Iconicity and Mimicry: A Philological Excursus

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Abstract

Iconicity and mimicry represent two distinct but related fields in semiotic studies. Academic history shows both fields have crossed the border between Nature and Culture and have thus blurred the distinction of the two domains in certain aspects. In terms of etymology and history of ideas, both terms are traceable to classical antiquity: one to Plato, the other to Aristotle. In modern research history, iconicity and mimicry have curiously converged in Peirce. For all their supposedly close relationship, the two areas have rarely crisscrossed and to date there has not been sufficient attention paid to “iconicity in mimicry” or “mimicry as icon”—except in biosemiotic studies, probably because of the empirical visibility, transparency and hence self-evidence of their identification. As to the fledgling applied science of biomimetics, for all its enviable achievements in engineering and industry, researchers in the field have shown little interest in the conceptual history of mimicry, let alone that of iconicity. The pages that follow will offer a philological excursus, which hopes to bring Peirce into rapport with Plato, and link current “biomimicry” to its classical prototype in Aristotle’s writings on animals.

Keywords: Plato, Aristotle, Peirce, Thom, iconicity, mimesis, mimicry, biomimetics

1. From “Eikon” to Iconicity

It has often been suggested that the concept of iconicity goes back to classical mimesis (Eco, 1984; Sebeok, 1976; Bouissac, 1986; Thom, 1983), but the locus classicus has never been identified, nor has the Platonic legacy in Peircean iconicity been clarified. Philology witnesses the equivocal junction of two Attican words, “icon” and “mimesis”, as the following pages will demonstrate. Despite the word’s ancient history, the OED attributes the first instance of “icon” to Peirce. The OED equates the word “mimicry” to “mimesis” and in fact refers to biological “mimicry” as one of the definitions of “mimesis” (OED online 2016). Whilst Aristotle gave a full account of mimesis as dynamics (dynamis)
in nature (physis) and culture (techne), it was Plato who initiated the idea of eikastike (icon-or likeness-making) as mimicry [Sophist 235d]. Plato uses two pairs of words: what “εικον [eikon]” (likeness) is to “φαντασμα [phantasma]” is “εικαστικη [eikastike]” (likeness-making [235d]) to “φανταστικη” [phantastike] (semblance-making [236c]), and he takes “likeness-making” to be part of “μιμητικης” [mimetikes] (“imitation”): “And the part of imitation which is concerned with such things [likenesses], is to be called, as we called it before, likeness-making?” (236b). The four terms enter into a homology where

\[ eikon : phantasma :: eikastike : phantastike \]

In other words, icons come into being because of the act of icon-making, an act that involves the bio-physical dynamics in physis and techne, which amounts to indexization and is essential to indexicality. The homology can be recast in Peircean terms as follows:

<table>
<thead>
<tr>
<th>ICON</th>
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<td>eikon (likeness)</td>
<td>eikastike (likeness making)</td>
</tr>
<tr>
<td>phantasma (semblance)</td>
<td>phantastike (semblance making)</td>
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It has been suggested that Quintilian (circa. 35-100) rendered “φαντασιαι” into an existing Latin word “visiones”, rather than transliterating it into “phantasii”: “What the Greeks call φαντασιαι [phantasiai], we call visiones, images [quas imagines] by which the representations of absent objects are so distinctly represented to the mind that we seem to see them with our eyes and to have them before us.” (Quintilian, 1921, 6.2.29-30; Watson, 1988, p. 68. Translation modified). Through a linguistic and conceptual shift, if not by accident, “phantasma” was to be substituted by the Latinate “imaginatio”, and eventually gave way to the French and English word/concept of “imagination”, which nonetheless retains the original Platonic sense of “image” (εἴδωλον [eidolon]) created by “fantasy” (The Sophist, 240a), regardless of the word image’s non-Greek etymon.1

