MORPHOLOGY AND STRUCTURAL AESTHETICS:
FROM GOETHE TO LÉVI-STRAUSS

by

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In a 1999 article written as a tribute to Claude Lévi-Strauss for a special issue of the French journal Critique, I surveyed Lévi-Strauss's references to Goethe, and this led me to refine the thesis that — as I had already argued in the mid-70s with regard to René Thom's morphodynamical structuralism — there exists an authentic morphological genealogy of structuralism in the history of ideas.

This is the thesis that I will develop in the present essay for the Cambridge Companion to Lévi-Strauss, taking as an example a pictorial analysis from Lévi-Strauss's Regarder, Écouter, Voir. I am grateful to Professor Boris Wiseman for this opportunity to revisit the teachings of a thinker who has left an indelible mark on my intellectual life.

I. THE MORPHOLOGICAL GENEALOGY OF STRUCTURALISM IN CLAUDE LÉVI-STRAUSS

In his presentation of the aims of this Cambridge Companion, Boris Wiseman recalls Claude Lévi-Strauss's assertion that there were only three structuralists in France: Dumézil, Benveniste and himself (by the way, for Roman Jakobson there were only five structuralists in the World: Saussure, Prince Troubetskoi, Lévi-Strauss, Thom and himself), and he interprets this as a warning against the temptation to dissolve Lévi-Strauss's thinking in the homogeneous cloud 'structuralism'.

Boris Wiseman's remark is well-founded. Lévi-Strauss often quite rightly set himself apart from the school of thought which Parisian intellectuals called 'structuralism' before they moved on to 'post-structuralism.' For instance, in his essay De

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2 Petitot [1999].
3 Lévi-Strauss [1993].
4 This volume.
Près et de Loin, he drily criticizes the 'ridiculous' excesses of the structuralist 'vogue' amongst the intelligentsia, upbraiding several of his colleagues. Even if he does not do so with the same vigour with which he backed Merleau-Ponty and Aron against Sartre, he proclaims his refusal to be lumped together with Foucault, Lacan and Barthes:

“It bothers me because there is no good reason to lump us together.... I feel that I belong to another intellectual family: that of Benveniste and Dumézil.” (p. 105) 5

Some day it ought to be explained how and why structuralism, which is the pursuit in phonetics, syntax, semantics and in anthropology of one of the most venerable, profound, technical and difficult of scientific concerns — the problem of the coherent or ‘organic’ (self)-organized composition and structuring of parts into wholes — could ever have become in France a journalistic fad associated with authors who never tackled this problem. Hence the need to go back quite precisely to the scientific and philosophical genealogy of structuralism.

In De Près et de Loin, once again, in the eleventh chapter (‘Des qualités sensibles’) of the second part (‘Les lois de l’esprit’), Claude Lévi-Strauss makes a series of very illuminating remarks about the way he conceives the epistemology of structuralism and how he locates the latter in the history of ideas. Thus, to a question from Didier Eribon concerning the origin of the central notion of transformation:

“From whom did you borrow it? From logicians?”

Lévi-Strauss answers:

“Neither from logicians nor from linguists. I got it from a book which had a decisive impact on me (...): On Growth and Form (...) by D'Arcy Wentworth Thompson (...). The author (...) interpreted the visible differences between species or animal or vegetable organs within the same genus as transformations. This was a revelation, all the more so in that I was soon to discover that this way of seeing things belonged to a long tradition: behind Thompson, there was the botany of Goethe, and behind Goethe, Albert Dürer with his Treatise on the proportions of the human body.” (pp. 158-59)

5 Lévi-Strauss [1988]. The page references to this book will be provided in the text of this article.
This testimony is crucial not only for the particular history of structural anthropology or the structural study of myth, but also for an intimate understanding of the theoretical genealogy of structuralism in general. According to conventional wisdom, structuralism is of formalist, logicist and linguistic descent and should be understood as the application to certain human sciences of a static, algebraic and combinatorial concept of structure which, on the most favourable view, harks back to the great founders of mathematical ‘structuralism’ Hilbert and Bourbaki. There exists, however, an alternative, essentially different way of situating it — ‘another itinerary’, as Lévi-Strauss puts it — naturalist rather than formalist, where structures are treated as dynamical forms in development (‘growth and form’), as morphodynamically (self)-organized and (self)-regulating wholes, the term ‘morphodynamics’ referring here to dynamical theories of natural forms. This ‘other’ tradition is much older and deeper than the formalist perspective, and it is fascinating to see how Claude Lévi-Strauss links up with it.\(^6\)

To be sure, Lévi-Straussian structuralism is mentalist and cognitivist and even, as Philippe Descola reminds us,\(^7\) open to a neural darwinism. So, even if, formally speaking, it is based on combinations of discrete features and not on continuist primitives,\(^8\) that does not keep it from being deeply rooted in a certain type of naturalism in which, by his own account, Lévi-Strauss has always been very interested:

“The traditional sciences of nature — zoology, botany, geology — have always fascinated me, like a promised land in which I have not had the privilege of setting foot.(...). From the moment I began writing Le Totémisme and La Pensée Sauvage until the end of the Mythologiques, I lived surrounded by books on botany, zoology... This curiosity goes back to my childhood.” (p. 156)

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\(^6\) I am grateful to Lucien Scubla for pointing out to me that the reference to D’Arcy Thompson is early and recurrent in Lévi-Strauss. It appears in Anthropologie structurale (p. 358), in Du miel aux cendres (footnote p. 74) and in the ‘Finale’ of L’Homme nu (pp. 604-606). The biological structuralism of Goethe and Cuvier is also cited in the ‘Leçon inaugurale’ at the Collège de France reprinted in Anthropologie structurale II.

