

1 *Morphologies in Nature and Art*

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3 *Our mind is the canvas on which the artists lay their colour: their pigments are our emotions; their*  
4 *chiaroscuro the light of joy, the shadow of sadness. The masterpiece is of ourselves, as we are of*  
5 *the masterpiece* (Okakura, 1906/1998, 143).

6

7 Morphology is, literally, the study of form (*μορφή, λόγος*). The term is used in diverse disciplinary  
8 areas: the perception of sensible forms in the environment and their artistic rendering, the  
9 external biological forms of living animal and vegetable organisms, the forms of lithification in  
10 geological sediments, the geometric figures, or the grammatical structures of language. With the  
11 recent development of computational models and techniques, however, the term has almost  
12 universally undergone a mutation towards syntax. Quantitative analysis as conducted in  
13 computational biology and computer science has pushed qualitative empirical analysis to the  
14 margins; in vision science, the analysis of shape and 3D perception has been restricted to the  
15 measurement and analysis of judgments of quantitative attributes, neglecting their semantic  
16 content (Albertazzi, van Tonder and Vishwanath, 2010); in linguistics, distributed morphology has  
17 lost every semantic connotation; and so on. This special issue deals with systematic and  
18 experimental aspects of the concept of form in its original sense: that is, it considers qualitative  
19 forms (*Gestalten*) as they are generated dynamically and presented subjectively and aesthetically  
20 in perceiving (*αἰσθάνομαι*). In its original (Aristotelian) meaning, in fact, form is not simply  
21 geometrical shape, but also embeds cross-modal qualities such as colors, flavors, tastes, and most  
22 of all, meanings.

23 The meaningful appearances of natural forms are incontrovertible primary ecological facts for  
24 humans and non-human living beings. The visual surfaces of natural forms are endowed with  
25 beauty and ugliness, desirability and repulsion, and are themselves intrinsically styled, expressive  
26 of a qualitative tone of their appearances (van Tonder, this issue). In arts, sensible forms are  
27 shaped, and able to retain and convey the informational, skeletal, emotional, imaginative,  
28 expressive and ecological value that they possess as experienced in nature: consider Klee's  
29 *Landschaftlich-physiognomisch* (Scenic-physiognomic) (1931), *Leidenschaftl. Pflanzen* (Passionate  
30 plants) (1914), and *Trauerblumen* (Mourning flowers) (1917). Perception and art develop and rely  
31 on common patterns. Consider the curved back of the bison, the strokes that depict the scene of

32 sacrifice, and even the undulating line of dots that memorizes the path of fleeing antelope on cave  
33 walls of Cueva Remigia or the Western Cape in South Africa, or the smooth and gleaming curves of  
34 Canova's Graces; the lanceolate and pure forms of *Lilium*, the ripples of desert dunes or the dome  
35 of *Rhizostoma pulmo*: entities taxonomically very distant from each other, but visually so close and  
36 intertwined that they share the same form (Pierantoni, 1999).