In all the English versions of the Sophist the word “εικον” is translated into “likeness”, not “icon”. And what’s more strange, in the OED we find the exchangeability among “likeness”, “semblance”, and “resemblance”, and half a dozen other synonyms, such as “image”, “appearance”, or even “apparition” and “vision”, but curiously, not “icon”. Nor, conversely, do the words “likeness” and “semblance” appear under the entry of “icon”. Interestingly enough, under the entry of “icon”, the OED gives three earliest instances of the word, two of which refer to Peirce 1914, the third one indirectly to Peirce via R.B. Braithwaite’s review of CP in 1934.

\[ a 1914 \text{ C. S. PEIRCE Coll. Papers (1931) I. III. iii. 195 ‘It has been found that there are three kinds of signs which are all indispensable in all reasoning; the first is the diagrammatic sign or icon, which exhibits a similarity or analogy to the subject of discourse.’} \]
There may be a mere relation of reason between the sign and the thing signified; in that case, the sign is an *icon*.

An *icon* is a sign which represents its object by virtue of having some character in common with the object: the colour of a colour-card as representing the colour of the object which it resembles is an *icon*, and a map as representing spatial relations is an *icon*.

Like “icon”, the word “iconicity” is also attributable to Peirce. According to the *OED*, “iconicity” [f. ICONIC a. + -ITY.] appeared as late as 1946, and was first used by Charles Morris. But for those of us familiar with the history of our discipline, Morris’ coinage was a derivative from Peirce’s “icon”. The root of “iconicity” goes back to Latin and eventually, as we have said, to the Greek “εἰκόν” (*eikon*), which stood for all kinds of statues and images, as it was used by Plato in the *Sophist* and the *Theaetetus*. If the *OED* can claim any authority, then it is in terms of “icon” that we see a distinct contribution of Peirce to the English language.²

The etymology from the *OED* enables us to draw a preliminary conclusion regarding the process from “icon” to “iconicity”. It marks the development from a common noun that refers to a particular concrete object—icon as sinsign—to an abstract noun which represents a more abstract but universal quality—a qualisign cum legisign. “Iconicity”, then, refers to the correspondence between representamen and object (via interpretant), with Saussure, *signifiant* and *signifié*, or with Hjelmslev, expression and content. In Platonic and Aristotelian parlance, it can be regarded as an instance of mimesis, as the *Sophist* 236b shows.

For all his admiration of Aristotle and his interest in syllogistic logic, Peirce rarely refers to “mimesis”, but on various occasions he does touch upon the biological phenomenon of ‘mimicry”. His assertion that “A piece of mimicry may be an auditory icon.” (*EP* 2: 13) is not an isolated incident. A notable example is his discussion of the zebra’s “resemblance” of donkey in the famous essay “What Is a Sign?” in which Peirce comments on photographic iconicity (*CP* 2.281, 285; *EP* 2: 5). Needless to say, he was by no means aware of evolutionary mimicry—let alone molecular mimicry—when coupling the two animals.

“[…][I]f I surmise that zebras are likely to be obstinate, or otherwise disagreeable animals, because they seem to have a general resemblance to donkeys, and donkeys are self-willed. Here the donkey serves precisely as a probable likeness of the zebra. It is true we suppose that resemblance has a physical cause in heredity; but then, this hereditary affinity is itself only as inference from the likeness between the two animals, and we have not (as in the case of the photograph) any independent knowledge of the circumstances of the production of the two species.” (“What Is a Sign?”, *EP* 2: 6)
The quote does not inquire into the hereditary information of genotype through observation of phenotype. Nor does it explore into evolutionary mimicry because neither the zebra nor the “donkey” mimics each other even though Grevy’s zebra (*Equus grevyi*) does resemble a donkey or mule with its long and narrow head. If there is “mimicry” in zebra, it’s more likely for “camouflage” (Forbes, 2009). Peirce’s Victorian contemporaries, zoologist Walter Second Baron de Rothschild (1868-1937) for one, were fascinated by zebras, so his citing zebras might not have been a coincidence. In all likelihood, Peirce has subscribed to the trendy Victorian discourse of natural history, including the many myths shrouding the mysterious zebra, as evidenced by the copious secondary literature. More relevantly, within the context, the quotation shows Peirce’s argument of the passage of iconicity (likeness of the two animals) to indexicality (inference to hereditary information).

