interface*. It is presentation, *Darstellung*, and not representation, *Vorstellung*. Somewhat like the surface of the sea, it separates two phases, two deep systems, and it can become

the object of a coherent scientific approach only if one brings together two kinds of science: on the side of the world, sciences of the phenomenalization of matter explaining the emergence of forms in physical and biochemical substrates (Thom), and on the side of the subject, cognitive neurosciences explaining the computational processing of sensory information (for Husserl, the noetic syntheses operating on the sensory *hyle*) resulting in perceptual structures.

In consequence, the scientific Peircean "secondness" at work here (in the sense of natural sciences that rely on mathematics and models) is *twofold*. Without it, the two "depths," the two "phases" separated by the interface, fall apart from one another and are again disconnected by an unbridgeable "gap." On the one hand, the physical sciences study nothing but the objective "depth" by treating the surface phenomenalization of objectivity as a simple, irrelevant epiphenomenon. On the other hand, phenomenology and the cognitive sciences study nothing but the subjective "depth" by bracketing—as in the Husserlian épochè—all objectivist realism as a bias. What is more, in disregarding the interface, one prevents semiotics itself from interfacing with the subject and the world. Hence the establishment of three independent and incommensurable realms: (i) biophysical matter, (ii) the cognitive subject, and (iii) the empire of signs. This separation is opposed by the fundamental scientific advancements that take the phenomenal interface into account.

*A. Thom and Turing*

In his classic *Structural Stability and Morphogenesis* René Thom departs explicitly from phenomenality, defining it morphologically as the emergence of qualitative discontinuities in substrates and proposing a theory based on the analysis of the dynamics internal to these substrates.[59] The central idea consists in describing material (physical, biochemical) properties internal to the substrate by means of internal dynamics (systems of differential equations) that vary with the point considered in the spatiotemporal extension of the substrate: dynamics whose attractors become manifest phenomenologically via sensible qualities. The qualitative discontinuities are then modeled by *bifurcations* (in the mathematical sense of the theory of singularities and the theory of dynamical systems) of these attractors. It is indeed a theory of the phenomenalization of physical and biochemical processes, *morphologies being interpreted as the spatiotemporal externalization of instabilities of internal dynamics*.

Fifteen years before Thom, Alan Turing, in his pioneer article from 1952, "The Chemical Basis of Morphogenesis," had introduced a similar but more limited idea, explaining how under certain conditions the dynamics of chemical reactions between "morphogenic" chemical substances could

be *destabilized* by processes of *spatial diffusion* of these substances. This, too, is a theory of physical and biochemical processes by the externalization of internal instabilities. Moreover, in another text (unpublished because of his suicide) Turing says explicitly that in morphogenesis "the chemical information [is] converted into a geometrical form."[60] From then on, Turing's reaction-diffusion models with instabilities have been commonly used to explain the emergence of patterns in biological tissues (leopard's coats, shells, and so on).

All these theories (considering also the dissipative structures of Ilya Prigogine, the synergetics of Hermann Haken, and so forth) are theories of self-organization explaining the emergence of macroscopic structures in terms of highly complex interactions of microscopic units. They give a rigorous scientific content to what, in his desire to complete Husserlian phenomenology via a philosophy of nature, Merleau-Ponty called quite suitably a "phenomenological physis" regarding "the emergence of original macro-phenomena between micro-phenomena, 'singular loci' in space or 'wrapping phenomena.'"[61]

Meanwhile, Per Aage Brandt has proposed calling the phenomenalization of physics "pheno-physics"—physics proper (matter, radiation, and so on) thus functioning as "geno-physics."[62]

*B. Morphodynamical Rationale and Gibson's Ecologism*

The works that we have just mentioned are scientifically essential not only for physics and biochemistry but also for the psychology of perception. In effect they allow one to justify an "*ecologism*" in the style of James Gibson, according to which perception extracts relevant structures directly from the environment.[63] The Gibsonian thesis is very far from being obvious, and Jerry Fodor and Zenon Pylyshyn have cogently argued that it is circular insofar as "what we need, of course, is some criterion for being ecological other than perceptibility. This, however, Gibson fails to provide."[64] I have shown in *Cognitive Morphodynamics* that the morphological level is precisely "what we need" and that, consequently, once completed by the morphodynamical approach, Gibson's ecologism becomes scientifically coherent.[65]

*C. Neurogeometry of Vision*

Likewise, on the subjective side, the comprehension of the phenomenal interface between the world and the subject and of perceptual morphologies on the basis of sensory inputs is extremely difficult. This is the business of the cognitive neurosciences. We have at our disposal a great deal of precise experimental data and a number of mathematical models of neurocomputational processing of peripheral information, from retinal transduction

(photoreceptors, horizontal cells, bipolar cells, amacrine cells, ganglion cells) to the visual cortical areas where the percepts are formed. The entire issue is one of understanding how such computational processing can result in a morphological geometry of percepts. In *Neurogéométrie de la vision* I explain in detail the crucial role that the *functional architectures* (that is, the precise type of connectivity) of the visual areas play.[66] These functional architectures of the neuronal hardware are so particular that their activation by sensory stimuli automatically produces the geometrization of these stimuli as *Gestalten*. In other words, they endow the stimuli with a morphological *formatting*; they neurally implement the forms of phenomenal manifestation, that is to say, transcendental aesthetics.

### *4. The Perceptual Anchoring of Language*

Today, even the most formalist cognitivists agree about the anchoring of language in perception. What is more, a number of works show that in children there are categories for objects, spatial relations, and events that are *preverbal* (the works of Jean Mandler, for example).[67] As I show in *Cognitive Morphodynamics*, these developmental psychologists agree with the anti-Chomskyan cognitive linguists like Charles Fillmore, Ron Langacker, or Len Talmy.[68] By the way, Talmy's works were the topic of the Colloquium "Topology and Dynamics in Cognition and Perception" that we were able to organize thanks to Umberto Eco and Patrizia Violi in December 1995 at the International Center for Semiotic and Cognitive Studies in San Marino.[69]

