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Naturalizing Symbols?

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Abstract: The paper's main goal is to draw attention to a reductionist strategy prompted by Jerry Fodor's work on the problem of human intentionality, and to suggest that said strategy could profitably be adopted to provide a naturalistic explanation of Peircean symbols. In the course of doing so, we consider two interesting semiotic approaches to this phenomenon due to René Thom and to Marcello Barbieri respectively, and we try to show that they both fall short of meeting two basic epistemological desiderata. In order to exemplify the kind of alternative strategy that we have in mind, we then sketch a toy model of our ability to use words and sentences, and we argue that, in spite of its manifest current limits, it could represent a useful starting point for the much broader challenge of naturalizing symbols.

Keywords: Symbol, naturalization, Fodor, intentionality, Biosemiotics, Semiophysics

1. Introduction

One of the stated goals of Thomas L. Short's extensive study of Peirce's theory of signs[1] was to highlight the largely neglected relevance of Peirce's thought to contemporary analytic philosophy. Although admittedly much less ambitious in scope, the following considerations intend to proceed in the opposite direction. Our main goal is that of bringing the fundamental theoretical challenge underlying a long-standing debate in the analytic philosophy of mind – i.e., that of developing a naturalistic account of intentionality in general, and of mental content in particular – to bear on current semiotic investigations targeting the Peircean notion of *symbol*. The plan is as follows. In the next section we will briefly outline the philosophical program usually referred to as the naturalization of intentionality, and we will clarify what we take to be its main desiderata. Section 3 will then argue that the human ability to interpret and manipulate symbols falls squarely within this program, and a theoretically satisfactory treatment thereof should hence be expected to meet those same standards. In section 4 we will briefly consider two fascinating semiotic approaches to the matter developed by René Thom, and by Marcello Barbieri respectively, and we will argue that, in our view, they both fall short on the above desiderata. In section 5 we will sketch and assess an alternative approach which – while of course facing problems of its own – we are inclined to regard as generally more promising from an explanatory point of view. The approach is reductionist in nature, and it draws on Jerry Fodor's Asymmetric Dependence Theory, whose explanatory resources, we think, may valuably contribute to deepen our understanding of human semiotic activity. The last section will then sum up our considerations and draw some general conclusions.

2. A Mental Cake out of Natural Ingredients

At the end of the Nineteenth century, Franz Brentano famously held, and forcefully argued for the view that, in principle, no purely physical system can ever manifest

[1] See Short (2007).

intentionality[2]. For the sake of simplicity, let us agree on referring to this metaphysical stance as *Brentano's thesis*. Nowadays, as it is well known, philosophers of an empiricist bent typically hold that human beings are at bottom purely physical systems[3]. Again, for the sake of simplicity, let us agree on referring to this stance as *Physicalism*. Both Brentano, and most philosophers belonging to the latter camp have however found unquestionable that human beings do as a matter of fact undergo intentional mental states such as, e.g., hopes, beliefs, and desires – i.e., that they manifest intentionality. Accordingly, let us agree on calling this last stance *Intentional Realism*. Now consider the following triad of statements:

i. Human beings manifest intentionality (*Intentional Realism*)
ii. Purely physical systems cannot manifest intentionality (*Brentano's Thesis*)
iii. Human beings are entirely physical systems (*Physicalism*)

These three statements are jointly inconsistent – i.e., they cannot all be true at the same time. As a consequence, on pain of contradiction, one cannot at the same time be committed to all three of them. In order to resolve this inconsistency – while holding on to the common core of Intentional Realism – one must hence either disavow a physicalist ontology and argue, on various a priori grounds, that human beings are not just physical systems, or else discard Brentano's Thesis and argue, on various empirical grounds, that physical systems can – and, in fact, do – manifest intentionality.

The task of arguing for one or the other strategy outlined above is well beyond the limited scope of our present considerations. Hence, we will simply lay our cards on the table, and disclose from the outset that we strongly favor the second option. In our view, one of the fundamental challenges that any empirically informed philosophy of mind will be bound to face consists in pr oviding a plausible explanation – and thereby reaching a theoretically satisfactory understanding – of how purely physical beings such as ourselves could nevertheless be the bearers of contentful mental states that refer to things other than themselves – i.e., exhibit intentionality. The ultimate goal, then, as Fred Dretske evocatively put it, is to demonstrate that Brentano was wrong by showing how one can "bake a mental cake using only physical yeast and flour"[4]. Within the analytic tradition, this challenge has given rise to a lively and multifaceted research program usually, though somewhat vaguely, referred to as the *naturalization* of intentionality.

