

Semiotic Insights into Aristotle's Theory of Being: Definition and Model of Sign

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This paper is aimed to develop a model of the sign as homomorphism (i.e. similarity of form) as the initial part of a strict and fundamental theory of sign. Many various signs—photographs, pictures, sculptures, diagrams, surface maps, etc.—might be viewed in terms of homomorphism. The proposed model of sign as a homomorphism is derived using Aristotle's theory of being. Two principles of Aristotle's theory—form and matter—are used as elementary ideas in the model of sign. The main peculiarity of the undertaken approach to semiotics is treating a sign and a signified object as derivative ideas; they are constructed as compounds of form and matter. To achieve more strictness, the model of sign is treated in terms of the system of Cartesian coordinates modified for the articulation of being. Intentionality is viewed as the key idea in the model of sign. The approach to the definition of sign presented in this paper can be viewed as an ontological alternative to Peirce's one.

Keywords: sign as homomorphism, Aristotle, hylomorphism, Cartesian coordinate system, ontology.

1. Introduction

Greeks used the name *semeiotike* to denote the science of medical signs—symptoms. Philosophers—including Plato and Aristotle—viewed the idea of sign in a wider context. Sign studies were a field of interest also for the medieval and Renaissance philosophers. Locke in 1690 cardinally extended their scope. In his *Essay concerning human understanding*, Locke divided science into three sorts—*physica*, *practica*, and *semiotike*—according to the “most general division of the objects of our un-

derstanding”. He viewed semiotics as *the doctrine of signs* and noted: “It is aptly enough termed also *logike*, logic”. Its task was “to consider the nature of signs, the mind makes use of for the understanding of things, or conveying its knowledge to others”. Signs are necessary “to communicate our thoughts to one another, as well as to record them for our own use”, Locke claimed.

Locke's semiotics took several forms during the last centuries. As logic, it became a flourishing domain of knowledge.

One of its branch—formal logic—made a significant contribution to the information revolution in the twentieth century. Charles Sanders Peirce in the beginning of the twentieth century changed significantly the shape of semiotics by proposing a philosophical account of the sign, based on the universal categories of being. He preserved Locke's idea to relate semiotics with logic. Ferdinand de Saussure, almost at the same time, proposed a different approach to the study of signs, which he termed *semiology*. It became very popular among linguists, anthropologists and other researchers of various domains of humanities. The scope of semiology was limited to language and its social environment. Saussure's approach differs significantly from that of Locke and Peirce; in particular, it does not include logic as its ingredient part; it is related to logic only to the extent the language is related to logic. Saussure did not use the powerful methods developed in logic.

The scope of research in modern semiotics ranges from the definition of its elementary ideas—including the idea of sign—to semiotic accounts of mental, social, cultural, political, and even computational phenomena.

In the middle of the twentieth century, semiotics became very popular in academic circles. The interest was provoked mainly by the need and expectation to find methodological tools for humanities; earlier, Dilthey (1889) related a similar hope to *hermeneutics*—the theory of interpretation. The expectations, however, mostly failed; semiotics did not become a methodology for humanities.

Strict and precise methods are rarely used in semiotics. Some authors borrow

tools from logic. Greimas (1970), in particular, employed the square of oppositions (the Boethian square)—a classical tool in logic. Other simple means of logic are applied for a semiotic interpretation of texts. Peirce also used ideas of logic in his classification of signs. Overall, semiotics actually still does not possess its own unique methods.

The current situation in semiotics might be evaluated viewing it from at least two different perspectives: as a domain of humanities and as a science. Philosophy should be mentioned separately. Semiotics as a philosophical study of signs has accumulated many interesting ideas during its long history. The current state of semiotics, from this perspective, is similar to many other directions in philosophy. The situation of semiotics as a domain of humanities, if compared with such domains as linguistics, anthropology, various cultural studies, might seem even a flourishing domain of knowledge.

The evaluation of semiotics in terms of science, however, is not very optimistic. Semiotics as logic (according to Locke) today is certainly a well-developed science. Its rest part—what is called semiotics in its contemporary sense—should be analyzed in more detail.

Locke placed semiotics next to physics, what implied their implicit comparison as two sciences. Physics was already a rather well-established science in the times of Locke; semiotics, however, was actually only a domain of philosophy. Today, the gap between physics and semiotics as two sciences is much wider: in fact, it is an abyss. Modern semiotics is a very young domain of knowledge. Even its name is not widely known beyond the academic

circles. Deely (2004) in the preface of his book has noted *Basics of Semiotics*: “The image of the modern semiotic universe is the same as that of astronomy in 1611”. We should admit that semiotics, despite its long prehistory, still lacks a strict theoretical ground similar to the one used in sciences. Only fragmentary, non-interrelated theories exist. Semiotics still has not reached the state when knowledge is being accumulated continuously to form a solid system of facts and theories. In terms of Kuhn (1962), it did not reach the state of a *normal science*. Locke’s idea—rather expectation—to view semiotics as important as physics is far from fulfilment.