There are several approaches to the way that the syntax of natural languages grammaticalizes *Gestalten* and perceptual schemes (the localist hypothesis, case grammars, the "image-schemas" of cognitive linguistics, Herbert Simon's mental imaging of contents, and so on).[70] These can be grouped under the general theme of a *primary iconicity of grammar*, which allows us to bring perception and language together again.[71] The nonpropositional form of iconic schemes is cognitively primary. As Peter Gärdenfors explains, "cognitive models are primarily image-schematic (not propositional)."[72]

These hypotheses about a perceptual anchoring of language are now beginning to be accepted even by the most formalist cognitivists. One striking example is that of Zenon Pylyshyn in his 2001 paper "Visual Indexes, Preconceptual Objects, and Situated Vision," in which he affirms that:

> Sooner or later concepts must be grounded in a primitive causal connection between thoughts and things. . . . The principle of grounding concepts in perception remains an essential requirement if we are to avoid an infinite

> regress. . . . Without such a preconceptual grounding, our percepts and our thoughts would be disconnected from causal links to the real-world objects of those thoughts.[73]

> The visual system has a mechanism for picking out and accessing individual objects prior to encoding their properties.[74]

This thesis fits nicely with what Eco says, namely, that the *indicalità primaria* is a presemiotic phenomenon.[75]

One could give a considerable number of examples of perceptual anchorings of language. A group of particularly striking phenomena—which, by the way, I mathematized in 2011—concerns the spontaneous *intentional actantialization* of simple kinematic motions (accelerating trajectories and changes of direction) of geometric spots (squares, circles, triangles).[76] Based on the pioneer experiments of Fritz Heider and Marianne Simmel in 1944,[77] specialists have analyzed with precision the way that kinematics is perceived and described by means of a refined actantial syntax for actants endowed with intentionality (with the use of sophisticated action verbs like "to enter," "to leave," "to hide," "to flee," "to pursue," "to attack," "to give," "to force," and so forth). This low-level, nonconceptual, automatic, and modular *perception of agency* constitutes a fundamental cognitive process, studied by Brian Scholl, Patrice Tremoulet, David Premack, Sarah-Jayne Blakemore, and Jean Decety, inter alia.[78]

Another equally striking example—which I modeled in 2011 using algorithms of convexification, transversality, segmentation, skeletonization (in particular, the SKIZ, "skeleton by influence zones") analogous to those encountered in vision for the morphological analysis of objects into parts[79]—is the way in which, in languages with prepositions, *prepositions grammaticalize spatial relations*.[80] It has been shown (in particular by Stephen Kosslyn) that there are two kinds of processing of spatial relations, one continuous (a metric with an approximate measurement of distance, orientation, and size) and one categorical (above, beside, before, and so on).[81] David Kemmerer has done comparative studies of six thousand languages and, with Hanna Damasio, has explored the "neuroanatomic correlates of linguistically encoded categorical spatial relations" by means of cerebral imaging (PET, fMRI).[82] The two kinds of processing are lateralized: continuous processing occurring preferentially in the *right* hemisphere and categorical processing in the *left* hemisphere (in the supramarginal gyrus). This example is particularly interesting because it is a perfect analogue in the plane of content to what happens with categorical perception in phonetics at the plane of expression—categorical perception, which, since Saussure and Jakobson, is found at the root of structuralism.[83]

It is only on the basis of all these preliminaries that the possibility of a properly semiotic Peircean thirdness (triadicity) of representamen and interpretants, immediate objects, semioses, inferences, signifying nexuses, judgments, abductions, and so on, is opened up. A semiotics that economizes its moments of firstness and secondness would not have the capacity to be a well-formed science.[84]

## VII. The Problematic of Morphological Organization

One will note that what links perception and qualitative macrophysics to their phenomenological interface are the structures of *morphological organization*, and that our thesis is therefore that semiotics depends on this morphological organization of the objective world and of subjective minds. It is therefore indeed the problem of morphological organization that, on this view, becomes scientifically and philosophically central.

Organization in the physical, chemical, and biological domains (what Kant called the *technè* of nature), organization in perception, language, and the arts, organization in phenomena: it is essential to consider these different dimensions together. Very few thinkers have dedicated themselves to this. I have looked further into two of them in particular, Kant and Goethe, who were the focal points of the *lezioni magistrali* (keynote addresses) that I had the privilege of giving in Bologna in March and April 2007 at the invitation of Umberto Eco.

### *1. Kant, the* Critique of Judgment *and the* Opus Postumum

In his third *Critique* Kant departs from the phenomenality of morphological organization, which is a massive empirical fact, and, in the context of the problematic of *purposiveness*, considers it as simultaneously having an objective side and a subjective side. Objectively, it is a question of the "objective internal purposiveness" of organized beings, in particular of living organisms; subjectively, it is a matter of the "formal subjective purposiveness" of works of art. It is thus a theory of organization that gives unity to this *Critique*. The immense difficulty of the problem is, as Leibniz had never stopped repeating throughout his life, knowing how to rethink principles of organization such as the Aristotelian *entelechies* and the medieval *substantial forms* in the aftermath of Galilean mechanics. At the time it was not clear how to explain the dynamics of form in terms of a mechanics of force. A symptom of this aporia is found in Kant's usage of apparently contradictory concepts such as "purposiveness without a purpose" for teleological judgment or "judgment without a concept" for aesthetic judgment.

How should we understand the *technè* (and no longer the *physis*) of nature as a producer of organized forms? How should we think of nature as "art" and "poiesis"? If organized forms cannot be explained mechanically, then, in order to "legalize" them (for all knowledge is "lawful" for Kant), it is necessary to introduce the concept of purposiveness, these forms becoming "natural ends," "ends" that are internal and immanent to nature. These "natural ends," whose organization is a type of "spontaneity" (which means that they are *self*-organized), are empirically given but can be explained only by a "formative force," a *bildende Kraft* (or a *Bildungskraft*), synthesizing forces and forms. And as this teleology does not really possess objective content, it "is only part of describing nature."[85]

It is only in the *Opus Postumum*, the cardinal importance of which Eco emphasizes in his commentary from *Il Protagora*,[86] that Kant imagines a system of "primitive" and "internally driving" forces internal to matter, which "are composed in the phenomenon" and could explain the emergence of forms as "a certain structure derived from matter." The problematic of the phenomenalization of physics here gets the beautiful name of "the phenomenon of the phenomenon."[87]