37 The clay and silt of deserts, the calcite crystals of statues, or the soft, waxy, or spongy tissues of  
38 animals and plants, the opalescence of jellyfish in water or the fleshy petals of the *saucer*  
39 *magnolia* are plurivocal modes of appearance of the same supporting form: the curved line  
40 dressed and endowed with multifarious sensible qualities and feelings (Klee, 1961, *Towards a*  
41 *theory of form production*). The same applies to the formal skeleton of visible points, surfaces and  
42 volumes, bearers of a skeletal semantics of natural forms expressed in the curved lines of pagodas  
43 or the stretch leap in dance (Kandinsky, 1926/1947, *On Point*, figs. 7, 9). Strictly speaking, the  
44 spatial primitives of form (Albertazzi, 2015, in press), their genesis, dynamics, and the symmetries  
45 that they produce in the visual field (Wright and Bertamini, this issue) are qualitative dimensions  
46 perceived in awareness. That these primitive patterns – the bearers of the meanings of forms –  
47 obey the formal rules of the grammar and syntax of seeing (Pinna and Deiana, this issue) is  
48 manifest in the similarity and morphogenesis of the lines common to the forms of shells, the horns  
49 of antelopes, and the *liberty* inflorescences of spumellarias and diatoms (Dadam et al., 2012;  
50 Albertazzi et al., 2014) which have shaped the figurations of textiles and architecture of  
51 monumental archways during the 19th and 20th centuries (Haeckel, 1866, 1904/2004; Thompson,  
52 1961; Ruskin, 1857; Kemp, 1995). They are zoomorphic or phytomorphic lines that inform both  
53 oriental calligraphy (Albertazzi et al., this volume) and the crossmodal structure of arabesques  
54 (Hanslick, 1854), and Pollock's action painting (see his *Number 13A*). They are primitives so  
55 powerful that they give rise, in artistic creations, to creatures only slightly more imaginary than  
56 those usually encountered in the environment, to zoomorphic images such as mermaids, centaurs,  
57 chimeras, hydras (Minelli, this issue) of which the same forms in nature offer a magnificent  
58 sampler; a bestiary that produces forms as fantastic as they are potentially real (Borges, 2005),  
59 objectifiable in virtual and pictorial space like Klee's *Die Zwitscher-Maschine* (The twittering machine)  
60 (1922). Nature is more an imaginative thinker than a computational engineer.

61 Like a painter on a canvas, nature as perceived by living beings seems to develop in force fields; a  
62 canvas where the boundaries of things are not detachable from the boundaries that our

63 perceptual system imposes on the raw material of stimuli. Like nature, the painter draws on our  
64 mind (Okakura, 1906/1998, Ch. 5, *Art Appreciation*). For this reason, the writings of painters and  
65 handbooks on how to draw or paint are real sources for visual theory in that they show the  
66 grammar of the primitives of space, colour, and expressive value of appearances in awareness. Art  
67 is an instrument with which to generate knowledge about natural processes, rendering manifest  
68 the conditions that make appearances visible, the genesis of crust formation, to use Klee's  
69 expression (Klee, 1961, p. 81): the artist, in fact, must be true to nature in order to objectivize its  
70 meaningful forms. In particular, the visual analyses developed by artists are major explorations of  
71 the phenomenology of vision (Kemp, 2001). Potentially, they could help to rewrite entire bodies of  
72 literature in vision studies in *both* qualitative and quantitative terms: think for example of the  
73 studies on shape from shading, where the concept of the shading cue may be replaced by that of  
74 the cue for relief articulation (Koenderink et al., 2015) because it is ecologically closer to human  
75 perception. It would be simpler, and more elegant, to move away from the current consolidated  
76 paradigms of shape perception, essentially based on the myth of veridicalism and the mechanistic  
77 idea of a computational mind, and ask ourselves how close the science of perception and  
78 aesthetics are; or even accept the idea that aesthetics itself *is* a science, very close to an  
79 experimental phenomenology developing concepts such as light form, colour, sound, touch,  
80 depth, etc. along a bipolar scale which includes their connotative dimensions (cold/warm,  
81 cruel/kind, wordly/spiritual, agitated/calm, etc.) (Albertazzi, 2013b). These are not idle questions,  
82 because answering them may induce a change of paradigm, challenging again "the night side of  
83 science" (Schubert, 1835). This would engender a very different conception of the human  
84 perception of the environment, and of nature, which in our awareness appear to be intrinsically  
85 and naturally multimodal, qualitative, and scaled, and requiring the necessary exactness of a  
86 scientific approach. The study of cross-modal natural forms requires much more than a sensory to  
87 sensory integration and much less than symbolic representations; and aesthetics comprises much  
88 more than the analysis of the beautiful or of the subjectively pleasant (Albertazzi et al., 2015).