\(^7\) This volume.

\(^8\) This is not the place to discuss here the theoretical problem of the relations between the discrete and the continuous in symbolic systems. The interested reader may consult Physique du Sens (Petitot [1992]) as well as my morphodynamical modeling of Lévi-Strauss’s canonical formula (Petitot [1988], [2001]).
This naturalist reference goes hand in hand with a critique of the formalist paradigm. After dissociating himself from the latter:

“the nature and importance of my borrowings from linguistics have been misstated” (p. 158),

he goes on to evaluate the theoretical role of the concept of transformation:

“The notion of transformation is inherent to structural analysis. I would even go so far as to say that all the errors, all the abuses committed with or about the notion of structure derive from the fact that the persons responsible have not understood that it is impossible to conceive of the notion of structure in isolation from that of transformation. A structure is not merely a system: a whole composed of elements and the relations that hold them together. In order to speak of a structure, there must exist invariant relationships between the elements and relations of several wholes, such that it is possible to move from one whole to another by way of a transformation.” (p. 159)

It is essentially on this point that Lévi-Strauss is in harmony with the morphological tradition from Goethe to D'Arcy Thompson. As he explains in his 1960 Inaugural Lesson at the Collège de France:

“No science today can regard the structures under its purview as being no more than an indifferent arrangement of indifferent parts. For an arrangement to be structured, it must fulfil two conditions: it must be a system governed by an internal coherence; and this coherence, inaccessible to the observation of the system in isolation, becomes apparent through the study of the transformations thanks to which similar properties may be found in systems of outwardly different appearance. As Goethe wrote, ‘All forms are similar, and none is the same as the others, so that their chorus leads us to a hidden law’.”

Lévi-Strauss thus returns to Goethe's central thesis: ‘Gestaltungslehre ist Verwandlungslehre,’ the theory of forms is the theory of transformations.
The concomitance of the concept of structure and the concept of natural form runs through all of Lévi-Strauss's writings, from epistemology to aesthetics. He aims for a ‘science of the concrete’ that calls into question

“the opposition, now classic in western philosophy, between the order of the sensible and that of the intelligible.” (p. 155)

What's more, natural forms likewise represent one of the pinnacles of aesthetics:

“In my view, man must persuade himself that he occupies an infinitesimal place in creation, that the latter's richness far outstrips him, and that none of his aesthetic inventions will ever rival those contained in a mineral, an insect or a flower.” (p. 241)

In this essay we will give some precisions on Lévi-Strauss structural aesthetics from one of his analysis of Poussin and show how close it is of Goethean conceptions. The specific aesthetic problem that will concern us is a structural approach of the specificity of a purely pictorial language: how painting (and also sculpture) 'signifies', in and of itself. But let us begin with some general theoretical remarks.

II. THE MORPHODYNAMICAL-STRUCTURAL TRIANGLE

Lévi-Strauss's 'revelation' regarding D'Arcy Thompson and Goethe was in turn a revelation to me. Goethe had in fact been one of the first philosophers of Morphology to whom I had been led in my efforts to reconstruct the philosophical genealogy of Morphodynamics developed by René Thom. Moreover, the applications of the morphodynamical approach to which I was paying especial attention at that time concerned the structuralism developed by Claude Lévi-Strauss, Roman Jakobson and Algirdas Julien Greimas. I had made use of singularities in differential geometry and of bifurcations of attractors in non-linear dynamics in order to model phonological systems, elementary semantic structures, and the ‘double twist’ of the canonical formula of myth proposed by Lévi-Strauss.9 This had led me to a twofold correlation between Goethe and Thom on the one hand and Thom and Lévi-Strauss on the other hand.

The fact that, in reconstructing his own theoretical genealogy, Lévi-Strauss went back to Goethe's botany by way of On Growth and Form — D'Arcy Thompson having likewise been one of the greatest sources of inspiration for René Thom — showed that there existed a very precise and strongly established double genealogical link between

9 See Petitot [2001].
the Goethean theory of forms and modern morphodynamical structuralism. We may therefore outline a Goethe/Thom/Lévi-Strauss trinity attesting to the unity of structuralism and morphology.

III. GOETHE, LÉVI-Strauss AND PROPP

In his preface to the French edition of Goethe's writings on art, Tzvetan Todorov emphasizes this line of descent running from Goethe to Lévi-Strauss. He recalls that, in *Anthropologie structurale* (p. 354), Claude Lévi-Strauss assents to the view of those who seek

“To link structuralism directly to one of the distant sources of Gestalt thinking, the natural philosophy of Goethe.”

For Lévi-Strauss, the transformation of prototypes is the key to structuralism.

But Todorov also insists upon the lesser-known fact that the famous debate between Claude Lévi-Strauss and Vladimir Propp about the complementarity of the paradigmatic axis (concerning semantic features such as uncooked/cooked) and syntagmatic axis (concerning the characters' roles such as hero, traitor, etc.) in narrativity was played out against the backdrop of a double fidelity to Goethe. Propp held that Lévi-Strauss had misinterpreted his work because the English translation did not include any of the epigraphs, which were all borrowed from Goethe's *Morphology*, as was the very title of Propp's 1928 *Morphology of the Folktale*. In his 1966 reply to Lévi-Strauss, Propp underscores Goethe's naturalism:

> “Behind this term [morphology], we discover in Goethe a new breakthrough in the study of the laws that permeate nature. (...) We may cordially recommend these works to structuralists. (...) There do not exist two Goethes, the poet and the scholar; the Goethe of Faust, who aspired to knowledge, and the naturalist Goethe, who attained it, are one and the same person.” (Russian version, *Folklor i dejstivel'nost*, Moscow, Nauka, 1976, pp. 135-136.)