This paper is aimed to contribute to developing the theory of sign. The concrete purpose is to make a little step in this direction and to develop a model of the *sign as a homomorphism* (i.e. similarity of form) as the initial part of a strict and fundamental theory of sign.

Many various signs—images, photographs, pictures, sculptures, diagrams, graphical schemes, surface maps, city plans, etc.—may be viewed in terms of homomorphism. Therefore, developing a model of sign as a homomorphism is an important task. Ambrosio (2010) has claimed that Peirce’s icon might be viewed as a homomorphism.

The main object of this paper, hence, is the sign as a homomorphism, or, more precisely, an *ontologically defined sign as a homomorphism*.

The approach of this paper aims to ground the account of sign in the theory of being and, in particular, to base the sign on the insights into Aristotle’s theory—hylomorphism. The theory of being, however, is a domain of philosophy, and it does not

provide precise methods for the analysis of sign. Therefore, for more strictness, also the idea of the Cartesian coordinates is employed. The latter is implicitly based in logic; therefore, in fact, I use the methods of logic. I adapt the Cartesian system for the articulation of being treated in terms of Aristotle’s hylomorphism. The peculiarity of my approach from the point of view of semiotics is in viewing the basic semiotic concepts—the sign and the signified object—as derivative ideas; traditionally, they are viewed as primary ideas. The two elementary ideas from Aristotle’s theory of being—form and matter (or content)—are used as primary ideas instead. The ideas of the signified object and sign are derived on their ground. Models of other related semiotic phenomena may also be derived using this approach.

A short remark on the interpretation of the classical texts analyzed in this paper should be added. Texts of Aristotle, Aquinas, Bonaventura and some other authors are used here. The purpose, however, is not the analysis and interpretation of these texts. The purpose is to propose a theory of sign, inspired by the insights into the classical texts; therefore, in some places I purposefully deviate from their ideas. The problem of the interpretation of classical texts is considered in hermeneutics. The reader’s intention might differ from that of the author; interpretation, therefore, might also differ.

The paper consists of nine chapters: introduction (Chapter 1), an overview of the conceptions of sign (Chapter 2), analysis and grounding of the approach (Chapter 3), derivation of the model of sign as a homomorphism (Chapters 4—7), description of the relation of sign as a homomorphism to

Peirce's conception of sign (Chapter 8), and conclusions (Chapter 9).

The text and the reference list of the paper are aimed to be compliant with the rules of the APA Publication Style.

2. Sign Idea and Being

Logically, semiotics should start from the account of sign as its primary idea. Sign is a complex phenomenon; therefore, in the history of semiotics, there were various approaches to its explanation. Theories of sign make the most elaborated part of the modern semiotics. In this chapter, the main conceptions of sign are analyzed in relation to the ontological approach of this paper. Peirce's ideas are described separately in more detail, because his approach is closest to that of this paper.

The terms defining the situation of sign should be defined first.

2.1. Defining the Sign

The situation of sign (and the sequence of sign correlates) is often presented as follows: a) signifier, b) signified, c) referent. Unfortunately, as Eco (1988) and Hébert (2006) have noticed, there is no full agreement on this subject. One of the problems is related to the treatment of the *signified*. Although most often it is treated as the *signified meaning* or the *signified concept*, some authors view it as the *signified object*, i.e. as a referent. Peirce used the term *signified* in relation to *object*.

The confusion of terms possibly emerged due to different positions of authors. There are two basic positions in modern semiotics: the view of linguistics (or literary, cultural, e.g. that, of Saussure) and the view of logic (or the general theory

of signs, e.g., that of Peirce). In the linguistic tradition, the concept is the signified. From the point of view of the logic (Peirce's tradition), the object is *the signified*. The meaning in the latter case is treated as a separate component of the sign: the *interpretant*. It should be added that according to Peirce, sign refers to its object; the object, therefore, could be viewed as a referent.

To avoid the confusion of terms and to combine both positions, I suggest using the term "signified" only as an adjective in a phrase: the *signified meaning*, *signified concept*, *signified object*, etc. In this paper, I will mostly use the term *signified object*.

2.2. Approaches

A detailed overview of the models and definitions of sign provide, for example, Nöth (1995) in his extensive *Handbook of Semiotics* and Sebeok (1986) in the *Encyclopedic Dictionary of Semiotics*. In the present paper, sign is viewed in relation to being; therefore, different conceptions of sign will be evaluated in this respect. According to the approach of this paper, I should start from Aristotle¹.

Aristotle considered sign in *On Interpretation* shortly:

"Spoken words are symbols of mental experience, and written words are symbols of spoken words. Just as all men have not the same writing, so all men have not the same speech sounds, but the mental experiences, which these directly symbolize, are the same for all, as also are the things of which our experiences are the images" (I, 1).

¹ Several sources for quotations from Aristotle are used in this paper. They all are provided in the list of references. A source can be determined according to the title of the essay.