As a matter of fact, several different projects currently travel under this banner[5], not all of which we happen to find equally convincing. It will therefore be convenient for our present purposes to single out two very general epistemological desiderata that, in our view, any satisfactory attempt at resolving the tension between Physicalism (as characterized in statement 3 above) and Intentional Realism (statement 1) should be able to meet. The *first* one is captured by Dretske's picturesque quote above, and it consists in requiring of any convincing account of human intentionality that it only appeal to concepts and categories generally accepted in current natural science. The *second*, related desideratum is that the understanding fostered by such an account be model-based. Attempts at modeling the target phenomenon, in particular, should not

[2] Cf. Brentano (1874).
[3] Cf., e.g., Field (1978).
[4] Cf. Dretske (1981: xi).
[5] Cf., e.g., Dretske (1981), Millikan (1984), and Dennett (1987).

only prove descriptively adequate, but also exhibit predictive power – i.e., not only be empirically testable, but also, as it is usually put, counterfactuals supporting.

3. Interpreting Symbols

According to Peircean orthodoxy, the peculiar kind of representational relation called *signification* ought to be thought of as a three-place relation, as a *sign* would typically consist of three basic elements – i.e., a so-called *sign-vehicle* that does the signifying, an *object* that the vehicle refers to, and an *interpretant* that connects the two. Now a possible way of classifying signs, according to the official story, is based on the specific way in which they perform their signifying function – i.e., refer to their objects[6]. From this perspective, Peirce thought, all signs ideally fall into one of three distinct categories – i.e., *icons*, *indexes*, and *symbols*.

An *icon* or iconic representation will be able to refer to its object in virtue of one or more shared properties or, if you will, of some kind of similarity existing between the two. A map of Greece, for instance, will share with its signified object certain spatial or geometrical properties which allow it to be an iconic representation of this country. An *index* or indexical representation will instead refer to its signified object in virtue of some physical fact, such as, e.g., a causal connection holding between the two. Smoke, for instance, will naturally signal the presence of fire, and the same will be the case for a molehill signaling the presence of moles in our garden. Finally, a *symbol* or symbolic representation will only be able perform its proper function in virtue of some convention, law, or habit that allows an interpretant to connect it to its signified object. A blue and white striped flag, for instance, will symbolically represent a certain country – i.e., Greece – and the Italian word "uomo" will equally symbolically represent a male individual of a certain talkative primate – i.e., homo sapiens.

To be highly relevant for our present, naturalizing purposes is the fact that, contrary to symbols, the specific kinds of connections that icons and indexes have been seen to rely on in order to perform their respective signifying function seem clearly able to hold quite regardless of the presence of an interpretant such as an intentional being that does the connecting. Arguably, the spatial similarity holding between the shape of Greece and its physical representation on a map counts as a brute geometrical fact about these two objects. It should hence be possible, at least in principle, to explain icons by means of a purely causal story that connects Greece to its map. By the same token, most people would be willing to grant that causal connections amongst entities of various kinds held in our universe long before our talkative species evolved and was able to learn about them. In the case of indexes, then, the interpretant could be considered simply as a further link in an already existing causal chain.

In the case of symbols, however, this does not seem to be the case, as the connection between the sign-vehicle and its signified object, as we have seen, is largely arbitrary. A physical token of the English word "cow" – or the mental representation of a cow, for that matter – does not at all resemble a cow under any respect of similarity (e.g., visual, auditory, olfactory), and even if some causal connection ever existed between the two, that connection has likely gone lost in time. In any case, it is certainly no longer what allows todays English speakers to use the word "cow" in order to refer to or to think about cows[7]. As far as symbols are concerned, then, the kind of

[6] The "official story" is of course a bit more complex than this. For a systematic presentation of Peirce's combinatorial taxonomy of signs, and its many developments throughout his work, see Atkins (2022).