## *2. Goethean Morphology*

I have also dealt at length with Goethe's *Morphologie*[88] because, in broadening Kant's *Critique of Judgment*, Goethe was the first in the modern (that is, post-Galilean) era to develop a strict morphological monism applicable simultaneously to natural morphologies (that he had himself examined in *The Metamorphosis of Plants*) and to works of art (for example, in his "Über *Laokoon*").[89]

In Goethe's *Morphologie* the concept of phenomenal form (*Gestalt*) is inseparable from that of formation (*Bildung*), of formative force (*bildende Kraft*), and of structure in the sense of the mereological relations of parts in an organic whole. In an organism phenomenal appearance is governed by an internal dynamical principle producing this external spatial connection of parts. As Wilhelm von Humboldt explained in 1830 in his review of the "Second Roman Visit,"[90] there is, according to Goethe, a "tendency to study form (*Gestalt*) and the exterior object on the basis of the interior essence of natural beings and laws of their genesis (*Bildung*)."[91] In the *Metamorphosis of Plants*, in particular, Goethe explains the a priori "entelechial" principle presiding (according to him) over the formation of morphologically organized beings.

But Goethe held himself to the *description* of the phenomenal appearance of natural forms. He is a thinker of the interface, interested most of all in the mediation between the physics and physiology that generate

morphologies and the mind that interprets them. There is for him a *visibility* of being in appearance, and the *Morphologie* is a treatment of this phenomenalization. Goethe thus limits the entelechial principle to *Erscheinung*, appearance expressing the entelechial principle in the play between *Darstellung*, *Bildung*, and *Gestalt*. There is indeed an "internal" principle of formation, but it is a question of understanding it on the basis of the very description of its "externalization."

The *Morphologie* is a theory of *functional correlations* of parts in an organism. It proposes what we have called a *schematism of composition*. As a result, the same theory of organized structure applies to both works of art and natural forms. Regarding the *Laocoön*, Goethe speaks of a highly organized living nature. In short, as Danièle Cohn formulates it in *La Lyre d'Orphée*: "Goethe, who invented morphology in the natural sciences, thereby enables us to conceive a morphological aesthetics . . . and a morphological theory of culture."[92]

### *3. Peirce on Self-Organization*

But I would like to underscore that Peirce has just as profoundly conceived of self-organization in nature as had Lessing, Kant, and Goethe before him—as a system of *natural* signs, and he developed with a remarkable thesis about the semiosis internal to nature.

In a paper on Eco's concept of the *semiotic threshold* presented at the Colloquium in Cerisy, Winfried Nöth delved quite deeply into the relations between natural signs and cultural semiotics in Eco's thought.[93] The enculturation of natural signs, as indexes allowing inferences, is brought about by sociopsychological interpretants ("minds" in the sense of consciousness or social conventions). But Nöth rightly recalls that according to Peirce the opposition between nonsemiotic and semiotic does not replicate the one between natural and cultural. There might be in effect *natural* minds acting as *final* causes. In a certain sense, every *function* attached to a structure is semiotic and causes an interpretant to intervene. For example, the complex physical-chemical reactions constitutive of the metabolism of a biological organism are "semiotic" in this sense. By virtue of the constitutive links between structure and function, the living being is a natural semiotic machine.[94] According to Peirce, the fundamental threshold between nonsemiotics and semiotics is rather one between dyadic levels (of a stimulus-response type where efficient causes produce effects mechanically) and triadic levels (where an interpretant, a mind, selects the stimuli from its environment that are functionally relevant for it).

In a manner that was simultaneously semiotic and naturalistic, Peirce thus reformulated the question of genesis and evolutionary complexifi-

cation of forms and natural structures. In his attempt to understand the enigma of the increasing diversification and complexification of organized beings, he reactivated in his own way the problematic of morphogenic *entelechies*. In a kind of new Critique of teleological judgment he interpreted entelechies and their "internal purposiveness" as *self*-interpreting natural signs.

We can therefore see that the semiotic dimension internal to self-interpreting nature in Peirce corresponds rather precisely to objective internal purposiveness in Kant. This allows us to position ourselves better in relation to this semiotics. For Peirce, intranatural morphogenetic semiotics is one semiotics among others. Let us invert this conception and give primary consideration to the natural problematic of morphological self-organization that is as much objective as subjective, and treat cultural semiotics as an evolutionary derivation. In speaking of a "naturalization" of meaning, we are essentially claiming that the actual theories of morphogenetic self-organization allow us to confer scientific status upon the phenomenological threshold leading from the presemiotic to semiotics proper.[95]

## VIII. The Morphological Genealogy of Structuralism

It should be emphasized that the reference to Goethe is indispensable in this kind of reflection because the *Morphologie* is, along with phenomenology and linguistics, one of the principal origins of modern structuralism (Jakobsonian, Lévi-Straussian, and Thomian).[96] As Tzvetan Todorov, Lubomir Doležel, Jean-Marie Schaeffer, Patrick Sériot, and Sergueï Tchougounnikov have each shown, the heritage continues by way of *Russian formalism*, which originally inspired the conception of the Prague Circle.[97]

The Goethean morphological tradition would have a considerable influence—first on the German rhetorical school of thought from 1900 to 1920 headed by Rob Riemann (with his 1902 thesis "*Goethes Romantechnik*"), Bernard Seuffert, and Otmar Schissel von Fleschenberg; as well as on the school of poetics of Wilhelm Dibelius, Oscar Walzel, and Wilhelm Worringer;[98] and then on the Russian formalists Petrovskij (his analyses of Maupassant's *En voyage* and of Pushkin in 1921), Vasily Gippius (his *Urmorfologie* of 1919 on roles and functions in Turgenev's novels), Alexander Nikiforov (on roles and functions in folkloric tales), Alexander Reformatskij (who was Petrovskij's student and author in 1922 of a narrative model of generative morphology joining structural categories with functional categories), and of course Vladimir Propp.[99]

Whereas in Romantic speculative idealism the "internal form" is a vital principle at once organic and spiritual (a vitalism that would last until the works of Hans Driesch on embryogenesis in his celebrated *Philosophie*

*des Organischen* from 1909),[100] in Russian formalism, which shows itself to be more functionalist and evolutionary in nature, it becomes on the contrary a transcendental principle (for example, in Heinrich Rickert's Neo-Kantian sense). From transcendental it would later become metalinguistic and formal.