Well-versed in Russian traditions, Todorov recalls that a Goethean morphological school linked to formalism flourished in Russia in the 1920s. The culturalist transposition of Goethe’s *Naturphilosophie* was a logical reaction against the Diltheyan division between *Naturwissenschaften* and *Geisteswissenschaften* and his morphological concepts are at the origin of the conceptions of the Prague Circle and of the Jakobsonian analyses where form turns into structure in the strict sense, as soon as
the parts of the whole assume a function. Russian formalism constitutes a fundamental link between Goethe and Jakobson, and therefore Lévi-Strauss.

IV. THE MORPHOLOGY-STRUCTURE AND NATURE-CULTURE UNITY

Claude Lévi-Strauss's œuvre displays many affinities with that of Goethe. We have just seen that this is true with respect to natural morphologies and Gestalten. But it is also true with respect to the relations between Nature and Culture. In his contribution, Philippe Descola explains that, even if Lévi-Strauss treated the Nature/Culture opposition as an antinomy insofar as it operates as such in the societies he studies, he nonetheless aims, for his own part, at a monist naturalist conception capable of overcoming the antinomy.10 In his tribute in the Cahiers de l'Herne, Philippe Descola emphasizes also this Nature-Culture monism:

“Nature governs cognitive operations which endow Culture with an empirical content.”11

“The roots of Culture must be searched for in Nature and organic principles.”12

Françoise Héritier also underscored this key point that Claude Lévi-Strauss always criticized mentalist and rationalist (Cartesian) dualism and emphasized

“structural features which are already there in Nature.”13

Now, exactly the same thing may be said for Goethe where the same theory of organized structure is the basis for thinking about the work of art and natural forms. His Aesthetics is therefore inseparable from his Morphology and Metamorphosis. He saw structural problems as forming a unity. As Danièle Cohn expresses it so well in her authoritative work La lyre d'Orphée devoted to Goethean aesthetics:

“Goethe, who invented morphology in the natural sciences, thus makes it possible to conceive of an aesthetic morphology (...) and a morphological theory of culture.”14

10 This volume.
12 Ibid., p. 299.
13 Héritier [2004], p. 409.
For him,

“the natural sciences and aesthetics go hand in hand, the process of nature is, like that of the arts, a fashioning, a construction of form.”

Goethe criticized the mechanist physical sciences of his time for divorcing objective knowledge from the organizational complexity of nature. This results in the transcendental opposition between Nature (objectivity) and Freedom (will), characteristic of modernity, which was thematized by Kant, taken up again by Romantics such as Schiller, and then canonized by Dilthey and the early hermeneuts with the opposition between Naturwissenschaften and Geisteswissenschaften, between explanation and understanding. Nature conceived as phenomenon and object has been opposed to Man conceived as noumenon and subject. The elimination of any organizational interiority of Nature in a narrow mechanistic conception has been balanced by an hypertrophic conception of Freedom as an unconditioned Will. Goethe opposed this scission in two ways:

(i) He broadened the concept of Nature to encompass the world of organization and of the forms which, through semiotizing cognitive processes, open onto the sphere of meaning.

(ii) But, concomitantly, he restricted the concept of Freedom by claiming to reconcile Man ‘ecologically’ with Nature.

Goethe understood that there exists a sphere of reality, that of organization and complexity, of morphology and structure, which is common to nature and culture. Lévi-Strauss is undeniably a part of this genealogy, and that no doubt accounts for a certain number of the criticisms he received.

V. THE BIRTH OF STRUCTURALISM

I have shown elsewhere that Goethe can be considered the inventor of modern structural Aesthetics and that his Laokoon (published in 1798 in the arts journal the Propyläen which he edited with Schiller and Heinrich Meyer) constitutes a sort of birth announcement of structuralism. This is not the place to rehearse all the arguments for this thesis, but the reader will nevertheless allow me to recall a few key points.

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14 Cohn [1999a], p. 11.
15 Ibid., p. 37.
16 See Petitot [2003].
1. **Morphologies and transformations**

In Goethe's *Morphologie*, the concept of phenomenal form (*Gestalt*) is inseparable from that of formation (*Bildung*), of formational force (*bildende Kraft*) and of structure in the sense of the relations between a Whole and its Parts (what are known as *mereological* relations). It raises a problem that is genetic, morphological (morphogenetic) and structural.

The heart of the problem is to understand the principle of the spatial connection of parts in an organic whole, especially in biology and, more precisely, as Lévi-Strauss emphasized it, in botany. Goethe introduced (in relation with Kant's treatment of biological organization in the second part of the *Critique of Judgement*) the hypothesis that there exists a *scheme* for the Idea of organized structure, a scheme open to infinite concrete *variations*, each *transformable* into the next.

The scheme is a *generic type* which can be realized through an infinity of cases, *variants*, occurrences, or different tokens. It is the *original identity* of a genus or species and as such is the generative principle of an infinite, eventually virtual, variability. It entails laws of organization and is a generative principle, a mode of construction, a model (*Modell*). As Goethe explains in a letter to Herder dated 17 May 1787, with this model

> “one may continue to invent an infinity of plants which would necessarily be consequent (...) which, even if they do not exist, nevertheless could exist, and which are not merely shadows and pictorial or poetic appearances, but which possess an internal necessity and truth.”