Indirectly, the above quotation might be treated as Aristotle's conception of sign. It presents a blend of physical (*the things of which our experiences are the images*) and mental (*mental experiences*) being. This quotation in modern semiotics is often viewed as the description of the triadic model of sign. Aristotle did not treat sign in terms of being directly. Overall, he did not contribute significantly to semiotics.

Poinsot directly viewed sign in terms of being. In his *Tractatus de signis* (Deely and Powell, 1985), he viewed sign as a special mode of being. Sign depends on something else; therefore, it is a *relational* being. To put it in other terms, sign is an *intentional being*. Many other representatives of medieval and modern semiotics claimed that *sign stands for something else*, and thus they admitted that sign is a relational being.

In modern semiotics, two basic conceptions of sign—Saussure's and Peirce's—are considered most often. F. de Saussure (1916/1972) viewed signs in terms of linguistics; therefore, there were no place for the physical signified objects in his model. Convention was a basis relating the signifier and the signified concept; this was a peculiarity of Saussure's approach. It might be noted that Saussure actually only reintroduced the ideas known already from antiquity. Already Plato noticed that names are conventional signs in *Cratylus*: "I (...) cannot convince myself that there is any principle of correctness in names other than convention and agreement". Part of the above Aristotle's quotation corresponds to Saussure's idea of sign: "Spoken words are symbols of mental experience..." (On Interpretation, I, 1). An important peculiarity of Saussure's sign is its relation

to being: a sign (both its components) is a mental being. It should be noted, however, that Saussure did not ground his account of sign in being.

Peirce, the founder of semiotics of the twentieth century, proposed a very original theory of sign. I describe Peirce's model in the next section separately in more detail.

Behaviorists presented a cardinaly different tradition in defining sign. They attempted to externalize the sign and analyzed it in empirical terms. Morris, for example, gave the following definition of sign:

If A is a preparatory-stimulus that, in the absence of stimulus objects initiating response-sequences of a certain behavior-family, causes in some organism a disposition to respond by response-sequences of this behavior-family, then A is a sign (Morris, 1946/1971, pp. 105—106).

The definition is based on the classical scheme of stimulus and response (or, action and reaction, more generally) common to behaviorism. George H. Mead started in 1922 the behaviorist tradition in his paper *A behaviorist account of the significant symbol*.

Jakob von Uexküll extended the behaviorist approach to the definition of sign in his *Theory of Meaning* (Bedeutungslehre) (1982/1940). He viewed sign in terms of the *functional circle* which relates organism to its environment (*Umwelt*). The functional circle might be treated in terms of the action and reaction scheme.

Behaviorists introduced an entirely new branch to the theory of sign; its importance, therefore, is even greater than the one of Peirce, which only continued the mentalist tradition in semiotics. The behaviorist approach—as a direction in

psychology—tended to ignore the internal (mental) being. Behaviorists’s models of sign, therefore, also had this peculiarity; this was a kind of opposition to the Saussure’s and Peirce’s models. It might be noted, however, that Uexküll’s functional circle, applied to Umwelt of the human organism, might include both internal (mental) and external (physical) being.

Klinkenberg (1996, as cited in Hébert, 2006) proposed a four-component model consisting of the stimulus, signifier, signified, and referent. He described stimulus as “... the perceptible physical element (e.g., a sound) that serves as the substrate in which the signifier is manifested” (Hébert, 2006).

Hébert (2006) further extended Klinkenberg’s model and described an even more detailed (six-component) speculative model of sign:

“The main terms that enter into the definition of the sign are the following: (1) the stimulus (the physical signal being used, such as a vocal sound), (2) the signifier (the model, e.g., a phoneme, of which the stimulus is a manifestation), (3) the signified (the meaning or content of the sign), the concept (the mental representation of the signified), which is either (4) logical or (5) psychological, and (6) the referent (what we are talking about when we use a particular sign) (Hébert, 2006, para. 1).

The conceptions of sign proposed by Klinkenberg and Hébert presented a mixed perspective of sign in relation to being: the stimulus was a physical being, and the signified meaning (concept) was a mental being.

The following conclusions might be drawn to summarize this short overview of the conceptions of sign. Currently, there exist several basic conceptions of

sign. Hence, semioticians acknowledge the complexity of the idea of sign. Some conceptions differ entirely, e.g., the behaviorist one; others have a certain similarity. Behavioral and mentalist (cognitive) conceptions make a certain opposition. None of the considered conceptions of sign includes all the rest. It should also be concluded that none of the proposed conceptions of sign has resulted in developing a strict scientific theory of sign. Peirce proposed the most profound theory and grounded it in being. According to the approach of this paper, the idea of sign is also grounded in the theory of being; therefore, his approach should be analyzed in more detail.