Even later, for André Jolles, whose *Einfache Formen* was a resounding success, Goethean morphology would be unified directly with structuralism. [101] As Jean-Jacques Vincensini has reminded us,[102] in his preface to *Einfache Formen* Jolles explicitly departs from Goethe's concept of *Gestalt* as a "typical and morphologically determinate" phenomenal manifestation resulting from an "effective power," in order to have it "serve as a basis for a morphological research with regard to literary criticism." For Jolles, this sets the "task" of understanding "for each [kind of] poetry" how "the constitutive and limiting forces of its form have resulted in a composition that one can recognize and distinguish. . . . Determination and interpretation of Forms—such is the task of this method."[103]

## IX. Conclusion

Beginning with the refined classical cultural elements of ekphrasis and the *ut pictura poesis*, we have accompanied Umberto Eco in a semiotic journey enabling us to propose the problem of the conditions for the possibility of a protosemiotics of meaning. As regards "lines of resistance" and the "hard ground" of being, we have reunited Peircean firstness, *a quo* dynamic objects, the phenomenology of perception, and Thom's morphodynamics as so many aspects of the morphological interface between a natural world and a semiotic subject. After that, further downstream, we reconnected this morphological interface with the purely scientific problems of the structural and functional self-organization of material substrates and functional neuronal architectures. Returning upstream the length of the philosophical genealogy of structuralism, we finally returned to Kant's *Critique of Judgment*, his *Opus Postumum*, and Goethe's morphological monism. In order to close the circle of this journey, we are therefore going to return to Lessing, our point of departure with Umberto Eco—Lessing, who, in 1766, was the first to break the circle of the *ut pictura poesis* and who revolutionized classical semiotics by introducing what a little later would become Kantian transcendental aesthetics.

In effect, with Lessing the issue of "formats" and "forms of intuition" emerges, which will lead to the novel idea of an *immanent* sense of forms. He separates the visual and the literary and launches into the dual critique of the abuses of the descriptive genre (*Schilderungssacht*, visual poetry and

a "speaking picture") and of allegory (*Alligoristerei*, literary painting and a "silent poem"). Let us recall the formula from antiquity: *poema pictura loquens, pictura poema silens* ("poetry is a speaking picture, painting a silent poem"). Taking into account the essential limitation of the medium—the "spatiality of the signifier" evoked by Eco—Lessing draws from it the conclusion that, essentially, painting cannot "express general ideas."[104] Its aesthetic meaning is *immanent* and is found in the fact that the parts of the plastic composition are *spatially correlated*. This is why, as Hubert Damisch notes, Lessing dismantles "the rhetoric of the *ut pictura poesis*, which purported to see in poetry a speaking kind of painting and in painting a kind of mute poetry."[105] By striving "to trace back to that which determines the condition for the possibility of the different arts," he achieved a "critical and truly grounding operation, in the Kantian sense of the word."[106]

Lessing's fundamental thesis is that in the plastic arts "signs must have a *natural and simple relation* with the signified object."[107] In figures ("bodies") there exists in some way a *formatting* common to both the sign and the referent, to both the signifier and the signified, and this format is that of the *articulation* of the spatial continuum, of its segmentation by means of qualitative discontinuities into domains filled with sensible qualities. The same can be said for the narrative arts, but here the format is the temporal continuum and no longer concerns bodies but actions.

However, phenomena being spatiotemporal, time can intervene secondarily when space is the originary form, and, alternately, space can intervene secondarily when time is the originary form. It is not a matter here of the truism that bodies can move and actions can stop. The problem is that the different arts are univocally associated with the form of articulation that defines their principle of composition: a painting does not move (this was before cinema) and a story does not illustrate (this was before the comic strip).

Let us conclude then on a humorous note from Umberto Eco's "Spazialità e testo litterario":

> Whenever taking Laocoön literally, we must say that the arts of space come to represent space but do not succeed in representing time. . . . (Naturally, Lessing's distinction falls into crisis with the birth of systems of communication such as cinema, which are capable of expressing spatial dimensions and temporal durations simultaneously. But Lessing was never able to see the Empire State Building filmed by Andy Warhol for twenty hours, and we can forgive him for this.)[108]

Jean Petitot

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## NOTES

TRANSLATORS' NOTE. When available, English translations in print are used and referenced in the notes. Otherwise we have translated into English from the French. Where the latter is the author's translation from Eco's Italian, the Italian has been included in the notes.

1. Jean Petitot, *Pour un schématisme de la structure: De quelques implications sémiotiques de la théorie des catastrophes*, 4 vols. (Paris: École des Hautes Études en Sciences Sociales, 1982). Published in two parts: (1) *Morphogenèse du sens* (Paris: Presses Universitaires de France, 1985); (2) *Physique du sens* (Paris: Éditions du CNRS, 1992). The Italian translation of the first part, *Morfogenesi del senso*, appeared in 1990 as a part of Bompiani's series on semiotics edited by Umberto Eco. *Morphogenesis of Meaning*, trans. Franson Manjali (Bern: Peter Lang, 2003).

2. Umberto Eco, "Il problema filosofico delle strutture trascendentali a priori nella riflessione neoilluminista di Jean Petitot," *Il Protagora* 38, no. 15 (2011): 195–200. This was a dialogue about my work that appeared in Italian in the series *Il campo semiotico* edited by Umberto Eco: *Per un nuovo illuminismo: La conoscenza scientifica come valore culturale e civile*, trans. F. Minazzi (Milan: Bompiani, 2009).

3. Discipline delle Arti, della Musica, e dello Spettacolo.

4. Centro Internazionale di Semiotica e di Linguistica.

5. Umberto Eco's lecture "Spazialità e testo litterario" was given at the Scuola Superiore di Studi Umanistici di Bologna on March 12th, 2002. A revised version was published as "Les Sémaphores sous la pluie" in Eco, *Sulla letteratura* (Milan: Bompiani, 2002), and was translated and published in French and English, retaining the French title in both cases. See Eco, *De la littérature* (Paris: Grasset, 2003), and Eco, *On Literature*, trans. Martin McLaughlin (Orlando: Harcourt, 2004). The text by Cendrars is from 1913. "Semaphores in the rain" is Cendrars's metaphor for "all the women I have met."