The rise (or revival) of “iconicity” as a research domain in linguistics over the past three decades is over-determined, but by a curious quirk of fate, it has been attributed to the non-linguist Peirce. As is well known now, Roman Jakobson’s delimiting the Saussurian “arbitrariness of the sign” through the principle of equivalence among all the linguistic features has contributed to the reinstatement of iconicity (See, for instance, Joseph, 2000, esp. ch. 6), but the main driving force of its revival beyond linguistics remains Peirce. Unlike Saussure, Peirce takes icon to be one type [the first type] of sign which enters into logical [generative and dialectic] relationships with the other two types, i.e., index and symbol. Underlying the above triad are other logical-semantic and pragmatic triads (e.g., quasign and legisign in one, rheme and dicent in another), none of which, insists Peirce, can be reduced to dyads, as Jakobson is to argue later in his laudable attempt at reconciling dyads and triads.

Because of its simplistic equation, i.e., “*aliquid stat pro aliquo*”, and its “apparent transparency”, icon is said to have less force in semiosis, and has been held suspect by quite a few semioticians (Eco, 1972, 1984; Sebeok, 1976; Bouissac, 1986). Their position can be aptly expressed by Barthes in his query: “[C]an an analogical representation (the ‘copy’) produce true systems of signs …?” (Barthes, 1977, p. 32). However, with Peirce, one could say that the conceptual entities which constitute the typology of icon, index and symbol are mutually implicated under interpretative constraints. Besides, system-specificity and pragmatics lay another level of constraint on the triad of representamen, object and interpretant, all of which are intrinsic to the sign in the first place rather than extrinsic to it. Take, for example, the relationship between the representational icon (A ≡ B) and the inferential index (A→B). In the afore-cited essay on signs, Peirce cites photographs as icons, which “are in certain respects exactly like the objects they represent.” Here the relationship of “likeness” between photographs and their objects is made possible by physical circumstances, i.e., by virtue of their relationship being indexical. Thus Peirce comments: “[T]his resemblance is due to the photographs having been produced under such circumstances that they were physically forced to correspond point by point to nature.” (*Ibid.*)

Because of over-determination, any attempt to trace Peirce’s enormous influence
on iconicity is bound to fail. Therefore, I shall focus on one adherent of Peirce’s only, namely, the late French mathematician René Thom (1923-2002). Drawing on the Peircean argument, Thom (1983) provides the material and formal conditions in icon-formation which involves the more refined four-term Hjelmslevian functives of expression/content plus form/substance rather than the Saussurian linguistic dyad of *signifiant* / *signifié*. He has taken a cue from Peirce to elaborate on the semiosis of photography. To him, a simple image, the shadow, which in appearance is an icon, is in fact a product of indexization:

In order that a shadow may form, the model must be illuminated by a luminous source approximating to a point. The light issuing from the source first touches the model [and] then outline the shadow . . . If the shadow is thrown not on to an insensitive screen but on to a sensitive photographic plate, the image will be able to be fixed for all time, thanks to the competence of the system. (Thom, 1983)

Due to its content’s “salience” and “pregnance”, the photograph can be transformed and elevated to the symbolic due to further human tampering (Thom, 1990). Thom alludes to Claire Lejeune’s photographic experiments in degradation by sunlight treatment which turns photography to art. He uses a pair of two-way arrows to stand for the extended, i.e., “non-linguistic” Saussurian sign-functives: *signifiant* $\leftarrow\rightarrow$ *signifié*, thereby suggesting not only the reciprocal relation between model and image in iconic and indexical signs, but also the possibility of their development to symbolic signs. This seems sufficient to undermine Umberto Eco’s critique of mirror image or photograph as sign for its lack of semiosic function and poverty in deductive reasoning (Eco, 1976, 1984). But with Thom, there is causality between the model, e.g., “man”, and its image, as well as a “coupling” if the relationship is reversible. This basic biological efficacy makes otherwise culture-specific iconicity motivated.