2.3. Peirce’s Conception of Sign

2.3.1. Approach to Being

Peirce viewed being from the perspective of subjective experience and treated it in terms of *universal categories*. He introduced the categories in his paper *On a New List of Categories* (1984) after analyzing several other philosophical systems, including those of Kant and Aristotle. Hoffmann (2001) described Peirce’s categories as follows:

“For Peirce, categories are not, as for Aristotle, “modes of proposition,” but phenomenological modes. The three categories designate all possible modes something may appear to us. Thus, they are absolutely basic for Peirce’s epistemology and his semiotics as well. To avoid misunderstandings, Peirce names his categories simply “Firstness,” “Secondness,” and “Thirdness.” Something may appear to us either as a “First, a “Second,” or a “Third”, there is no other possibility (Hoffmann, 2001, para. 9).

The experience of reality for Peirce begins from Firstness considered only in

respect to the *ground* which is "... a pure abstraction, reference to which constitutes a *quality* or general attribute ...” (Peirce, 1984). He related the Secondness and the Thirdness accordingly to the *correlate* and the *interpretant*. The correlate is an equivalent of *other*: “An *other* is plainly equivalent to a *correlate*” (ibid.); “... *interpretant* (...) fulfils the office of an interpreter, who says that a foreigner says the same thing which he himself says” (ibid.). There exists a strict order among categories as their numerical names indicate and “no one of the categories can be prescind from those above it” (ibid.). To summarize, the categories were presented as follows:

Firstness is a reference to a ground,
 Secondness is a reference to a correlate,
 and
 Thirdness is a reference to an interpretant.

Peirce used also other names for the categories, in particular, *quality* for Firstness, *relation* for Secondness, and *representation* for Thirdness. The categories, nevertheless, remained difficult to understand for his contemporaries and followers because of their extreme generality.

2.3.2. Definition of Sign

Peirce related sign with the idea of *thing*:

“There are three kinds of interest we may take in a thing. First, we may have a primary interest in it for itself. Second, we may have a secondary interest in it, on account of its reactions with other things. Third, we may have a mediatory interest in it, in so far as it conveys to a mind an idea about a thing. In so far as it does this, it is a sign, or representation (Peirce, 1998, para. 2).

Peirce placed sign in the framework of being by viewing it as a category of Third-

ness. More specifically, he presented sign as a “triple connection of sign, a thing signified, and cognition produced in the mind” (Peirce, 1984, Vol. 1, p. 372). He also often used other names for the sign components: *representamen* for sign, *object* for the thing signified, and *interpretant* for cognition produced in the mind; the latter now is often treated as *meaning*.

Graphically, the Peirce model of sign may be presented as a triangle (see Figure 1).

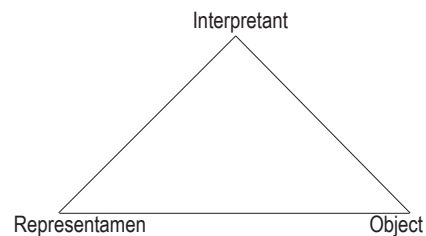


Figure 1. Graphical presentation of Peirce's model of sign

Peirce has noted, however, that a triangle does not express fully the idea of sign as Thirdness. It gives only its *dyadically degenerated* image.

Marty (1997) has collected and analyzed 76 definitions of sign in Peirce's writings. Nöth (1995, p. 42) singled out the following definition as the more elaborated one:

“A sign, or representamen, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the interpretant of the first sign. The sign stands for something, its object. It stands for that object, not in all respects, but in reference to a sort of idea (Peirce, 1931, Vol. 2, § 228).

2.3.3. *Limitations of Peirce's Theory of Sign*

Peirce's account of sign, as any other theory, has certain limitations.

Peirce's account might not be viewed as a general theory of sign despite the fact that it is usually treated as the general one. Although it is more general as compared, for example, with Saussure's approach, overall it does not embrace all the complexity of the phenomenon of sign. In particular, it does not give a behavioral account of sign (as Morris and Uexküll treated it). Peirce's theory is essentially a mentalist one.

Peirce's theory provides only a triadic model of sign; however, there can be other options, too. The triadicity is a ground of Peirce's semiotics. His model is the same for the whole variety of signs. Different levels of sign complexity are ignored. Admitting the essentially triadic character of sign, different levels of its complexity should be employed; the model, hence, might be monadic, dyadic, triadic, etc. Hébert (2006), in particular, singled out up to six correlates of sign.

Peirce did not provide a clear definition of sign in terms of being. He only claimed that sign should be viewed in terms of the category of Thirdness. The latter, however, is a primary idea in his ontology and, therefore, defined only in a descriptive way.

Peirce's classification of signs does not cover all the complexity of the idea of sign. The definitions of some types of signs are deficient. In particular, Peirce's classification does not allow discriminating between the formal and the material signs.

Peirce's semiotics has only a limited productivity. It ends, in fact, with the defi-

nition and classification of signs. It provides only a limited possibility to produce new semiotic constructions.

Despite its limitations, Peirce's semiotics remains the most significant modern contribution to the philosophical theory of sign. It is probably the best project of this kind, proposed so far.