The Goethean *Metamorphosis* thus unites the regular and the singular, the generic and the specific, the collective and the individual, unity and diversity. And if a type may have an open-ended diversity of variants, that is because these variants are connected to each other through *transformations*. The Goethean morphology is inseparable from the Metamorphosis as a theory of morphological transformations. This is the point which was to count the most for Lévi-Strauss in his defense of a *transformational* conception of structures.

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17 This idea of the virtual plant has now been perfectly realized by artificial life software that constructs virtual reality organisms.
2. **Structure and composition in Aesthetics**

This conception of structure was transferred by Goethe to Aesthetics especially in his analysis of the Laocoön published in 1798 in the *Propyläen*. At that time, the Laocoön was at the centre of the renaissance of the classic arts and of the problematic of the *autonomization* of the plastic arts. It was an absolute masterpiece, a ‘miracle of art’, and the topic of a spectacular debate between Winckelmann and Lessing. In 1766, as a reply to Winckelmann's 1755 *Gedanken über die Nachahmung der griechischen Werke in der Malerei und Bildhauerkunst* (Reflections on the imitation of Greek works in painting and in sculpture), Gotthold Ephraim Lessing, a great writer and art critic of the Berlin Enlightenment, published his sensational *Laokoon, oder über die Grenzen (limits, frontiers) der Malerei (painting) und der Poesie*.\(^{18}\)

This essay, which introduced the revolutionary thesis of an immanent meaning and a *sui generis* legitimacy of the sensible world, had an enormous impact because, for the first time, the plastic arts (painting and sculpture) were considered to be autonomous, in themselves and for what they truly are, namely *arts of spatially extended forms and sensible qualities*, and not mere illustrations of literary arts such as poetry, rhetoric, grammar, narrativity, or mythology. Lessing separated the visual and the literary and launched into a twofold criticism of the descriptive genre (visual poetry and ‘talking painting’) and allegory (literary painting and ‘silent poetry’). Painting *does not have* to exemplify and idealize ‘the splendor of nature.’ It does not have to illustrate the great narratives (previously considered the only ones worthy of great historical painting). It does not have to be pedagogical and to instruct. It does not have to subordinate itself to religion. *Visual beauty is in itself a metaphysical value.*

By its very nature, painting cannot ‘express general ideas’. Owing to this essential *limitation* of the medium, the parts of any plastic composition must be spatially correlated and the aesthetic properties of the work must derive from the agreement between the parts spatially bound together to form a whole. The Kantian opposition between, on the one hand, the intuitive properties of space, time and movement and, on the other hand, the conceptual, discursive and logical properties of judgement is already present in Lessing, as is the mereological problematic of organization.

In *Dichtung und Wahrheit* (I, 8), Goethe recalls the impact of Lessing's book:

> “One has to be young to measure the influence of Lessing's *Laocoön*, which wrested us from the passivity of contemplation and opened us

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\(^{18}\) See Petitot [2003].
up to unbounded fields of thought. The *ut pictura poesis*, so long misunderstood, was swept away with a single stroke, and the difference between the plastic and the verbal arts was illuminated; they appeared to us quite distinct at their pinnacles despite the proximity of their foundations.”

As to Wilhelm Dilthey, he explains in his essay on Lessing that

“[Lessing] thus became the second legislator of the arts (...) after Aristotle.”

For Lessing demolished

“the rhetoric of the *ut pictura poesis*, which claimed to see in poetry a sort of talking painting and in painting a kind of silent poetry.”

As H. Damisch emphasizes, for Lessing it was a matter of

“going back to what makes up the condition of possibility of the different arts.”

One may speak in this respect of

“the critical and, in the Kantian sense of the word, foundational operation effected by the Laocoön.”

The fundamental problem raised by Lessing was that of an *immanent* theory of the meaning of plastic creations, one able to constitute meaning on the basis of the very constraints imposed by a transcendental spatio-temporal aesthetics. How can a meaning arise and emerge without the expressivity of a meaning transcending the plasticity of the creation and without resorting to allegorical convention? *How is it possible to make the leap from empirical forms to aesthetic forms?* What accounts for the *supplement* which

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20 Reprinted in Dilthey [1929], pp. 17-174.

21 Damisch [1990], p. 8.

22 Ibid., p. 9.

23 Ibid.
the aesthetic adds to what is perceived? Of course, an emotion is present (the sentiment of pleasure and pain, as Kant would put it). But this emotion is itself the consequence of certain properties of form. Taking up and significantly refining some of Lessing's intuitions, Goethe became the first to resolve this problem and, in the process, he quite simply invented structuralism: the immanent meaning emerges from functional correlations between the whole and the parts of a work. There is a schematism of the composition which explains the emergence of properly aesthetic meanings.

Goethe's so-called ‘classicism’, his turning away from the irrationalist excesses of Romanticism, does not result from an aesthetic ‘taste’ but rather from a deep theoretical inquiry into the processes of the self-organization of forms. To employ Danièle Cohn's apt expression, one may speak in this respect of a morphological monism in which Nature and Aesthetics unite in

“a formal shaping of form where the rule is given within the freedom of an achieved creation.”

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Like Kant, Goethe established a profound identity between the living being (Naturwerk) and the work of art (Kunstwerk). In a letter to Zelter25 dated 29 January 1830, he wrote:

“Kant did an enormous favour to the world, and, I might add, to myself as well, when, in his Critique of Judgement, he placed art and nature side by side and granted both of them the right to act without finality (Zwecklos) in virtue of great principles.(...) Nature and art are far too great to pursue ends, and they have no need to do so, for there are correlations (Bezüge) everywhere, and correlations are life.”