At this juncture, if we were forced to defend iconicity against the critique of cultural relativism, we could cite Paul Bouissac. In his contribution to one of the many *Festschriften* dedicated to Thomas A. Sebeok (1986), Bouissac comments:

> [W]hat was considered as pertaining to biological universals is transformed by a sleight of hand … into an instance of social convention … Thus, the biological nature of those iconic signs which were supposed to be phylogenetically, and possibly ontogenetically, anterior to arbitrary signs, becomes dissolved into the realms of social contracts, arbitrary conventions….
> (Bouissac, 1986, p. 198)

The statement sounds balanced, but one may have reservation about Bouissac’s postulating *a priori* biological categories precisely because of the evolutionary nature of phylogeny and ontogeny. As Thom observes in a different context, “the human psychic structure has changed over the course of time … and all epistemology … must take into account the effect of evolutionary transformations …” (Thom, 1990, p. 1).
Lest we get sucked into the quagmire-like contention of naturalism versus conventionalism, initiated by none other than Plato in the *Cratylus*, let me make a few preliminary, albeit eventually eclectic, observations before moving on to biomimicry. Firstly, the motivated relationship between expression and content cannot be theoretically established as universal; it’s *a posteriori* rather than *a priori*, and iconicity as convention, if any, has to be culture-specific, i.e., phylogenetically specific. Secondly, the commonsensical basis of iconicity that “seeing is believing” is not biologically true, as I shall demonstrate later, and perceptual resemblance (or likeness) cannot pass the test of cognitive science. And thirdly, the rapid growth of neuro-science and genetics after the 1970s has rendered a major blow to the empiricist concept of verisimilitude, but at the same time has opened up new horizons of iconicity studies, e.g. molecular mimicry.

So what’s next to “seeing is not believing”? If visual perception is deceptive, and “seeing is believing” remains a cognitive fallacy, what does it mean when one says “they look alike” when in fact “they don’t look alike”? Or does the “image” (*pace* Thom) perceive that it does “look” like the “model” it mimics? Or is it capable of perceiving at all? Take the octopus and flat fish slides released by BBC Nature for example (Figs. 1 and 2).

**Fig. 1** Talented octopus dupes predators by impersonating fish, by Pamela Rutherford, Reporter, BBC News

![Fig. 1](image1.jpg)

**Fig. 2** Fish disguised as copycat octopus (06+01+2012 BBC Nature)

![Fig. 2](image2.jpg)
Whereas a “talented” octopus would dupe its predators by impersonating fish, a clever fish can disguise itself as copycat octopus. Who’s imitating who(m) and who’s afraid of who(m)? Even in the case of humans, the prior to mirror-stage infant does not know it’s mimicking its dad. An extreme case would be: Do molecules from dissimilar genes “see” and “know” that they mimic one another to present similar structures? Alternatively, the questions boil down to: Whose iconicity are we talking about? and who’s deceiving who(m)?

Let me return to the zebra’s camouflage photo. The vertical striping may help the zebra to hide in grass. This may seem absurd at first glance, because grass is neither white nor black, but it is supposed to be effective against the zebra’s main predator, the lion, which is said to be colour-blind. In addition, even at moderate distances, the striking striping merges to an apparent grey. Don’t lions as predators rely more on other senses, e.g., olfactory sense, than visual perception? So there is a possibility of clash in perception between humans and lions because it is humans that produce signs as models of interpretation, and it is what Karl Popper terms (notoriously misleading, I would say) world-3 knowledge (i.e., of libraries and laboratories) that enables naturalists to infer from their perceived iconicity—wonderfully performed in alternation by the octopus and the flat fish—that there is a semiotic exchange of values between “models” and “images”. This applies to all kinds of biological mimicry, Batesian, Müllerian, behavioural, evasive, facultative, sexual, intraspecific, etc.