2.4. *Sign as Ontological Homomorphism*

Homomorphism is the key idea and the main object of investigation of the present paper.

Homomorphism is a term of the Greek origin (*homos* means same, similar, and *morphê* means shape). Sign as homomorphism, therefore, etymologically is a sign defined as similarity, resemblance of form. Not all signs can be viewed as homomorphisms; therefore, the term should be used to denote a class of signs.

The term of homomorphism is used in various domains of science, and its definition is not exactly the same. Mathematics provides its strictest definition. In semiotics, homomorphism can be defined in two alternative ways (Figure 2): syntagmatically, when one sign is viewed as a homomorphism of another one, and paradigmatically, when a sign is viewed as a homomorphism of the signified object. In this paper, only the latter way is considered.

The term of homomorphism is rarely used in semiotics. Goguen (1999) and Harrell (Goguen & Harrell, 2003), in particular, considered syntagmatic homomorphism, whereas Reichardt (2003) viewed paradigmatic homomorphism.

The term *sign as a homomorphism* I will use interchangeably with the term *homomorphic sign*.

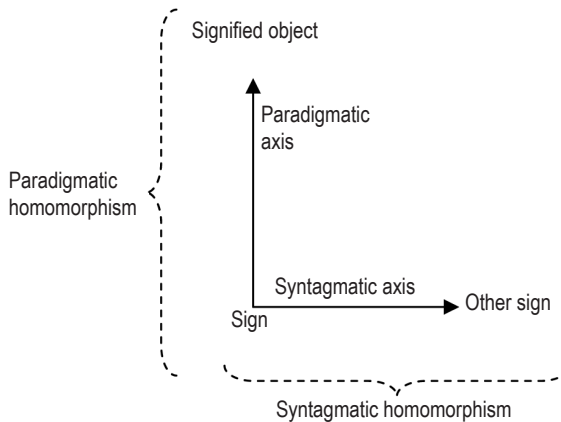


Figure 2. *Homomorphism in semiotics. Illustration of difference between paradigmatic and syntagmatic definition of the semiotic homomorphism*

Roots of the modern idea of homomorphism I trace back to Aristotle. I suggest grounding the idea of homomorphism in his theory of being. Hence, I will consider an ontologically defined homomorphism. I suggest shortly calling it an *ontological homomorphism*. The latter, due to its grounding in the theory of being, is the most fundamental conception of homomorphism as compared to its other conceptions in sciences.

3. Sign and Aristotle's Theory of Being

The theory of being is chosen in this paper to ground the idea of sign. Its roots descend to the antiquity when the knowledge of reality was not split into thousands of directions. Aristotle proposed one of the most influential accounts of being. It allows accounting for cognition as an ingredient part of reality. In particular, he provided an ontological account of the perception used in this paper to introduce the sign as a homomorphism.

3.1. On Application of Aristotle's Theory of Being

Aristotle considered being in two different ways. In *Categories*, he treated it linguistically and gave a list of ten categories—the most general predicates describing being. In *Metaphysics*, he defined being ontologically, that is, *being as being*. The latter he accounted for in terms of two metaphysical principles—*matter* and *form*. The two terms cannot be strictly defined; Aristotle chose *hulê* (it means *wood* in Greek and corresponds to *matter* in Latin) to denote the first principle, and shape (*morphê* in Greek, *form* in Latin) to denote the second one. His theory, accordingly, was denoted by a compound term *hylomorphism*—*matter-formism* (also spelled *hylemorphism*). It should be noted that the meaning of the form should not be limited to its geometrical treatment as a shape. It may have many different interpretations; in particular, Aristotle treated it also as a function when noting that vision is a form of the eye, as Green described (1998). The matter might also be treated as the content.

The form and matter as two primary ideas might be viewed as a binary principle for the articulation of being. The universality of the binary approach in the treatment of reality was also claimed by Leibnitz. Later, in the twentieth century, the binary principle was implemented in the fundamentals of information technologies.

The doctrine of hylomorphism flourished until the Renaissance. A similar idea of treating things as a conjunction of form and content is common in modern times. Some skeptics, however, acknowledge now only the historical value of hylomorphism.

For description of sign as a homomorphism, I take the basic idea of Aristotle to describe being in terms of form and matter. I do not consider deeper ideas—the *primordial matter* and the *quantified matter* (*materia signata*). I do not include parallel ideas—actuality (*actus*) and potentiality (*potentia*)—in treating being; the latter two, together with form and matter, make the *four causes of being* in the theory of Aristotle. Actuality and potentiality allow defining the dynamical aspect of being.

Hence, I consider only the part of hylomorphism, necessary for the account of the homomorphic sign. A fuller scope of hylomorphism should be employed in further developments; analysis of actuality and potentiality, in particular, might be used for building dynamical models of sign and its interpretation.