6. Gotthold Ephraim Lessing, *Laocoön: An Essay on the Limits of Painting and Poetry*, trans. Edward Allen McCormick (Indianapolis and New York: Bobbs-Merrill, 1962); *Laokoon oder* Über *die Grenzen der Malerei und Poesie*, 2nd ed. (Berlin: Hugo Blümner, 1880); *Laocoon* (Paris: Hermann, 1990).

7. Eco, "Spazialità e testo litterario." "*La questione di come la letteratura, o in generale il linguaggio verbale, rappresenti il visibile è delle più complesse, e le difficoltà nascono se ci rifacciamo alla distinzione posta da Lessing, nel* Laocoonte, *tra arti del tempo e arti dello spazio. È facile dire che la pittura può rappresentare lo spazio e non il tempo, mentre il linguaggio verbale può rappresentare il tempo e non lo spazio. Ma già a questo punto dovremmo prendere in considerazione la distinzione posta da Genette tra spazialità del significante e spazialità del significato, e aggiungervi quella tra temporalità del significante e temporalità del significato.*" [Part of this passage appears in the English translation in Eco, "Les Sémaphores sous la pluie," in *On Literature*, 185–86. —Trans.]

8. "*Come si descrive il visibile con le parole*? *Il problema ha una sua storia e la tradizione retorica rubrica le tecniche di rappresentazione verbale del visibile sotto il nome di ipotiposi o di* evidentia, *talora identificata con, e talora giudicata affine a, la* illustratio, *la* demonstratio, *l'*ekphrasis *o* descriptio, *l'*enargheia, *eccetera*." [This passage can be found in the English translation, "Les Sémaphores sous la pluie," in Eco, *On Literature*, 180. —Trans.] Do not confuse *enargeia* (derived from *argos*), the clarity of evidence, with *energeia* (derived from *ergon*).

9. Eco, "Spazialità e testo litterario." "*Una tecnica per animare una descrizione, e rendere visibile lo spazio come luogo in cui avvengono cose*."

10. Herman Parret, "Au nom de l'hypotypose," in J. Petitot and P. Fabbri, eds., *Au nom du sens* (Paris: Grasset, 2000), 139–54. The Colloquium was organized by Paolo Fabbri and myself at the International Cultural Center of Cerisy in 1996.

11. Eco, "Les Sémaphores sous la pluie," in *On Literature*, 181. The internal quote is from C. C. Dumarsais, *Des tropes ou des différents sens dans lesquels on peut prendre un même mot dans une même langue* (Paris: Flammarion, 1998), accessible at http://gallica.bnf.fr.

12. Pierre Fontanier, *Les Figures du discours* (Paris: Flammarion, 1999), 390.

13. *Dictionnaire Le Robert* (Paris: Le Seuil, 2003), s.v. "Ekphrasis."

14. Achilles's mother—"silver-footed" (18.125), "lovely-haired" (18.407), and "long-robed" (18.385) Thetis—goes to see Hephaestus "the famous blacksmith" (18.391), "the famous lame god" (1.607) (whom she had rescued after he was thrown down to the base of Olympus by Hera) to supplicate him to forge armor for her son. The "large and heavy" (18.478) shield is fashioned with "all sorts of decorations for it, executed with consummate skill" (18.482), in five layers, bordered by a "bright triple rim of gleaming metal" (18.480). Homer, *The Iliad*, trans. E. V. Rieu (London: Penguin, 2003).

15. Jean Petitot, *Morphologie et Esthétique: La forme et le sens chez Goethe, Lessing, Lévi-Strauss, Kant, Valéry, Husserl, Eco, Proust, Stendhal* (Paris: Maisonneuve et Larose, 2004).

16. *Arts poetica*, v. 361–65. See Horace, *Satires, Epistles, Ars Poetica*, trans. H. Rushton Fairclough (Cambridge, MA: Harvard University Press, 1991). The *Ars poetica* is dated around 14 BC. According to Plutarch, however, the *ut pictura poesis* goes back to Simonides of Ceos, an Athenian poet and friend of Themistocles: to his *poema pictura loquens, pictura poema silens* ("poetry is a speaking picture, painting a silent poem").

17. See *Dictionnaire Le Robert*, s.v. "La Comparaison des arts" by Jacqueline Lichtenstein. See also Rensselaer Lee's classic work, *Ut Pictura Poesis: The Humanistic Theory of Painting* (New York: Norton, 1967).

18. "*Un univers où l'on passe sans difficulté du système des signes plastiques au système des signes verbaux. . . . Pour décrire une statue, il suffit dans la pensée sémiotique classique, de remonter de l'œuvre d'art à l'idée qui lui a présidé, pour reformuler ensuite cette idée au moyen de signes verbaux*." Elisabeth Décultot, "Les Laocoon de Winckelmann," *Le Laocoon: Histoire et réception*, ed. E. Décultot, J. Le Rider, and F. Queyrel, *Revue germanique internationale* 19 (2003): 145–57 (146).

19. Ibid.

20. Laïla Ghermani, "L'*Enargeia* musicale ou les modalités d'une *ut musica poesis* dans *The Arte of English Poesie* de George Puttenham (1589)," *Etudes Epistémè* 18 (2010): 16–33.

21. F. Wigham and W. A. Rebhorn, eds., *The Art of English Poesy by George Puttenham: A Critical Edition* (Ithaca: Cornell University Press, 2007), 245. Cited in Ghermani, "L'*Enargeia* musicale," 23.

22. [The author uses the substantive "format" and the French verb *formater.* Typically "form" would be used to translate the conjugations of and substantives related to *formater* since "propositional form" is more common in English than "propositional format." In this instance, however, since to use "form" as a translation of *formater* might give the wrong impression that these architectures constitute or produce the stimuli, and "formalize" incorrectly suggests that the organization of the stimuli is an epistemological or conceptual activity, we have kept "format" for both the conjugations of and substantives related to the term—Trans.]

23. See, for example, Jerry A. Fodor, *The Modularity of Mind: An Essay on Faculty Psychology* (Cambridge, MA: MIT Press, 1983).

24. Ray Jackendoff, *Semantics and Cognition* (Cambridge, MA: MIT Press, 1983), 17.

25. See, for example, Jean Petitot, *Cognitive Morphodynamics: Dynamical Morphological Models of Constituency in Perception and Syntax* (Bern: Peter Lang, 2011).