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Goethe considered the Laocoön to be a ‘perfect masterpiece’ (p. 165), a ‘crowning achievement of the plastic arts’, an exemplary and universal type containing the ‘totality’ of art ‘in its entirety’. It constituted in his eyes an extraordinary solution to the fundamental problem of the balance between unity and diversity.

He treats the Rhodian group as

24 Cohn [1999b], p. 27.

25 Karl Friedrich Zelter, a Berlin architect and musician nine years his junior, was a great friend of Goethe's.

26 Quoted by J. Lacoste [1997], p. 219.
“a highly organized living structure.” (p. 166)

As Richard Brilliant puts it,

“Goethe saw the sculptural ensemble as a quintessential natural sign.”27

Goethe's conception is ‘organic’, i.e. systemic and mereological. It is the relations of the parts within the whole — the famous correlations — which define their function, that is to say their meaning. For the first time in the history of aesthetic thought, we are in the presence of an immanent and systemic analysis founded uniquely on relevant mereological relations. These relations are perfectly identified by Goethe: differences, oppositions, contrasts, symmetries, gradations.

Goethe places great emphasis on the laws of structure: the symmetries that undergird intelligibility, the oppositions that draw on ‘fine discrepancies’ to make manifest ‘strong contrasts’ (morphological principle of instability), etc. Such laws are only intelligible when the work is considered to be ‘autonomous and closed upon itself’ (p. 168). Without a principle of autonomy and closure, it becomes impossible to bring out the relations of symmetry and opposition, and the non-conceptual perceptive meanings vanish. Here we recognize the basic structuralist principle of the primacy of differential cues which makes it possible for a work to possess a structure and therefore to be autonomous, in other words to contain within itself the principles and the rules of its own interpretation (principle of immanence).

But that is not all. Of course, to have invented the structuralist principle of the constitutive semiotic function of differences already amounts to nothing short of a revolution. Yet that would not be enough, far from it, for the following reason. Paintings and sculptures are by definition continuous forms, while (in the structuralist conception) semic units are discrete. Therefore, we still need to know how to go from the continuous to the discrete. This is easier said than done. Percept and concept oppose one another. The signs found in the plastic arts being natural signs, they vary in continuous fashion. In the conceptual domain, it is categorization which resolves the problem of the passage from the continuous to the discrete: we categorize semantic continua by introducing qualitative discontinuities, and then we take the typical values central to the domains (categories) thus delimited by these boundaries. But categorization is a conceptual mode of abstraction, and conceptual abstraction is not

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27 Brilliant [2000].
compatible with the essence of the plastic arts, for each work presents an irreducible spatial individuality. How then are we to inject discreteness into those irreducibly singular continuous compositions that are works of art? The problem is to succeed in extracting a form of discrete expression from a form of continuous intuition.

This is where an absolutely crucial geometric concept must be introduced, that of genericity and non-genericity. This notion was used intuitively by Goethe, but it goes back at least to the geometric painters of the Renaissance. Intuitively, a situation is generic when its properties don't change under small perturbations. On the contrary, it is non-generic if infinitesimal perturbations can change some of its properties. For example, in a plane the property for two straight lines to be parallel or orthogonal is a non-generic property because the modification of the inclination of one of the lines by as little as you want would result in them no longer being respectively ‘orthogonal’ or ‘parallel’. Likewise, it is a non-generic property for two segments to be exactly aligned or for a triangle to be equilateral.

This very intuitive concept was not adequately theorized until the middle of the 20th century, by such mathematicians as Whitney and Thom, on the basis of initial definitions coming from Italian algebraic geometers of the late 19th century. Let us take a form $F$ that can be deformed through the action of parameters $w$. A state $F_w$ of $F$ will be said to be generic if its qualitative type does not change when $w$ varies a little, in other words when it resists small deformations. A typical example is that where $w$ varies in a space of vantage points (for example, the vantage point chosen by any painter for a painting) and where $F_w$ is the apparent contour of a 3-D object seen from the perspective $w$.

Non-genericity has remarkable perceptive effects. For example, it is well known that a 2-D diagram displaying the form which is the apparent contour of a cube is spontaneously interpreted by the visual system as a 3-D object when it is seen in perspective from almost all vantage points. These are the ‘generic’ vantage points. When the viewer moves from one generic vantage point to a neighboring one, there is no significant modification to the perceived cube. However, there is a set of exceptional vantage points from which the apparent contour of the cube appears as an hexagonal maximally symmetrical apparent contour. In that cases, the third dimension disappears and the diagram is interpreted as a planar hexagon. These are the non-generic vantage points onto the cube (cf. figure 1).

FIGURES 1a and 1b ALREADY SENT
Figure 1. (a) The 2-D apparent contour of a cube in a generic position is perceived as that of a 3-D cube. (b) If the position is non-generic, the visual system interprets the apparent contour as a 2-D form, a planar hexagon, and does not reconstruct the 3-D form.

The visual system being a \textit{probabilistic} (Bayesian, in all likelihood) neural machine that learns to extract statistical regularities from the environment, it is very good at detecting \textit{rare} events, and it treats them as \textit{intrinsically significant} because they are rare. Since the probability of non-genericity is null it is perceptively salient. \textit{It provides a purely perceptive immanent criterion of meaningful relevance.} What's more, insofar as normal perceptive scenes are, for their part, generic, \textit{non-genericity provides an immanent criterion for the difference between perceptive structure and artistic composition.}

Since (at least) the Renaissance, great painters have been geniuses of non-genericity. In their works, the disposition of bodies and the vantage point are chosen so that, for example, a finger points exactly in the direction of a symbolically important site, a head is at a tangent to such and such an architectural element, two arms are parallel or orthogonal, etc. These painters had matchless experience with non-genericity as the basis of composition: the art of composition involves arranging the figures and objects depicted on the canvas in such a way that they make up non-generic forms and scenes. The same may be said for sculptors, with one qualification: a sculpture being a 3-D object which the spectator may circumambulate, the non-genericity depending on a particular vantage point disappears, but the non-genericity of mereological relations remains.