2. From “Mimesis” to Biomimetics

As with “icon”, we ought to take another philological excursion to “mimicry” before returning to the scientific advances of our time. We already mentioned it in passing. The word “mimicry” is traceable to a better known word “mimesis”, as in Books 2, 3 and 10 of Plato’s Republic, and throughout the Aristotelian corpus. In the Sophist, Plato has Socrates say: “When someone uses his own person or voice to counterfeit your traits or speech, the proper name for creating such a semblance is, I take it, mimicry [μίμησις {mimesis}].” (267a). Note the Loeb translator Harold Fowler has chosen to use the English “mimicry” rather than “imitation” to render “μίμησις”, given the fact that as a meta-language user, the translator could not have simply Latinized “μίμησις” as “mimesis” because that would have amounted to repeating the object-language, i.e., without doing his transcoding job properly. The fifth century BCE Attican word “μίμησις”, which was transcribed to the Roman alphabet in the second and third centuries, has been translated into the Latinate “imitation” and widely used in philosophy and literary criticism after the Renaissance. The original “mimesis”, with its three other variants according to the OED, had already entered the language in the sixteenth century and has gained considerable currency ever since. As a result, “mimesis” is now being used at the expense of “imitation” in poetics probably because of the latter’s pejorative connotation of “lacking originality”.

The quotation from Plato above suggests that “mimesis” can be retroactively translated as “mimicry”, depending on the context. In addition to imitation in art and
literature, the *OED* has given two other definitions of “mimesis”, respectively in sociology and biology, dating back to 1671 and 1814.

In *Biol.* = mimicry n.2. Also: imitative behaviour of one species by another.

In *Sociol.* The deliberate imitation of the behaviour of one group of people by another (usually less advantaged) as a factor in social change.

The “biological” definition suits perfectly well the counter-mutualism of octopus and flat fish, and the sociological (in fact, cum biological) definition adequately explains much of the post-colonial discourse. Back to history, the very root of “mimesis” can be traced to the fifth century BCE, but its origin remains obscure. One interpretation of the stem “mime”, which has eventually christened the classical theory of “mimesis”, the phenomenon of molecular “mimicry”, and the scientific “biomimetics”, suggests that it was an imitative word, a human mimicry of the bull’s “mooing” sound, “mimoi” (cf. Lucas, 1968), uttered in Dionysiac dithyrambs, the precursor of Attican tragedies. Thus the word’s journey has come full circle, from Nature to Culture and back to Nature again.

Talking about border-crossing between Nature and Culture, I suppose it’s time now to brief on versions of “mimicry” in bio-engineering today. We shall be able to see from remotely “post”-Aristotelian *techne* of “biomimetics” (1970) to the linguistically redundant “biomimicry” (1982), both words having been admitted to the *OED* as late as 2007. The word “biomimetics” is defined therein as “[t]he development and use of biomimetic materials, methods, etc.; the branch of science concerned with this”. Three examples are given:

1970 *Brain Res.* 19 1 These advanced scientific concepts of brain function early influenced the engineering development of the digital computer; an example of ‘bionics’ or to use the term McCulloch preferred ‘biomimetics’.

1985 *Fortune* 27 May 60/3 The new science of biomimetics … seeks to incorporate what has been learned from enzymes into man-made catalysts.

2001 R. W. Cahn *Coming of Materials Sci.* xi. 427 Biomimetics seems to have begun as a study of strong and tough materials (skeletons, defensive starfish spines, mollusc shells) in order to mimic their microstructure in man-made materials.

Meanwhile the dictionary refers “biomimicry” to the earlier word “biomimetics”, but defines “biomimicry” as “[t]he design and production of materials, structures, and systems that are modelled on biological entities and processes”, as in the following sentence.

1982 *Inorganica Chimica Acta* 62 1/1 “The successful synthesis of homo- and heteronuclear metal complexes which have found application in the area of biomimicry.”
Obviously the two terms have been used in alternation or interchangeably and their usage has given rise to some confusion. Suffice it to cite two examples from two recent books, one on molecular biomimetics, the other on architectural biomimetics. Raz Jelinek, author of the first book, queries:

How one is to define ‘Biomimetics’? The term was likely coined by Janine Benyus in her 1997 book Biomimicry: Innovation Inspired by Nature. Biomimicry (from *bios*, meaning life, and *mimesis*, meaning to imitate) has been generally defined as ‘the examination of nature, its models, systems, processes, and elements to emulate or take inspiration from in order to solve human problems.’ (Jelinek, 2013, p. 1)

The author alternates between “biomimetics” and “biomimicry” but settles in “biomimetics” for the title of his book. About the same time, a new book on “building [architectural] biomimetics” has noted the two terms’ confusion and one of the co-authors, Göran Pohl, who is responsible for chapter 1, feels the need for clarification.