26. Michael Dummett, *Origins of Analytic Philosophy* (London: Duckworth, 1993), 26. On this convergence/divergence, see Jean-Michel Roy, *Rhin et Danube: Essais sur la schisme analytico-phénoménologique* (Paris: Vrin, 2010).

27. On the profound affinities between the cognitive neurosciences and phenomenology, see, for example Alain Berthoz and Jean-Luc Petit, *Physiologie de l'action et Phénoménologie* (Paris: Odile Jacob, 2006).

28. See Louis Hjelmslev, *Prolegomena to a Theory of Language*, rev. ed. (Madison: University of Wisconsin Press, 1961). One must not confuse "expression" in the classical sense of expressivity and "plane of expression" in the sense of Hjelmslevian semiotics.

29. Immanuel Kant, *Critique of Judgment*, trans. Werner Pluhar (Indianapolis: Hackett, 1987), 225–29.

30. On the *Laocoön*, see the reference work by Salvatore Settis, *Laocoonte: Fama e stile* (Rome: Donzelli, 1999), and the bibliography from Petitot, *Morphologie et Esthétique*.

31. Pline l'Ancien, *Histoire naturelle*, *XXXVI*, ed. J. André et al. (Paris: Belles Lettres, 1981), 37.

32. Christian Michel, "Anatomie d'un chef-d'oeuvre: *Laocoon* en France au XVIIème siècle," *Le Laocoon: Histoire et réception*, ed. E. Décultot, J. Le Rider, and F. Queyrel, *Revue Germanique Internationale* 19 (2003): 105–17.

33. Ibid., 115.

34. Ibid.

35. Cited in Richard Brilliant, *My Laocoön: Alternative Claims in the Interpretation of Artworks* (Berkeley and Los Angeles: University of California Press, 2000), 35.

36. Johann Joachim Winckelmann, *Gedanken über die Nachahmung der griechischen Werke in der Malerei und Bildhauerkunst* (Dresden-Leipzig: Walther, 1756), 21.

37. See Elisabeth Décultot's entry in *Dictionnaire Le Robert*, s.v. "Mimesis."

38. See Jean Petitot, "Les Nervures du marbre : Remarques sur le 'socle dur de l'être' chez Umberto Eco," in Petitot and Fabbri, eds., *Au nom du sens*.

39. Umberto Eco, *Kant and the Platypus: Essays on Language and Cognition*, trans. Alastair McEwan (New York: Harcourt Brace & Co., 2000), 5. "C'è qualcosa nel continuum dell'esperienze che pone dei limiti alle nostre interpretazioni," in Eco, *Kant e l'ornitorinco* (Milan: Bompiani, 1997), xii.

40. Umberto Eco, *A Theory of Semiotics* (Bloomington: Indiana University Press, 1976); *Trattato di semiotica generale* (Milan: Bompiani, 1975).

41. "*L'Oggetto Immediato è il modo in cui l'Oggetto Dinamico viene dato dal segno*." Umberto Eco, *Semiotica e filosofia del linguaggio* (Turin: Einaudi, 1984), 107. [We have translated from the author's French: "*L'Objet Immédiat est la façon dont l'Objet Dynamique est donné par le signe*." The passage is rendered differently in Umberto Eco, *Semiotics and the Philosophy of Language* (Bloomington: Indiana University Press, 1984), 44: "It is the Dynamic Object that Peirce talked about that motivates the sign, though the sign does not render it immediately, since its expression only conveys an Immediate Object (the *content*)." —Trans.]

42. Umberto Eco, *The Open Work*, trans. Anna Cancogni (Cambridge, MA: Harvard University Press, 1989); *Opera aperta* (Milan: Bompiani, 1962); *Lector in fabula: La cooperazione interpretativa nei testi narrativi* (Milan: Bompiani, 1979), parts of which have been incorporated into Eco, *The Role of the Reader: Explorations in the Semiotics of Texts* (Bloomington: Indiana University Press, 1979).

43. Umberto Eco, *The Limits of Interpretation* (Bloomington: Indiana University Press, 1990); *I limiti dell'interpretazione* (Milan: Bompiani, 1990).

44. Patrizia Violi, "Eco et son référent," in Petitot and Fabbri, eds., *Au nom du sens*, 21–40.

45. See, for example, Eco, *Semiotics and the Philosophy of Language*, 45.

46. This text is cited by Patrizia Violi, "Eco et son référent," in Petitot and Fabbri, eds., *Au nom du sens*, and taken up again in Eco, *Kant and the Platypus*.

47. Eco, *Kant and the Platypus*, 53. "*Nel magma del continuum ci sono delle linee di resistenza et delle possibilità di flusso, come delle nervature del legno o del marmo che rendano più agevole tagliare in una direzione piuttosto che nell'altra*." Eco, *Kant e l'ornitorinco*, 39.

48. André Weil, *Oeuvres scientifiques: Collected Papers I, 1926–1951* (New York: Springer, 1979), 255.

49. Eco, *Kant and the Platypus*, 54. [The English edition does not include the reference to Peirce's affirmation of the existence of universal laws in nature. —Trans.] "*Affermare che ci siano delle linee di resistenza non significa ancora dire, con Peirce, che ci siano leggi universali operative in natura. . . . Affermare che ci siano linee di resistenza vuole soltanto dire che, anche se appare come effeto di linguaggio, l'essere non lo è nel senso che il linguaggio liberalmente lo costruice. . . . Il linguaggio non costruice l'essere* ex novo." Eco, *Kant e l'ornitorinco*, 40.

50. "*Il continuo cessa di essere un numinoso totalmente extrasemiotico, ma divienne oggetto almeno parzialmente semiotizzato nel momento in cui esibisce delle linee di tendenza che stabiliscono, per così dire, dei parametri per l'organizzazione del senso; l'oggetto, il continuum, l'essere non sono più né il limite totalmente impenetrabilie e opaco del senso, nè pura costruzione linguistica*." Patrizia Violi, "Eco e il suo referente," in P. Fabbri and J. Petitot, eds., *Nel nome del senso: Intorno a Umberto Eco* (Milan: Sansoni, 2001), 37.

51. Umberto Eco, "Ci sono delle cose che non si possono dire: Di un realismo negativo," *Alfabeta* 2, no. 17 (2012): 23–25.