I do not follow Aristotle literally. Some ideas of this paper probably cannot be reconciled with Aristotle's hylomorphism. The role of form and matter in treating individuation makes one of the main differences. My approach is closer to the one of Bonaventura and might be characterized

as *symmetric*: I take matter and form as equally important parts in the individuation of an *object*.

Essays of Aristotle on being, as any other ancient texts, are a subject of interpretation. Now we have an opportunity to compare the ideas of Aristotle with the heritage of other philosophers and to place them in the context of contemporary science. From my point of view, Aristotle's hylomorphism might be viewed as a *binary architecture of being*—and of reality on the whole. Form and matter are the two principles applied for the articulation of being. Leibnitz later provided the mathematical description of the binary principle. In the twentieth century, the binary principle was implemented in the idea of information.

It might be added that in this paper Aristotle's hylomorphism is used as an alternative to the Peirce's approach to being.

3.2. Aristotle's Theory of Perception

I will base the definition of sign in Aristotle's theory of perception; therefore, this theory should be described in brief.

Aristotle based his account of perception and cognition on his theory of being. According to Aristotle, in perception, the form of a thing is abstracted (detached, separated) from the thing perceived. The perceiver in this way obtains ideas (forms) of things. The forms then are used in the mind of the perceiver instead of things: "... it is not the stone which is present in the soul, but its form" (*On the Soul*, III, 8). This idea is sometimes termed as Aristotle's theory of abstraction.

Aristotle illustrated his account of perception by comparing it with an impression of a signet ring in wax. In his essay *On the Soul*, he wrote:

“By “sense” is meant what has the power of receiving into itself the sensible forms of things without matter. This must be conceived as taking place in the way in which a piece of wax takes on the impress of a signet-ring without iron or gold; we say that what produces the impression is a signet of bronze or gold, but its particular metallic substance makes no difference: in a similar way, a sense is affected by what is coloured or flavoured, or sounding, but it is indifferent to what in each case the substance is; what only matters is the quality it has, i.e. in what ratio its constituents are combined” (II, 12).

Aristotle did not propose a full theory of sign. Barnouw noticed that the theory might have been grounded in the account of perception (Reynolds, 2006):

“Aristotle himself could have avoided the deficiency if he had developed more completely his theory of sign and had connected it to his analysis of perception (p. 99).

An attempt to ground the sign in Aristotle’s theory of perception is made in this paper.

4. Definition of the Signified Object

Semiotics usually starts with the definition of sign. The *signified object*, however, is a more primary idea, and therefore it should be defined first.

The definition of the object is not a simple problem in philosophy. King (2000) described the general problem of *objecthood*. He noted, in particular, that a great part of modern science defines an object as a set of properties. This mechanistic approach prevailed during the last centuries and provided a powerful tool for sciences; its usefulness for semiotics, however, is not evident. I will demonstrate here that an alternative approach, based on hylomor-

phism, might be a more appropriate one. I start from describing the place of the object in philosophy and semiotics.

4.1. Object in Semiotics and Philosophy

The signified object in semiotics is often viewed as a primary idea requiring no definition.

Pierce did not focus his attention on the definition of the object and simply described it as follows: “By an object, I mean anything that we can think of, i.e. anything we can talk about.” (Peirce, not dated).

Generally, the object in semiotics is usually viewed in relation to the *perceiver*; then it might be termed a *perceived object* (see Figure 3).

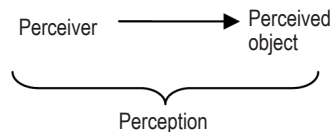


Figure 3. Object in the scheme of perception, viewed from the point of view of semiotics

The treatment of the object in semiotics cannot be separated from its wider context. In the theory of knowledge, the object is treated as an *object known* to its *knower*. In phenomenology, the object is viewed in relation to the *intentional act*; the latter is considered as directedness of the *subject* toward the *object*.

4.2. Hylomorphic Definition of the Object

The object can be defined using the hylomorphic approach as a conjunction of its form and matter.

Considering the relation between form and matter, Aquinas in *Summa Theologica*² notes that matter in determining a *particular thing* is made finite by form, and vice versa:

“Now matter is in a way made finite by form, and the form by matter. Matter, indeed, is made finite by form, inasmuch as matter, before it receives its form, is in potentiality of many forms; but on receiving a form, it is terminated by it. Again, form is made finite by matter, inasmuch as form, considered in itself, is common to many objects; but when embodied in matter, a form is ascribed to this particular thing” (ST, part 1, q.7, a. 1).

I suggest viewing the object in terms of individuation. Aristotle and Aquinas considered only one component (matter) as the principle of individuation. According to the approach of this paper, I will follow Bonaventure’s approach based on two ideas—form and matter. He described how the individuality of a thing emerges from the conjunction of its form and matter:

“Individuation arises from the actual conjunction of matter with form, and from this conjunction each appropriates the other to itself—just as it is clear that when an impression or stamping of many seals on wax which previously was one takes place, neither the seals can be made many without the wax, nor is the wax enumerated except because diverse seals come about in it. Still, if you were to ask from which [individuation] comes principally, it should be stated that an individual is a this-something. That it is this, it has more principally from the matter, by reason of which the form has a location in space and time. That it is something, it has from the form. An individual has being (*esse*) and also has existence (*existere*). Matter gives existence to the form, but form

gives actual being (*actum essendi*) to the matter. Therefore, in the case of creatures, individuation arises from a double principle (Bonaventure, II Sent. d. 3 pars 1 art. 2 q. 3 resp. (Vol. II, 109b—110a), as cited in King, 2000).

