Morphologies in Nature and Art

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

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

The meaningful appearances of natural forms are incontrovertible primary ecological facts for humans and non-human living beings. The visual surfaces of natural forms are endowed with beauty and ugliness, desirability and repulsion, and are themselves intrinsically styled, expressive of a qualitative tone of their appearances (van Tonder, this issue). In arts, sensible forms are shaped, and able to retain and convey the informational, skeletal, emotional, imaginative, expressive and ecological value that they possess as experienced in nature: consider Klee’s Landschaftlich-physiognomisch (Scenic-physiognomic) (1931), Leidenschaftl. Pflanzen (Passionate plants) (1914), and Trauerblumen (Mourning flowers) (1917). Perception and art develop and rely on common patterns. Consider the curved back of the bison, the strokes that depict the scene of...
sacrifice, and even the undulating line of dots that memorizes the path of fleeing antelope on cave walls of Cueva Remigia or the Western Cape in South Africa, or the smooth and gleaming curves of Canova’s Graces; the lanceolate and pure forms of Lilium, the ripples of desert dunes or the dome of Rhizostoma pulmo: entities taxonomically very distant from each other, but visually so close and intertwined that they share the same form (Pierantoni, 1999).

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

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

I am aware of the basic “Romantic” flavor of the viewpoint, based on a Goethian idea of a multimodal nature that shapes itself in a variety of patterns with a common origin in form primitives (Goethe, 1790; Coen 2001); and whose syntax is indissolubly imbued with meaning, and whose core concept is marvelously rendered in Otto Runge’s *Die Genien auf der Lichtlilie* (Spirits on the light-lily, better known as Lily of the light and morning star) (1809). However, I think that a
turn towards an experimental phenomenology (Albertazzi 2013a) may be closer to an ecological theory of perception than we have ever had in science: a science of qualities per se where the beautiful retains its basic biological and aesthetical value (Rothenberg, this issue, and 2011).

The issue, as mentioned, comprises a series of studies, both experimental and systematic, on the homology between forms in art and nature, as revealed by the genesis of their multifarious appearances (i.e. figuration, Gestaltung) in perceptual awareness.

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

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

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

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

Jan J. Koenderink presents a systematic study on the part–whole relation in visual awareness applied to the structure of the works of art. His negative conclusions about the possibility to draw a formal mereology of works of art are based on a discussion of the subjective, different and parallel pictorial worlds, between which both the artist’ and the painter’ eyes fluctuate.
Baingio Pinna and Katya Deiana present an experimental study with children on the syntactic relation between shape and color. Their results show that shape and color are organized in sequential order, and that the shape is hierarchically prior and the core reference for color, what gives an insight into the language of vision and the implications for art and biology.

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

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

Liliana Albertazzi
Trento-Rovereto, April 2015, the kindest of months.

References