[7] This is the long-noticed arbitrariness of linguistic signs already acknowledged by Ferdinand de Saussure. Cf. Saussure (1916).

connection that allows a specific sign-vehicle to represent its object seems to require an intentional interpretant in order to exist at all – i.e., it seems that the sound "cow" could never refer to a cow if it weren't for the presence of an intentional agent that connects these two physical items. We take this to mean that the puzzling human ability to interpret and manipulate symbols – and its consequential ability to create and make use of natural languages – ought to be seen and treated as an inherently *intentional* phenomenon. For the same reason, we believe that attempts at providing a naturalistic account thereof fall clearly within the scope of the research program outlined in section 2, and should hence be expected to meet our two general epistemological desiderata. In the next section, we will briefly consider and assess two interesting semiotic approaches to the phenomenon at hand due to René Thom, and to Marcello Barbieri respectively.

4. Two Semiotic Approaches

Even with the best of intentions, one would be hard pressed to find a topic that the brilliant French mathematician René Thom did not write about. As it is well known, his late investigations into the problem of signification led to the development of *Semiophysiscs*[8], a research field that has been aptly characterized as an attempt "to bind physics and language through bold examples of isomorphisms between physical processes and those of linguistic significance … [and which considers] the process of signification as one of conflict and antagonism between different forces"[9]. Thom's thought on the matter can be traced back to Wolfgang Köhler's *Gestalttheorie*, and it is premised on the naturalistic assumption according to which the basic mechanisms out of which human symbolic abilities eventually evolved would already be present in early lifeforms as well as in inanimate matter. The key to understanding the origins and development of natural languages, in Thom's view, would indeed be to focus on the dynamic opposition between the (mathematically representable) continuities and discontinuities that characterize the physical world. Leaving details – and most technical terminology – aside, the gist of his model of human semiotic activity, as we understand it, seems to be the following.

Some patterns of external stimuli, according to Thom, would initially impinge on our sensory system more than others merely in virtue of their subjectively unexpected and objectively discontinuous character with respect to an otherwise undifferentiated and continuous background. The ensuing mental representations, once stored in our short-term memory, will constitute what he calls *saliencies* or salient forms. Most saliencies, however, will only temporarily occupy our limited attentional resources. As a consequence, they will fail to have long-term effects on our behavior and will soon fade out of our conscious mental life. It is only those salient forms that happen to be either biologically or socially relevant for us that will exert such longstanding effects on our behavior by shaping our motor and affective responses, and that will therefore be invested with relatively stable meanings. Thom refers to this second kind of mental representations by means of the technical term *pregnancies* (from the French: *prégnance*) or significant forms. According to his approach, then, the human ability to interpret and manipulate symbols that gives rise to natural languages would gradually emerge from the same interplay between saliencies and pregnancies which characterizes biological interactions in general.

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[8] Cf. Thom (1988). The following sketch of Thom's ideas draws mainly on the writings collected in Thom (2006).

[9] De Luca Picione & Freda (2016: 145-146).

A second approach that, in our opinion, clearly deserves a fair hearing has its roots in Marcello Barbieri's lifelong work in *Biosemiotics*[10]. Working in the tradition of Thomas Sebeok, Barbieri is actively committed to the idea that "life and semiosis are co-extensive"[11]. Differently from the latter and contrary to Peirce, however, he does not believe that all semiosis requires interpretation, a generalization to which, in his view, the behavior of cells would represent a valid counterexample. Indeed, in addition to an evolutionarily more recent kind of *interpretive semiosis*, he posits the existence of a more ancient form of *code semiosis* – i.e., "a form of semiosis that relies exclusively on coding"[12]. Code semiosis, according to Barbieri, would be made possible by the existence of *organic codes* – i.e., sets of arbitrary rules which establish a correspondence between the objects of two independent worlds[13]. The general idea would be that over and above the genetic code – following the rules of which cells are able to synthesize proteins by mapping a sequence of three nucleotides (the codon) onto a sequence of amino acids – there would also exist a plurality of different organic codes responsible for the mechanisms underlying many other biological processes. In particular, Barbieri holds that the main macroevolutionary steps that characterized the history of life on our planet – such as, e.g., the evolution of the first animals from populations of cells – would all be traceable to the appearance of new organic codes.

The last of those novelties, in his view, would be the development of a uniquely human faculty of language which, differently from other forms of animal communication, would make abundant use of symbols[14]. As it was the case with Thom, the details of Barbieri's model are rather complex, but the fundamental idea here is that the brain wiring processes responsible for the appearance of language – through the evolution of a new modeling system capable to make use symbols – would be based on organic codes whose function is, roughly, to select a particular kind of wiring out of countless other physical possibilities. According to him, then, the human ability to interpret and manipulate symbols, and its consequential ability to create and use natural languages, would be the consequence of organic codes in virtue of which our brains become capable of establishing arbitrary connections between signs and objects.