Bonaventure’s idea on individuation visually might be presented as shown in Figure 4.

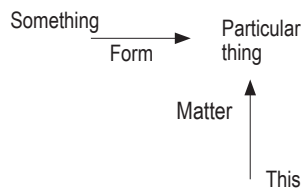


Figure 4. *Visual presentation of Bonaventure’s approach to the individuation of a particular thing treated as a conjunction of its form (something) and matter (this)*

5. The Cartesian System and Determination of the Signified Object

The described philosophical account of individuation gives only general guidelines for the definition of the object. For its more detailed account, I suggest employing the system of Cartesian coordinates. Further, I will also use it as the major tool in describing models of sign in this paper.

5.1. The Cartesian System for Being

In *Discourse on Method*, Descartes (1637) proposed a coordinate system for space (see Figure 5). The system introduced quantitative relations into geometry. It proved to be a powerful tool for mathematics, physics and other domains of science during the last few centuries. There were also attempts to use it in semiotics; Marti-

² An abbreviation ST for *Summa Theologica* is further used. Description of the works by Aquinas is provided in the list of references.

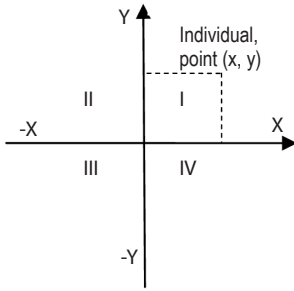


Figure 5. *The Cartesian coordinate system for space*

nelli (2008), in particular, used it to articulate the idea of musical authenticity.

Royce (1951) suggested that a point in the space might be treated in terms of individuation. The Cartesian system, hence, might be viewed as a tool for the individuation of points in space.

I suggest applying the Cartesian system for the articulation of being. Matter and form might be viewed as two axes, and their intersection makes the system of coordinates (see Figure 6). The pair of form and matter then makes an entity (being). The system should be treated in terms of structure, and not quantity. The arrows on its axes indicate only the presence or

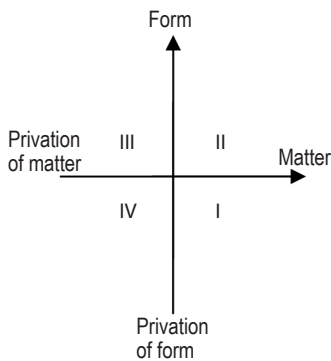


Figure 6. *The coordinate system for being*

privation of form or matter, respectively. That is, they do not imply any quantitative relations, such as *more* or *less* of form and matter.

The numbering of the quadrants might naturally start from the one determined by the presence of matter and the privation of form (see Figure 6). Such order implies that matter is viewed as an initial mode in determining being. Another order might also be used and grounded ontologically.

The term *privation* needs an additional explanation. Privation is not the same as absence. Aristotle gave the following example: a blind man has a privation of the ability to see. It cannot be said that a stone has the privation of vision, because it has no eyes. It should be noted that Aristotle and Aquinas used it only in relation to form, but not matter. Privation of matter is also considered in this paper.

The described system of coordinates for being might also be called the *system of ontological or hylomorphic coordinates*. These terms further will be used interchangeably.

5.2. Determination of the Top-level Modes of Being

The system of coordinates for being can be used to determine the most general modes of being and relations among them (Budrevičius, 2006). The thing is one of them. It will be used further as a ground for the definition of object.

The intersection of matter and form axes in the system of ontological coordinates creates four corresponding quadrants. Each of them is determined as a compound of form, matter or their corresponding privations. Each quadrant can be interpreted

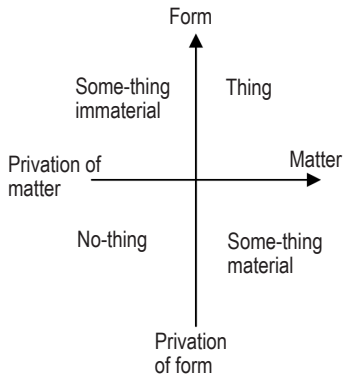


Figure 7. *Presentation of the top-level modes of being in the system of hylomorphic coordinates*

as a basic mode of being as shown in Figure 7.