Recently, a different terminology has been found: ‘BIOMIMICRY’, which literally means the ‘imitation of life’ and does not match the goal of this book. ‘BIOMIMETICS’ is the more recent terminology and is professionally accepted. For this reason this term will be used in this book. (Pohl & Nachtigall, 2015, p. 1)

If one compares the authors’ “philologies” with the *OED* entries cited above, one would say that the two books’ three authors have not done proper dictionary research though such a usage matter is only secondary, if not trifling, in science textbooks. First, Janine Benyus could not have coined the word “biomimicry” in 1997 because it had been already in use as early as 1982. That her book is pioneering and popular and has contributed to the rapid development of biomimetics (“biomimicry” to her) on a global scale is another matter (Benyus, 2002). Second, the *OED* tells us that “biomimetics” is in fact an older form of “biomimicry”. Finally, apart from Benyus’ own sustainable projects here and there, the older form is now universally used. I suspect the reason can be quite simple: “biomimetics” sounds more like a science than a natural phenomenon.\(^3\)

Let’s examine the joint authors’ definition for their 2015 book on building biomimetics.

Biomimetics is not the mere imitation of nature, neither in material and functional nor in creative regard, rather the grasping of natural principles to aid in the comprehension of analogous, technological questions, which could then be solved by the applications of optimized technologies. (Pohl & Nachtigall, *Ibid.*)

The definition has in fact ruled out the immediately visible identification of the model and its imitator because both the model system in Nature (*φύσις* [*physis*]) and the imitating system of Culture (that is “technology” or “téχνη” [*techne*] in Greek) have to undergo
complex processes of abstraction and interpretation. These have made primitive versions of correspondence-based iconicity obsolete and irrelevant.

In the four cases I have come across the only constant element is the dubious word dear to us semioticians, namely, “relation”, or simply put, “correspondence”, between animal models and their technological mimics’, but how they are construed to “correspond” makes all the difference. The cases I read include: (1) the correspondence between termites’ mounds and high-rise buildings in terms of thermoregulatory ventilation system (Pohl & Nachtigall, 2015, pp. 254-255); (2) the correspondence between kingfisher’s beak and the Japanese bullet train’s nosecone in terms of sudden change in air resistance (Fig. 3) (Kobayashi, 2005); (3) the correspondence between gecko’s feet pad hair and the microfabricated adhesive tape (Geim et al., 2003; Knight, 2003); and (4) the correspondence between human olfactory faculty and the electronic nose (Fig. 4) (Jelinek, 2013, pp. 232-234). One could say that in each case, mediating the model and its mimic is a quale, in fact, a network of qualia, to wit, “temperature consistence” in (1), “high/low air resistance” in (2), “a formidable adhesion of $\approx 10 \text{ N cm}^{-2}$” in (3), and “receptor and sensor arrays comprising chemical molecules” in (4). To say that there is a functional quale mediating both sides is stupendous simplification of the matter. Once the transformations are done, there is hardly any iconicity or mimicry existing between the biological and technological entities.