In our opinion, both approaches to the human symbolic activity considered in this section, while undeniably fascinating, fall short of the two epistemological desiderata introduced at the end of section 2. Thom's approach, by his own admission, is entirely descriptive in nature. It has the merit of developing insightful technical notions – such as, e.g., the *saliencies* vs. *pregnancies* distinction – by means of which we may be able to capture interesting subjective aspects of its target phenomenon, without however being able to provide an explanation of the latter in purely objective terms. As a consequence, the question of empirical testability or the ability to support counterfactuals does not even arise in his case and, to our eyes at least, this disqualifies his approach from counting as a genuine attempt at naturalizing symbols. Moving on to Barbieri's approach, one of our epistemological desiderata was that a satisfactory

[10] Cf. Barbieri (2003). The following sketch of Barbieri's ideas draws on Barbieri (2008, 2010, and 2017).
[11] Sebeok and Umiker-Sebeok (1992), quoted in Barbieri (2010: 202).
[12] Barbieri (2010: 206).
[13] What makes these rules – just as the rules of any code – "arbitrary", according to him, would be the fact that they "are not determined by the laws of physics and chemistry". Cf. Barbieri (2018: 6). In our view, this thesis is one of the aspects that make his approach rather speculative, and not fully naturalistic.
[14] This would be a second modelling system which followed the one we inherited from our animal ancestors, based on icons and indexes only.

account of human intentionality should only appeal to concepts and categories generally accepted in current natural science. Now, in spite of his truly admirable efforts, we are afraid that his notion of *organic codes*, while deeply thought-provoking, would not pass muster on this score. Our perplexity, in particular, comes from the fact that organic codes, far from being useful theoretical posits, would in his view be as real as chairs, electrons, and, well, cells! Moreover, even though this critique could be generalized to other approaches, we would like to respectfully suggest that there is something suspiciously question begging in premising an explanation of human semiotic activity on the assumption that "life and semiosis are co-extensive". By our standards, then, even Barbieri's empirically informed approach fails to represent a convincing naturalization strategy. To sum up, whereas Thom's approach fails to meet our first naturalization desideratum, Barbieri's fails to meet the second one. In the next section, we will consider an alternative approach whose general spirit we find more promising.

5. A Reductionist Approach

As we noticed at the end of section 3, in the case of both icons and indexes, the kind of connection between the sign-vehicle and its signified object does not strictly require the presence of an intentional interpretant in order to exist, as the connection in question seems to hold in virtue of objective facts such as geometrical similarities or causal links. As a consequence, it seems reasonable to expect that, at least in principle, a satisfactory theoretical understanding of these two kinds of representations should and will be possible within a broadly naturalistic framework – i.e., that we should in principle be able to explain both icons and indexes in terms of concepts and categories generally accepted in current natural science.

On the contrary, at first sight at least, it appears extremely difficult, if not downright impossible, to provide an equally satisfactory account of symbols in purely naturalistic terms. What makes this latter task seem so daunting, in particular, is the fact that in the case of symbols, as we have seen, the connection between the sign-vehicle and its signified object seems to inherently require an intentional interpretant in order to exist at all. The connection, in short, is not objective. On closer inspection, however, the challenge of providing a naturalistic explanation of symbols may not be altogether impossible to meet, or so we intend to argue.

A strategy worth exploring, we suggest, would consist in attempting to provide a reductionist explanation of symbols by modelling this kind of signs as representations whose connection to their signified objects – as it is the case with icons and indexes – does indeed hold in virtue of purely objective facts. In what follows, we will try to sketch the outline of the kind of model that we have in mind. In order to keep things simple, we will restrict our attention both to a particular class of symbols – i.e., words and sentences in a natural language – and to a particular class of intentional mental states – i.e., perceptual beliefs. The model we are looking for, in particular, should ideally provide us with one or more empirically testable sufficient conditions – i.e., conditions the obtaining of which would be sufficient to make it the case that, e.g., the word "cow" refers to cows and to cows only.