89 I am aware of the basic "Romantic" flavor of the viewpoint, based on a Goethian idea of a  
90 multimodal nature that shapes itself in a variety of patterns with a common origin in form  
91 primitives (Goethe, 1790; Coen 2001); and whose syntax is indissolubly imbued with meaning, and  
92 whose core concept is marvelously rendered in Otto Runge's *Die Genien auf der Lichtlilie* (Spirits  
93 on the light-lily, better known as Lily of the light and morning star) (1809). However, I think that a

94 turn towards an experimental phenomenology (Albertazzi 2013a) may be closer to an ecological  
95 theory of perception than we have ever had in science: a science of qualities *per se* where the  
96 beautiful retains its basic biological and aesthetical value (Rothenberg, this issue, and 2011).  
97 The issue, as mentioned, comprises a series of studies, both experimental and systematic, on the  
98 homology between forms in art and nature, as revealed by the genesis of their multifarious  
99 appearances (i.e. figuration, *Gestaltung*) in perceptual awareness.

100 Gert van Tonder presents a systematic contribution on perceptual aspects of visual style. Bearing  
101 on the proportional relationships among constituent shape parts, stylization is relevant to the  
102 morphology of shape; style is argued here to be fundamentally perceptual in nature, both in its  
103 generative grammar and in its appearance. The set of phenomenological characteristics of style  
104 presented should benefit a more systematic definition and analysis of style.

105 Liliana Albertazzi, Luisa Canal, Rocco Micciolo, and Massimo Vescovi present an experimental  
106 study on the categorical ambiguity between visual appearances belonging to different categories,  
107 such as Oriental Calligraphy and Klee's Abstract Paintings. The results show that both the  
108 categories share morphological patterns that make them graphically and conceptually similar, to  
109 the point where the similarity induced subjects to mistake examples from one category with that  
110 of the other.

111 Alessandro Minelli discusses the presence of a few architectural schemes, or principles of body  
112 syntax, to which plant and animal form largely conforms. The same principles also prevail in the  
113 products of imagination developed in myth and represented in art, such as chimeras, centaurs,  
114 mermaids, angels and dragons. Familiarity with the regularities of living form provides a scope for  
115 perceptual manipulations frequently experienced by humans but also by other animals.

116 Damien Wright and Marco Bertamini present a series of experiments on human aesthetic  
117 preferences in the perception of dynamic stimuli although stripped from context and semantic  
118 meaning. The results show a preference for dynamic symmetrical patterns over random ones and  
119 for global over local transformation, and that different transformations, such as expansion, can  
120 influence aesthetic preferences.

121 Jan J. Koenderink presents a systematic study on the part-whole relation in visual awareness  
122 applied to the structure of the works of art. His negative conclusions about the possibility to draw  
123 a formal mereology of works of art are based on a discussion of the subjective, different and  
124 parallel pictorial worlds, between which both the artist' and the painter' eyes fluctuate.

125 Baingio Pinna and Katya Deiana present an experimental study with children on the syntactic  
126 relation between shape and color. Their results show that shape and color are organized in  
127 sequential order, and that the shape is hierarchically prior and the core reference for color, what  
128 gives an insight into the language of vision and the implications for art and biology.

129 David Rothenberg and Michael Deal attempt to develop a new form of visual notation for the  
130 beautiful song of the humpback whale, enabling humans to better perceive its musicality, tonality  
131 and morphology. The beauty of the humpback whale song is considered as to whether it is an  
132 inherent characteristic or a human projection.

133 I thank the colleagues that have contributed to this issue with their expertise and originality, and  
134 often with their unconventional ideas. I am most grateful to the Museum Klee for allowing Klee's  
135 original images to be reproduced: every reader, of whatever background and persuasion, will  
136 enjoy them. I also thank Gert van Tonder for giving permission to print one of the Japanese  
137 stencils that he owns for the cover page, a shaping of form genesis through patterns in a Japanese  
138 eye. Especial thanks go to Johan Wagemans for the attention paid to this issue, and to Margarita  
139 Cuevas, to whose commitment the issue owes much of its external dress. I hope that its reading  
140 will be enjoyable, trigger the interest of both scientists and artists, and induce them to work  
141 together. A science of forms and their genesis in awareness is a challenge worth taking up on the  
142 grounds of the manifoldness of mind and the manifoldness of nature.

143

144 Liliana Albertazzi

145 Trento-Rovereto, April 2015, the kindest of months.

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