52. See Umberto Eco, "La soglia e l'infinito. Peirce e l'iconismo primario," in *D'all'albero al labirinto: Studi storici sul segno e l'interpretazione* (Milan: Bompiani, 2007), 513–36. On the iconic function in general, see, among others, the theoretical part of Jean-François Bordron, *L'iconicité et ses images* (Paris: Presses Universitaires de France, 2011).

53. Eco, *Kant and the Platypus*, 60, 107.

54. [The author refers to Peirce's unique categories of *firstness*, *secondness*, and *thirdness*. The French word he uses for "firstness" is *priméité*, which is rendered more naturally in English as "primacy." We use "firstness," but the reader should be aware that these categories are being drawn upon to make Petitot's case. —Trans.]

55. See René Thom, *Esquisse d'une sémiophysique* (Paris: InterEditions, 1988).

56. For Greimas's semiotics, see Algirdas Julien Greimas and Joseph Courtès, *Sémiotique, Dictionnaire raisonné de la théorie du langage* (Paris: Hachette, 1979).

57. "*La struttura è un oggetto in quanto è strutturata, o è l'insieme delle relazioni che strutturano l'oggetto ma che possono essere astratte dall'oggetto*?" Eco, *Trattato di semiotica generale*, 322. [We have translated from the author's French: "*Est-ce que la structure est un objet en tant qu'il est structuré, ou bien est-elle l'ensemble des relations qui structurent l'objet mais qui peuvent être abstraites de l'objet*?" The question is formulated somewhat differently in Eco, *A Theory of Semiotics*, 46n4: "is structure, thus defined, an *objective reality* or an *operational hypothesis*?" —Trans.]

58. Edmund Husserl, *Thing and Space: Lectures of 1907*, trans. and ed. Richard Rojcewicz (Dordrecht: Kluwer Academic Publishers, 1997); *Ding und Raum, Vorlesungen 1907*, Husserliana XVI (The Hague: Martinus Nijhoff, 1973).

59. René Thom, *Structural Stability and Morphogenesis*, trans. D. H. Fowler (Reading, MA: Benjamin, 1975); *Stabilité Structurelle et Morphogenèse* (New York: W. A. Benjamin and Paris: Édiscience, 1972).

60. Alan M. Turing, "The Chemical Basis of Morphogenesis, *Philosophical Transactions of the Royal Society of London*, Series B, Biological Sciences, 237/641 (1952). *Collected Works of A. M. Turing*, vol. 3, *Morphogenesis*, ed. P. T. Saunders (Amsterdam: North-Holland, 1992), 93.

61. Maurice Merleau-Ponty, *Résumés de Cours. Collège de France 1952-1960* (Paris: Gallimard, 1968), 174. See also *Nature: Course Notes from the Collège de France*, ed. D. Séglard, trans. R. Vallier (Evanston: Northwestern University Press, 2003); *La Nature: Notes de cours du Collège de France*, ed. D. Séglard (Paris: Le Seuil, 1995).

62. Per Aage Brandt, "Pour une phrastique intégrale," *Linguistique cognitive et modèles dynamiques*, ed. Jean Petitot, *Sémiotiques*, 6–7 (1994): 121–36.

63. See James Gibson, *The Ecological Approach to Visual Perception* (Boston: Houghton Mifflin, 1979).

64. Jerry Fodor and Zenon Pylsyhyn, "How Direct is Visual Perception? Some Reflections on Gibson's 'Ecological Approach,'" *Cognition* 9 (1981): 139–96, 146.

65. See Petitot, *Cognitive Morphodynamics*, ch. 1, sect. 6.

66. See Jean Petitot, *Neurogéométrie de la vision: Modèles mathémathiques et physiques des architectures fonctionelles* (Éditions de L'École Polytechnique: 2008), pt. 1.

67. See Jean Mandler, *The Foundations of Mind: Origins of Conceptual Thought* (New York: Oxford University Press, 2004).

68. See Petitot, *Cognitive Morphodynamics*, ch. 1.

69. Talmy's works have been collected in Leonard Talmy, *Toward a Cognitive Semantics*, vols. 1 and 2 (Cambridge: MIT Press, 2000).

70. See Herbert Simon, "Literary Criticism: A Cognitive Approach," in S. Franchi and G. Guzeldere, eds., *Bridging the Gap: Where Cognitive Science Meets Literary Criticism*, Special Supplement of *Stanford Humanities Review* 4, no. 1 (1994): 1–27 (http://web.stanford.edu/group/SHR/4-1/text/toc.html).

71. On this subject see, inter alia, John Haiman, ed., *Iconicity in Syntax* (Amsterdam: J. Benjamins, 1985).

72. Peter Gärdenfors, *Conceptual Spaces: The Geometry of Thought* (Cambridge: MIT Press, 2000), 162.

73. Zenon Pylyshyn, "Visual Indexes, Preconceptual Objects, and Situated Vision," *Cognition* 80, nos. 1–2 (June 2001): 127–58 (154).

74. Ibid., 139.

75. Eco, *Kant and the Platypus*, 14.

76. I mathematized these phenomena in Petitot, *Cognitive Morphodynamics*, ch. 6, sect. 3.

77. Fritz Heider and Marianne Simmel, "An Experimental Study of Apparent Behavior," *American Journal of Psychology* 57 (1944): 243–59.

78. See, for example, Brian J. Scholl and Patrice D. Tremoulet, "Perceptual Causality and Animacy," *Trends in Cognitive Science* 8 (2000): 299–309; and Sarah-Jayne Blakemore and Jean Decety, "From the Perception of the Action to the Understanding of Intention," *Nature Reviews Neuroscience* 2 (2001): 561–67.

79. Petitot, *Cognitive Morphodynamics*, ch. 3, sect. 5.

80. Among a number of linguistic works on this subject, see, for example, the classic by Annette Herskovits, *Language and Spatial Cognition: An Interdisciplinary Study of the Prepositions in English* (Cambridge: Cambridge University Press, 1986).

81. See, for example, Stephen Kosslyn, "Seeing and Imagining in the Cerebral Hemispheres: a Computational Approach," *Psychological Review* 94 (1987): 148–75.