Goethe perfectly understood this crucial point which makes it possible to establish a non-conceptual origin of aesthetic meaning on a purely immanent basis (i.e., with sole reference to the forms composed by the artist). Indeed, if we radicalize his response, we arrive at the following fundamental idea:

\textit{spatial relations are significant and relevant when they are non-generic, that is, unstable with regard to small continuous variations.}

Plucked from the backdrop of an infinite (continuous) variability of possibilities, a symmetry, a contrast, a parallelism, etc. are non-generic. They \textit{select} among all possible relations some that are exceptional and which, for that very reason, are laden with information. \textit{Non-genericity is the fundamental process of production of morphological
information in a continuous composition, and this purely immanent information constitutes the basis of interpretive meaning.

So, in the plastic arts, non-genericity guarantees significance and provides a specifically morphological criterion of meaning.

What holds true for space holds equally true for time. The artist must ‘discover the culminating moment’ of a scene (p. 166), choose a unique ‘transitory moment’ that must be represented for the composition to contain the maximum amount of information and to make manifest a productive dynamic. The scene is a temporal section of a story, and the greatest possible temporal interval must be compressed into a fleeting instant. The represented present is a snapshot. Goethe speaks arrestingingly of ‘immobilized lightning’ and ‘petrified wave.’ But it is not an arbitrary snapshot. The chosen moment must also be highly non-generic. As Goethe says:

“A little earlier no part of the whole must be found in this posture, a little later each part must be forced to abandon it.” (p. 169)

This non-genericity guarantees not only the intelligibility but the pathos as well:

“The loftiest pathetic expression which they [the plastic arts] may represent is located in the transition from one state to another.” (ibid.)

In summary:

To be significant and capable of mediately expressing more abstract meanings, spatial relations in the plastic arts must be non-generic and unstable. This is the fundamental principle of the emergence of non-conceptual semiotic meanings.

VI. LÉVI-STRAUSS ON POUSSIN: DOUBLE ARTICULATION AND COMPOSITION

In Regarder, Écouter, Lire, Claude Lévi-Strauss analyzes in particular certain paintings by Poussin and, in doing so, he calls several times upon the structural principle of non-genericity.

We will focus here on his analysis of the masterpiece Eliezer and Rebecca at the Well (1648, Louvre Museum, Paris). Lévi-Strauss recalls first the debates which the

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28 In the same book, Lévi-Strauss analyzes also another celebrated Poussin's painting: Et in Arcadia ego. See Scubla [2004].
painting (‘a pinnacle’ among the ‘sublime’ works of Poussin) provoked at the Royal Academy of Painting the 7 January 1668 and, in particular, the commentaries of Philippe de Champaigne reported by Félibien. An important part of the discussion turned on the fact that, according to Philippe de Champaigne, Poussin didn't represent Eliezer's ten camels which play a fundamental role in the biblical text (Genesis XXIV):

“It seemed to him that M. Poussin didn't treat the subject of his painting with a sufficient historical faithfulness.”

Indeed, God's Angel announced to Eliezer that he would recognize the right virgin he was searching for by the fact that she would water his camels after having supplied him with drink. Water the camels was therefore the identifying sign. Poussin was supported by Le Brun who explained that the deformity of the camels would have ruined this tribute to beauty.

In fact, the answer to Philippe de Champaigne is simply that Poussin represented in this painting not Rebecca's recognition but the next moment, when Eliezer gives her the golden ring and the two bracelets. Poussin was perfectly aware of the narrative since in two other versions of Rebecca at the Well (the first in 1629 and the third in the early 1660s) he depicted the inaugural moment of the recognition and represented camels. Daniel Arasse emphasized that, in the Louvre 1648 painting, the chosen moment is that of Rebecca's election and

“foreshadows Mary's Annunciation as a synthesis between God's blessing and human caritas.”

This parallel is strengthened by the colors of Rebecca's clothes, blue and red being the distinctive colors of the Blessed Virgin. And Arasse concludes that:

“The camels, which can seem today rather secondary, have been the object of extensive reflections from Poussin, and the three paintings present as a system of transformations whose analysis enables to reconstruct Poussin's artistic meditation.”

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29 Champaigne [1668].

30 Arasse [1992], p. 35. See also Glen [1979].

31 Ibid.
Let us return to Lévi-Strauss’s commentary. He emphasizes the organic character of the composition and the fact that it operates at

“three levels of organization, one nested in the other, each raised to the same degree of perfection” (p. 24):32

first the figures, each one being ‘as profoundly thought out as the whole’ (p. 34), then the groups of figures and finally the picture in its entirety (figure 2).

\[ \text{FIGURE 2a ALREADY SENT} \]

\[ 
\text{Figure 2. (a) Nicolas Poussin, Eliezer and Rebecca at the Well, Paris, Louvre Museum. (Photo R.M.N.). (b) the frames of the details we will comment.} 
\]

This compositional hierarchy leading from internally structured “first-order” units to higher-order structures is fundamental for Lévi-Strauss, who sees at work in it the universal structural principle of duality of patterning (‘double articulation’ 33) characteristic of all constructions imbued with meaning:

32 Lévi-Strauss [1988]. The page references to this book will be provided in the text of this article.

33 In Linguistics, ‘double articulation’ means that at the phonetic level words are decomposed (‘articulated’) into phonemes while at the syntactic level sentences are decomposed into words.
“Poussin illustrates above all the procedure of double articulation.” (p. 13)

“In a painting by Poussin no part is unequal to the whole. Each is a masterpiece of the same stature which, considered on its own, is as worthy of attention as the rest. The picture thus appears as a second-order organization of forms of organization already present in the smallest details.” (p. 34)

Lévi-Strauss starts out from the structure made up of groups of figures:
(i) in the foreground, the couple formed by Eliezer and Rebecca;
(ii) to the left, a ‘compact and lively’ (p. 25) group of nine women (structured as \((5 + 1) + 1 + 2\));
(iii) to the right, a group of three more hieratic women.
And he makes the fundamental observation that one figure is selected by the fact that it is prolonged by a pillar. He formulates the matter most precisely, speaking

“of the pillar of masonry (...) surmounted by a sphere, against which the woman is silhouetted and to which she almost seems attached.” (p. 26)

I would like to underscore the fact that this selection is achieved by a typical procedure of non-genericity. The perspective is chosen in such a way that the elbow of the right arm leaning above the edge of the well (the distinctive position of the figure) is exactly tangent to the edge of the pillar, and tangency would not survive to the smallest perturbation of the vantage point. This effect of non-genericity is further reinforced by the fact that the side of the pillar seen in perspective appears as a narrow band that is exactly prolonged by the neck and the base of the jug; moreover, this alignment precisely divides the elbow from the body of the figure (cf. figures in frames 3a and 3b of figure 2b).

Frames 3 in figure 2b. (a) The pillar-woman leaning over the well and selected by her non-generic position with respect to the pillar. (b) The side of the pillar selects her elbow before being prolonged by the neck and the base of the jug.

This non-generic construction selects a figure and imposes, in a structural and immanent manner independent of any external meaning, the identification ‘leaning
woman = pillar.’ And, recalling that Philippe de Champaigne had criticized this figure for being too much ‘at variance with the style of anquity’ (p. 26), Lévi-Strauss states:

“It is true that this sculptural figure is in sharp contrast with the others. I believe this calculated difference holds the key to the painting.” (p. 24)

Indeed, once one has recognized this first identification, one immediately notices that there exists a vertical correspondence between the three groups of figures and the architectural or landscape components of the scenery:

<table>
<thead>
<tr>
<th>Figures</th>
<th>Left-hand group</th>
<th>Central couple</th>
<th>Right-hand group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenery</td>
<td>Palatial buildings</td>
<td>Distant landscape</td>
<td>Pillar and manufactory</td>
</tr>
</tbody>
</table>

Lévi-Strauss returns here to the biblical episode of Genesis XXIV: having arrived in the promised land of Canaan, Abraham does not want his son Isaac to marry an autochthonous daughter of the soil but ‘a daughter of his blood’ and dispatches Eliezer, his oldest servant, to his home country (Ur in Chaldea) to bring back a wife. Rebecca is the daughter of Bethuel, the son of Abraham’s brother Nachor, and the sister of Laban. As an anthropologist, Lévi-Strauss asserts that this episode stages the conflict between blood and soil or, more precisely,

“the contradiction between what the jurists of the Old Regime called race and land.” (p. 25)

If we identify the women with ‘race’ and the buildings with ‘land’, then the painting immediately acquires, through its very composition and organization and the immanent properties of its structure, an intrinsic meaning apart from any extrinsic hermeneutic projection.

With regard to Poussin's compositional genius, Lévi-Strauss makes the following startling remark:

“In one precise point in the picture, Poussin furnishes, formulated in plastic terms, the solution to the problem.” (p. 26)

First of all, the form and tone of the selected figure make it appear to be more a statue than a character, so that it
“realizes the synthesis of an effigy which is still human (and thus of a piece with ‘race’) and a pillar of masonry (already ‘land’).” (p. 26)

But the most startling facet of this assertion is the idea that a conceptual problem can have a plastic solution. Yet that is precisely what composition accomplishes: by introducing singular spatial relations between terms naturally invested with meanings (here, the ‘race’ and the ‘land’), it spatializes relations and tells a philosophical tale through the composition itself. In this sense, what the great painters do is not to represent. Instead, they usually are great theorists who produce pictorial solutions to philosophical, theological, moral, political, metaphysical or like problems.

Lévi-Strauss makes several other observations about this painting by Poussin.

(i) The left-hand group is lively, the right-hand group immobile and the buildings immutable; thus,

“seen as a whole, the picture plays on an opposition between stable and unstable, mobile and immobile.” (p. 25)

(ii) This opposition is amplified by the parallel between the woman on the left (Rebecca's double) carrying an unstable jug on her head and the pillar-woman on the right whose column-body supports a stable sphere.