Fig. 3 The bullet train’s nosecone is modelled on the kingfisher’s beak to resist sudden air pressure change. Here the model and its mimic are visibly “iconic”. (Jaymi Heimbuch, Treehugger: Driving Sustainability Mainstream, January 9, 2009)
The picture of the electronic nose in Fig. 4 is a good illustration against visual iconicity: the model olfactory process and the mimicking machine’s operation may overlap in a number of ways, e.g., serving the receptor’s and sensor’s functions, but they don’t look (or smell) alike. On the left-hand side of the picture, there is a conventionally acceptable icon of human head, which is intended to “represent” the physiology of smell, and on the right-hand side is supposedly an “icon” of the e-nose, which mimics its model on the left, not in shape but in process. The left half displays how odors interact with receptor arrays in the olfactory bulb, and how the signal patterns are then analyzed in the brain which “matches” the pattern with known smells. In the e-nose “icon” on the right, the tested vapor interacts with a sensor array comprising different chemical molecules, and the produced patterns are analyzed using computer algorithms to identify the vapor molecules.

A few comments can be made on the photo regarding iconicity. First of all, neither side’s picture is iconic—not even the human head on the left, let alone the machine on the right mimicking its biological model. The sketch of a side-view human head is at most a make-shift device in “representing” the otherwise invisible and un-representable brain’s processing of smell molecules. Then, secondly, the two pictures don’t look alike. Their functions may overlap only to a limited degree, as the author Jelinek rightly observes. “[D]espite the great interest in the e-nose sensing concept since the early 1980s, this field has disappointed due to problems with reproducibility, specificity, sensitivity, and ‘sensor training’, which have confined these types of sensors to specialized applications.” (Jelinek, 2013, p. 234). Thirdly—and this is more relevant to us visual semioticians, given the fact that both pictures are already “representations”, the truth-claim of their iconicity is greatly compromised, and we are thus once again thrown into that vicious circle of *mise-en-abîme* and are forced to suspend our judgement. This point is no doubt out of the question in biomimetics. Finally, in a strong sense, the relation between model and mimic is no more than an initial psychological phenomenon called “bioinspiration”, and there is a long distance to travel from there to biomimetics.

Fig. 4 The olfactory system (left) and the electronic nose concept (right) (Jelinek, 2013, p. 233)
The joint authors of the architecture book wisely warn his readers against the naïve mind-set: “[O]ne must be cautious when translating inspirations from the living world to the world of technology …; a direct copy never leads to the goal. However, when the architect or engineer grasps a fundamental idea from nature …, these inspirations can contribute to … their biomimetic applications in the engineering sciences.” (Pohl & Nachtigall, 2015, p. 7)

3. Concluding Remarks

There is a cognitive fallacy in the simplistic concept of iconicity: that the model and its mimicry remain static, three-dimensional end-products. Building biomimetics, for example, is concerned with the dynamics of “structuration” and “processing”, so is the artificial biomimicry of electronic nose. As such, they are unwittingly closer to Aristotle’s idea of mimesis as techne. In his Meteorology the Philosopher has this to say regarding cooking—a phenomenon relevant to the trades of both architects and e-nose technicians concerned with kitchens’ ventilation: “Now broiling and boiling are artificial processes, but the same general kind of thing, as we said, is found in nature too. The affections produced are similar though they lack a name; for art imitates nature.” [Meteorology, Book 4, Ch. 3, 381b6. My emphasis.] The italicized phrase here is among the most famous statements of Aristotle’s though, unfortunately, it should have appeared in Poetics rather than Meteorology. Incidentally, the standard Oxford translation by E. W. Webster quoted above is a bit misleading for his rendition of “τέχνη” as “art” may beguile the reader into inputting our narrow sense of “fine arts”, whereas in Greek it refers to any cultural activity as process rather than product, indeed anything artificial, cooking for one, building for another. Therefore, I believe the Loeb translator Lee’s option “human operations imitate natural” is a much better translation of “μιμεῖται γὰρ ἡ τέχνη τὴν φύσιν”. This leads us across the millennia to the contemporary scene of biomimetics—a techne unforeseen by Aristotle but not entirely incompatible with his concept of mimesis.