82. See David Kemmerer, "The Semantics of Space: Integrating Linguistic Typology and Cognitive Neuroscience," *Neuropsychologia* 44, no. 9 (2006): 1607–21 (1607).

See also David Kemmerer, "A Neuroscientific Perspective on the Linguistic Encoding of Categorical Spatial Relations," in V. Evans and P. Chilton, eds., *Language, Cognition and Space* (London: Equinox, 2007).

83. For categorical perception in phonetics see Jean Petitot, *Les Catastrophes de la parole: De Roman Jakobson à René Thom* (Paris: Maloine, 1985).

84. On this point I concur with Jean-Claude Coquet, who, as the very title of his work indicates, claims as a semiotician and linguist that it is necessary to reintegrate the *physis* of nature in its "foundational role" into the phenomenology of language. Jean-Claude Coquet, *Phusis et Logos: Une phénoménologie du langage* (Saint-Denis: Presses Universitaires de Vincennes, 2007).

85. Kant, *Critique of Judgment*, 302.

86. See Eco, "Il problema filosofico delle strutture transcendentali a priori nella riflessione neoilluminista di Jean Petitot."

87. Immanuel Kant, *Opus Postumum*, trans. E. Förster and M. Rosen (Cambridge: Cambridge University Press, 1993), 119. For a more detailed discussion, see Petitot, *Morphologie et Esthétique* and *Per un nuovo illuminismo*.

88. See, for example, Petitot, *Morphologie et Esthétique*.

89. Johann Wolfgang von Goethe, *Zur Naturwissenschaft überhaupt, besonders zur Morphologie* (Stüttgart: J. G. Cotta, 1817). Partially translated in *Goethe's Botanical Writings*, trans. B. Mueller (Honolulu: University of Hawaii Press, 1952); Goethe, *The Metamorphosis of Plants*, trans. D. Miller (Cambridge, MA: MIT Press, 2009); *Versuch die Metamorphose der Pflanzen zu erklären* (Gotha: Ettingersche Buchhandlung, 1790). Goethe, "On the Laocoon Group," *Essays on Art and Literature*, trans. Ellen von Nardoff and Ernest H. von Nardoff (New York: Suhrkamp, 1986); "Über Laokoon," *Die Propyläen*, reprinted in *Gesammelte Werke*, vol. 8 (Gütersloh: Bertelsmann Verlag, 1798).

90. Johann Wolfgang von Goethe, "Second Roman Visit," in Goethe, *Italian Journey 1786–1788*, trans. W. H. Auden and Elizabeth Mayer (London: Penguin, 1970).

91. Wilhelm von Humboldt, *Werke*, 5 vols., ed. Andreas Flitner and Klaus Giel (Darmstadt: Wissenschafliche Buchgesellschaft, 1961–1981), 2: 404. Cited in Jean Lacoste, *Goethe, Science et Philosophie* (Paris: Presses Universitaires de France, 1997), 6.

92. Danièle Cohn, *La Lyre d'Orphée: Goethe et l'esthétique* (Paris: Flammarion, 1999), 11.

93. Winfried Nöth, "Le Seuil sémiotique d'Umberto Eco," in Petitot and Fabbri, eds., *Au nom du sens*, 52–63.

94. See the works in biosemiotics since Thomas Sebeok, for example, D. Favareau, ed., *Essential Readings in Biosemiotics: Anthology with Commentary* (Berlin: Springer, 2010).

95. See J. Petitot, F. Varela, J.-M. Roy, and B. Pachoud, eds., *Naturalizing Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science* (Stanford: Stanford University Press, 1999).

96. For phenomenology, see the classic essay by Elmar Holenstein, *Jakobson ou le structuralisme phénoménologique* (Paris: Seghers, 1974). Structuralism is intimately linked to Husserl's third Logical Investigation on the mereology of wholes and parts.

97. See, for example, Lubomír Doležel, *Occidental Poetics: Tradition and Progress* (London: Lincoln, 1989) ; and Sergueï Tchougounnikov, *Entre* "*organicisme*" *et* "*post-structuralisme*"*: Deux âges du discours russe-soviétique sur le langage et la littérature (1914–1993)* (Paris: École des Hautes Études en Sciences Sociales, 2003).

98. Wilhelm Worringer (1881–1965) was an art historian whose 1907 thesis "Abstraktion und Einfühlung" had a wide influence. For him, as for Riegl, aesthetic forms expressed the anthropological roots of subjects and abstraction became part of humanity's "aesthetic will."

99. For more information on Russian formalism see, for example, David Romand and Sergueï Tchougounnikov, "Le Formalisme russe. Une séduction cognitiviste," *Cahiers du monde russe* 51, no. 4 (2010): 521–46.

100. Hans Driesch, *Philosophie des Organischen* (Leipzig: W. Engelmann, 1909).

101. André Jolles (1874–1916) was a Dutch specialist in art history and literary history who naturalized as German in 1918. See André Jolles, *Einfache Formen: Legende, Sage, Mythe, Rätsel, Spruch, Kasus, Memorabile, Märchen, Witz* (Tübingen: Max Niemeyer Verlag, 1968); *Formes simples* (Paris: Éditions du Seuil, 1972). One could also mention Günther Müller, *Morphologische Poetik* (Tübingen: M. Niemeyer, 1958).

102. Jean-Jacques Vincensini issued this reminder at the 2003 Seminar on Semiotics at the École des Hautes Études en Sciences Sociales.

103. Jolles, *Formes simples*, 15.

104. Lessing, *Laocoön*, p. 5.

105. Hubert Damisch, "Préface" to Gotthold Ephraim Lessing, *Laocoon ou Des frontières de la peinture et de la poésie* (Paris: Hermann, 1990), 8.

106. Ibid., 9.

107. Lessing, *Laocoon* (Paris, Hermann, 1990), 120.

108. Eco, "Spazialità e testo literrario." "*Sempre prendendo alla lettera il Laocoonte, dovremmo dire che le arti dello spazio riescono a rappresentare lo spazio ma non riescono a rappresentare il tempo. . . . (Naturalmente la distinzione lessinghiana entra i crisi con la nascita di sistemi comunicativi come il cinema, capace di esprimere sia dimensioni spaziali che durate temporali, ma Lessing non aveva mai potuto vedere lo Empire State Building ripreso da Andy Warhol per ventiquattro ore, e lo perdoneremo).*"