The first step in developing such a model will consist in identifying a suitable word-object connection that could provide the above conditions, and – to the extent that our approach is overtly reductionist – the natural place to look for such a relation will of course be icons and indexes. Let us hence begin from icons. In the case of iconic representations, as we already know, the sign-object connection may hold in virtue of an objective similarity of some kind – i.e., it is grounded on physical properties shared by the two relata. This relation, however, will obviously not give us what we want in

the case of symbols. Indeed, as we already noticed[15], utterances of the word "cow" do not at all resemble cows under any respect of similarity (e.g., visual, auditory, olfactory). It would hence be clearly wrong – indeed, ridiculous – to propose that utterances of "cow" refer to cows if they resemble cows!

Our next move could then be to consider the sign-object connection that has been seen to characterize indexical representations – i.e., causality. Indeed, given their hardly questionable objective nature, casual relations may certainly look promising at first sight. We could hence decide to take them onboard, and this would give us something like the following model:

CM. Alice's utterances of "cow" refer to cows if they are *caused* by cows.

On reflection, however, this simple causal model, while arguably on the right track, is still far from delivering the goods. The main problem with **CM** is that there happen to exist a plethora of things or events that are *not* cows – such as horses, pictures of cows, questions (e.g., "what is your favorite animal?"), blows to the head or even certain controlled recreational substances – but which nevertheless seem clearly sufficient to *cause* Alice's utterances of the word "cow". As a consequence, if, say, a horse seen by Alice at a distance on a dark night were to be mistaken for a cow and thereby cause her utterance of the word "cow", then, on **CM**, "cow" would refer to horses. Moreover, if this horse-caused utterance of "cow" were to be part of the sentence "there is a cow", then again, on **CM**, this sentence would have to be true – a clearly unwelcome consequence. The simple causal model, in other words, lacks the resources needed to take care of what the analytic literature on mental content refers to as the *problem of error*[16].

We mentioned above that, in spite of its ultimate inadequacy, **CM**'s idea of relying on causal relations to account for the reference of words (and the truth-conditions of sentences) seems to be on the right track. Causal relations, however, cannot do all the work. The problem of error can indeed be profitably seen as the problem of finding a principled way to separate reference-determining causes (cows in the case of "cow") from non-reference determining ones (horses, pictures, or blows to the head). In our view, one of the most ingenious attempts to solve this problem is due to Jerry Fodor[17]. Simplifying somewhat, the gist of Fodor's proposal is that the word "cow" refers to cows – or, if you will, that only cows count as reference-determining causes of "cow" – in virtue of a peculiar kind of relation holding amongst psychological laws. The basic idea, in a nutshell, is as follows.

Suppose it were a fact that visual appearances of cows under certain conditions are sufficient to cause Alice's utterances of the word "cow" – i.e., (reading "→" as the causal relation) suppose that a certain *cow → "cow"* psychological law were to hold true of Alice. And suppose it were a further fact that visual appearances of horses under certain conditions are also sufficient to cause her utterances of the word "cow" – i.e., that a further *horse → "cow"* psychological law were to hold true of Alice as well. Suppose, finally, that these two natural laws happened to be related in a way such that the holding of the *horse → "cow"* law fundamentally depends on the holding of the *cow → "cow"* law in roughly the following sense:

[15] Cf. Section 3 above.
[16] Cf. Loewer (2017: 178).
[17] Cf. Fodor (1987, 1990a, 1990b, 1994).

> If the *horse → "cow"* law were to stop holding (i.e., if, for whatever reason, the causal link between appearances of horses and Alice's utterances of the word "cow" were to be broken), then the *cow → "cow"* law would nonetheless continue to hold. If, however, the *cow → "cow"* law were itself to stop holding, then the *horse → "cow"* law would stop holding as well.

The relation between the *cow → "cow"* law and the horse → "cow" law, in other words, is supposed to be asymmetric – i.e., whereas no *horse → "cow"* law would exist at all if a *cow → "cow"* law didn't also exist, the converse does not hold. According to Fodor, the obtaining of such a relation of asymmetric dependence amongst psychological laws would in effect be sufficient to make it the case that Alice's utterance of the word "cow" refers to cows and to cows only. So, letting S stand for a given subject, and x for any object or event (other than cows) which is sufficient to cause S's utterances of the word "cow", our final model would look like this:

> **ADM**. S's utterances of "cow" refer to cows (and to cows only) if there is a *cow → "cow"* psychological law holding true of S which all other existing *x → "cow"* laws holding true of *S* asymmetrically depend on.