Notes
1 Roland Barthes traces this non-Greek word to its Proto-Indo-European etymon “imitari” (Barthes, 1977, p. 32).
2 As I have discussed the issue in considerable length elsewhere (Chang, 2012), there is no point of repeating myself here. The following is an excerpt. In the Sophist, a dialogue on the myth and truth of the sophists’ profession, the mysterious “stranger” makes the famous distinction between eikon (likeness) and phantasma (semblance) (236a,b). Of these two terms, eikon has been more uniformly translated into “likeness” rather than transliterated as “icon”, but the case of phantasma is more complicated in that it has been variously rendered as “semblance”, “appearance”, “apparition”, the French “apparence” by Jean-Pierre Vernant (Vernant, 1991), and “simulacra-phantasms” following Marsilio Ficino’s “phantastica simulachra” in the fifteenth century (Allen, 1989). Judging from the English equivalents, there seems to be little problem
with “eikon” as likeness, but the ambiguous and polyvalent “phantasma” may give rise to a considerable Tower of Babel. The larger variety in rendition manifests itself in the introduction of Latinate words, “image” and “simulacra”, the coinage of Greek-Latin compounds, “icon-copies” and “simulacra-phantasms”, the invocation of philosophical concept, like “appearance”, or mystical and supernatural overtone, like “apparition”. All these incidents bear witness to the trans-lingual phenomenon of semantic shifting. They also indicate the curious fortune of the word and its changing shape throughout history, from Plotinus through Augustine, from Quintilian through Ficino, and finally, to the Romantics where the classical concept of mimesis was to be superseded by (in fact, “equated to”) imagination.

As to Peirce’s usage, anyone that knows some Peirce would agree that “likeness” and “resemblance” are two variants of his more extensively used “icon”; other synonyms include the less used “semblance”. In the Collected Papers, “semblance” appears 8 times, “likeness” 34 times, “resemblance” 87 times, and finally “icon” 99 times. There is an interpretation that Peirce uses “likeness” in early writings, and “icons” in later ones. Given the high frequency, one could easily cite over a hundred cross-references pointing to the identification of the terms.

Peirce’s link to the Sophist is also well documented. To the inaugurating issue of Journal of Speculative Philosophy in 1867 (EP 1: 250-56), Peirce contributed an article entitled “Paul Janet and Hegel” by W.T. Harris.” He comments on Hegel’s discussion of Being and Not-Being in the German philosopher’s Logik und Metaphysik as “not widely different from that of Gorgias, as given us by Sextus Empiricus, nor from that of Plato in the Sophist.” (WCSP 2, 140). An entry on individuum in Dictionary of Philosophy and Psychology (1911) is annotated as a Latin translation of ἀτομον from Plato’s Sophistes (CP 3.611). In addition to a few random references to the Sophist by Peirce, the Collected Papers (6.349-52) records a dialogue between C.S.P. and a certain person called the Velian. This short dialogue is reminiscent of the Sophist in its discussion of the afore-mentioned Being and Not-Being, an ontological paradox begun by the Eleatic Canon of Parmenides (Seligman, 1974). One of the two interlocutors is named “C.S.P.”, presumably a dramatis persona of the historical “Charles Sanders Peirce”, but the identity of the other interlocutor, the Velian, is rather puzzling. The editors Charles Hartshorne and Paul Weiss provide an annotation in the footnote:

§§7 and 8 form a digression in ch. 4 of the Minute Logic (1902-3). The Velian is the stranger of Plato’s Sophist, a dialogue which Peirce characterizes in the preceding, unpublished portion of the manuscript (see 1.584n) as being purely a logical dialogue with all Hegel’s faults and more than a glimmer of Hegel’s merit. The present section is part of an attempt to give the Velian stranger a little dose of his own cathartic.

We are informed here that Peirce did not attach much importance to the Sophist, but why did he bother to write a dialogue as rejoinder? As far as I can tell, the relationship between these two texts in terms of iconicity, i.e., both in subject matter and reflexively in form, or one may say, in signifié and signifiant, has not attracted serious critical attention. If, as Peirce says, echoing the Sophist 263e, “All thinking is dialogic in form. Your self of one instant appeals to your deeper self for his assent. Consequently, all thinking is conducted in signs that are
mainly of the same general structure as words,” (CP 6.338), this little dialogue will occupy a prominent position in his voluminous writings on signs. (Chang, 2012)

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References


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