(iii) Finally, concerning the configuration of the jugs, Lévi-Strauss notes the existence of

“a triangle formed by the jug that she [the woman on the right] is carrying on her head (unstable), the jug beneath her (or that of Rebecca) resting on the ground (stable), and the jug upon which the statuesque figure is leaning, located at an intermediate height.” (p. 26)

One might add some further observations:

(i) The extraordinary interplay of the nine jugs (joined by the 10th which is the sphere) relative to the nine women:

   (a) at the far left a figure is associated, by an opposition between her arms, to two vertically superimposed jugs, one on the head (unstable) — exactly tangent to the horizontal borderline between the upper part of the immediate background and the bottom of the wall in the distant background — and the other on the ground (stable);
   (b) the group of two figures sitting in the shade is leaning on a jug;
(c) next, in the group of five figures (really only four, since the two holding each other's shoulders make up a single split figure), the central figure, the only one facing the viewer, is carrying on her head a jug exactly framed by one of the façades of the building, while the three other jugs are interlaced near the ground in an extraordinary trinity;
(d) Rebecca's jug is resting on the ground between Eliezer and Rebecca;
(e) the pillar-woman's jug corresponds to the sphere;
(f) and, finally, the duo at the far right connected by an arm around the shoulder corresponds to a jug held at arm's length (which embodies a stable position symmetrical to the unstable one of a jug carried on the head) (cf. figures in frames 4 (a)-(d) of figure 2b).

Frames 4 in figure 2b. The harmony of the jugs. (a) At the far left, a figure with two vertically superimposed jugs. (b) The jug on the head is tangent to the bottom of the wall. (c) The central figure in the group on the left supports a jug exactly framed by one of the façades. (d) The three jugs on the left side are intertwined to form a trinity.

(ii) The no less extraordinary interplay of positions, especially of the arms. One will notice in particular the left arm of the woman standing behind and to the left of Eliezer. The hand, which precisely prolongs her right forearm and is seen behind Eliezer's body to his right, is automatically placed in correspondence with Eliezer's right hand, which points toward Rebecca. These two hands are parallel and their positions are very similar. That of the woman is holding the rope of the well, which is precisely prolonged by the braid on the hilt of Eliezer's sword (cf. figures in frames 5 (a) and (b) of figure 2b). The fingers' positions are also particularly interesting. With his right hand Eliezer at once points toward Rebecca with his index and gives her the golden ring he holds between his thumb and his middle finger. With his left hand he gives Rebecca the two bracelets. With her left hand, the woman behind him at once points toward the golden ring with her index and holds the rope with her other fingers.

Frames 5 in figure 2b. (a) The hand holding the rope of the well is horizontally parallel to that of Eliezer. (b) the rope is vertically prolonged by the braid on the sword-hilt.
(iii) The essentially horizontal and vertical organization of the picture. The 14 figures (9+1+1+3 from left to right) are distributed in a very open triangle pointing toward the viewer (positions of the feet), and there are an ascending series of horizontal lines along which the jugs are arrayed like notes on a musical scale.

(iv) Standing above Rebecca there is a tree which must be placed in relation with the other trees, the complementarity stone/tree being an essential feature of the scenery (cf. figure in frame 6 of figure 2b).

*Frame 6 in figure 2b. The tree and the elements of masonry above Rebecca's head.*

(v) Other elements of the scenery such as the church, in the middle, off in the distance, and above all the second pillar, also in the distance, which the chosen perspective has made exactly tangent to the capital of the first pillar, an example of maximal non-genericity (cf. figure in frame 7 of figure 2b).

*Frame 7 in figure 2b. The two pillars made tangent by a powerful perspective effect of non-genericity*

With regard to Poussin's method of composition, Lévi-Strauss recalls that the painter constructed three-dimensional mock-ups of his pictures so as to be able to move about 'wax figurines' on 'small boards', clothing them in wet paper and taffeta, and that he enclosed these scenes in boxes pierced with holes, allowing him to project light upon the scenes and to analyze the shadows (p. 15). Lévi-Strauss considers this to be a

“method of composition so perfectly assimilated that it nearly ends up being a mode of thinking.” (p. 15)

This method was criticized by, among others, Delacroix, who chided Poussin for the fact that

“his figures are set down one next to the other as if they were statues (quoted p. 14).”

But I would like to stress the fact that varying projections of a 3-D scene onto the 2-D plane of the canvas is the technique *par excellence* for obtaining non-generic dispositions.
CONCLUSION

In this essay, we have sought to show that Lévi-Strauss's structuralism belongs to a specific scientific problematic, that of the morphodynamical organization of complex systems, whether biological, semio-linguistic or social. The genealogy of this problematic took us back to Goethe, who was himself already the heir to the Kant of the *Critique of Judgement* and to the great naturalists like Buffon, Geoffroy Saint-Hilaire or Cuvier. From Goethe, we returned to Lévi-Strauss's structuralism by two routes, on the one hand that of biological morphogenesis leading to René Thom, and on the other that of the rediscovery of Goethean Morphology by Russian formalism, leading in turn to the Prague Circle and to Roman Jakobson.

We then demonstrated, using the example of Lévi-Strauss's analysis of a painting by Poussin, the continuity that exists between the Goethean principles of composition and correlation and structuralist principles, in particular with respect to the selection of singular elements in a work by means of a criterion of non-generic positioning.

Many scientific trends testify to the contemporary relevance of these approaches. First of all, the models of morphogenesis have been significantly refined and developed. In addition, everything having to do with perceptive Gestalten and with structures in the structuralist sense of the term is right at the forefront of current research in cognitive neuroscience, thus confirming the soundness of the intuition behind Lévi-Strauss's naturalist mentalism and neural materialism. Finally, the role of non-genericity in works of art is beginning to be studied within the framework of what is called as ‘neuro-aesthetics’. It has already been proven experimentally that the visual exploration of a painting involves a different pattern of eye-movements from an ordinary perceptive scene, precisely because the framing and composition generate non-generic singularities which ‘guide’ the gaze. Such experiments confirm the expertise of the artists.

In sum, contrary to what is too often said, structuralism, and first and foremost that of Claude Lévi-Strauss, is assured of an enduring and wide-open future.

BIBLIOGRAPHY


Translated by Mark Anspach.