Contrary to the simple causal model above, **ADM** can clearly take care of the problem of error, as it allows that horses (pictures, blows to the head, etc.) may cause utterances of the word "cow" without thereby being the referent of "cow". Moreover, if a horse-caused utterance of "cow" were to be part of the sentence "there is a cow", then, on **ADM**, this sentence would be false. Contrary to the simple causal model, then, **ADM** does seem to provide us with the sufficiency conditions we were looking for – i.e., conditions the obtaining of which would be sufficient to make it the case that, e.g., the word "cow" refers to cows and to cows only.

Needless to say, the one just sketched is merely a toy model of an admittedly much broader, and much more complex phenomenon. In our view, however, it could still constitute a useful starting point in order to provide a naturalistic explanation of symbols. **ADM**'s main theoretical virtue, to our eyes, is that it clearly seems to meet at least one of our two epistemological desiderata. Indeed, to the extent that it appeals to psychological laws, and that such laws are about or quantify over experimentally reproducible types of events – i.e., visual appearances and their distal stimuli – **ADM** is in principle both empirically testable, and counterfactuals supporting. This being said, our intention in sketching its outline was simply to point in one direction that we regard as promising for future research, and much of course remains to be done in order for this toy model to reach a mature stage. In particular, for reasons of space, it will not be possible for us to consider and assess here the many objections that have been levelled against Fodor's Asymmetric Dependence Theory, a lifelog intellectual endeavor that was conceived and developed as much more general in scope[18]. We shall however conclude our present considerations by acknowledging one aspect of our toy model that arguably constitutes, at present, its main vulnerability. The overall strategy recommended by our reductionist approach, as you will recall, consisted in modelling symbols as representations whose connection to their signified objects – as in the case of icons and indexes – holds in virtue of purely objective facts, and **ADM** does not yet seem fully satisfactory on this score. On the one hand, indeed, it is at bottom a causal model as it is grounded on objective causal relations amongst kinds of entities. At the

[18] Adams & Aizawa (2021) contains a useful overview of the standard objections.

same time, however, it crucially relies on a metaphysically suspect asymmetric dependence amongst natural laws, and one could therefore legitimately wonder whether this is a purely objective fact about our world. Indeed – contrary to one of our stated epistemological desiderata – it is still far from clear how this notion could be analyzed in terms of (or otherwise amenable to) concepts and categories that are commonly accepted in current natural science. Let us just to point out, however, that the idea of asymmetric dependencies amongst psychological laws sound strongly intuitive from a psychological point of view, and that the status of such asymmetric dependencies is remarkably different from the one of, e.g., Barbieri's organic codes. Whereas such codes, by Barbieri's own admission[19], should be explicitly conceived of as not determined by the laws of physics and chemistry, asymmetric dependencies, if they exist at all, will clearly fall within the scope of a more mature psychological science. In other words, the mere fact that they happen to be currently unexplained – however unfortunate – does not make them in principle unexplainable.

6. Conclusions

The main goal of the above considerations was to draw attention to a reductionist strategy that, in our view, could be profitably adopted in order to provide a naturalistic explanation of symbols. The strategy in question exploits the explanatory resources made available by Jerry Fodor's extremely insightful approach to the puzzling mystery of human intentionality as it manifests itself in our far-reaching ability to create and make use of conventional signs in order to think and talk about things. It seems only fair to say that we are still far from being able to provide a completely satisfactory, and fully naturalistic account of symbols. In particular, from where we stand, the challenge faced by any convincing attempt to reach this goal is that it should be able to meet two basic epistemological desiderata. On the one hand, it should only appeal to concepts and categories generally accepted in current natural science; on the other, it should at some point eventuate in empirically testable, as well as counterfactuals supporting models of the phenomenon under investigation. As we have tried to show, the approaches to this phenomenon pursued by Semiophysiscs and Biosemiotics, as developed by René Thom and by Marcello Barbieri respectively, although certainly fascinating, seem to each fall short of at least one of the two desiderata. The kind of project that we have in mind, on the contrary, while already meeting one the two, could in the future meet the other one as well. For this reason, we regard it as the currently most promising on the market. This does not mean, of course, that said project has no obstacles on its way, nor does it by any means guarantee that it will ever be able to actually deliver what it promises. Suffice it to say, however, that at present we do not see any invincible a priori reasons for pessimism. *Ignoramus sed non ignorabimus*!

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[19] Cf. fn. 13 above.

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