The first mode corresponds to the thing—a compound of form and matter. It occupies the first quadrant and presents a fully determined being. The other three modes are not fully determined (or fully undetermined), because they lack either form or matter, or both. In our common language, we denote the partly determined modes by the word *something*; its relation with the thing can be more clearly seen by spelling it as *some-thing*. The latter is either an *immaterial some-thing* when it corresponds to the mode determined by the presence of form and privation of matter, or a *material some-thing* when it is determined by the privation of form and presence of matter. The fully undetermined mode may be termed as *nothing* (*no-thing*), because it is described in terms of the privation of both form and matter. It should be noted that the words *something* and *nothing* might also be interpreted in a different way; here, I gave only one of their natural meanings.

5.3. Determination of the Object

The above system of coordinates for being might be used for the determination of the object.

I suggest viewing the object as an *individuated thing*. For this purpose, I suggest applying the earlier described approach of Bonaventura to individuation. A particular thing then can be defined as a conjunction of concrete matter and concrete form creating its individuality (see Figure 8). The object then might be viewed as a particular thing or, more generally, as a class of particular things. In the latter case, a set of matter and form pairs would be employed.

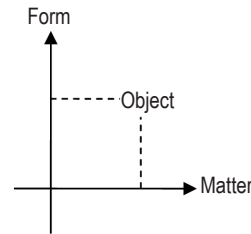


Figure 8. *Individuation of the object considered in terms of the system of ontological coordinates*

It should be noted that the system of ontological coordinates introduced in this paper provides only a *structural* but not quantitative individuation of the object; the Cartesian system for space provides a *quantitative* individuation.

The determination of the object might be viewed as a final result in the sequence of determinations started from the two metaphysical principles—form and matter. The latter might be viewed as *determinants*, or constituents, of determination. The sequence of determinations is summarized in Table 1.

Table 1. *Sequence of determination of being from indetermination to object*

No.	Determinants	Description	Result
1.	Form or matter	Indetermination	Material or formal indetermination
2.	Form and matter	Determination of being generally	Thing, being in general
3.	Substantial form and matter	Individuation according to Bonaventura	Particular thing
	Form, matter, and their corresponding privations	Determination of being by means of the system of ontological coordinates	Object, particular thing, and three partially determined entities

5.4. Evaluation of the System of Ontological Coordinates

The introduced system of ontological coordinates will be used as the main instrument for developing the models of sign in this paper; therefore, its peculiarities should be analyzed in more detail.

5.4.1. Being as Transcendence and a System of Ontological Coordinates

The introduced system of ontological coordinates discriminates among four modes of being. The discrimination might seem to create a contradiction if being is treated as a transcendental idea: the latter cannot be logically divided. Harper (1879) puts it as follows: “You can never escape from being within the sphere of reality: yet being cannot be its own divisor” (Chapter II, Prolegomenon I). There is no contradiction, however, because the coordinate system does not divide being; it only defines its different determinations. Harper describes determinations of being in the following way:

“Nevertheless, Being admits of what may be called classifications; and these *quasi* classifications are called its *determinations*. But why? Because one and the same object

is more clearly defined, or rather determined, by the representative presence of additional notes or determining *forms*” (ibid.).

This quotation also shows that *forms* can be a means for the determination of being. It might be added that, according to the approach of present paper, matter is also used as a determining factor.

5.4.2. Limitations of the System of Ontological Coordinates

The system of coordinates allows presenting only a *static view* of being. The latter might be termed *Cartesian being*, taking into account its basis—the Cartesian system of coordinates. Treated in terms of structure, the system gives only a logical projection of being. More profound logical means should be used to treat being more fully, including its dynamical aspect. Logic, overall, cannot fully describe being; it is incapable of treating being as a transcendental idea. It should be noted that the Cartesian system of coordinates for space has similar limitations: it does not fully present the idea of *Space* and gives only its logical (and quantitative) projection.

The proposed system of coordinates is insufficient for the definition of sign,

because it allows determining only non-relational being; the latter is defined as a conjunction of form and matter and does not depend on any other being. The sign, however, *stands for something else*; therefore, it is a *relational being*. Further, I will demonstrate that for the definition of sign, three components (one form and two instances of matter) are necessary. Correspondingly, a more advanced system of coordinates should be used.

Despite the described limitations, the proposed combination of Aristotle's hylomorphism and the Cartesian system of coordinates gives a new and productive idea. The latter still might be viewed as an ontological construction. It partly retains the philosophical depth of Aristotle's theory, but also it possesses the logical strictness of the Cartesian system of coordinates.

6. Derivation of the Model of Sign as Indeterminate Homomorphism

6.1. Rationale

I suggest using the following rationale to derive the model of sign as homomorphism.

Aristotle's account of the perception described earlier in this paper will be employed. Aristotle compared perception with the process when "a piece of wax takes on the impress of a signet ring" (*On the Soul*, II, 12). In terms of hylomorphism, the process might be described as follows: the wax takes on the form of the signet. The signet ring is meant for making signs; therefore, it is natural to view its impress in the wax as a sign. Three related components of sign might be singled out in this situation: the signet ring with an embossed image as the signified object, the lump of

wax as the medium for presenting the sign, and the impress of the signet in the wax as the sign itself. The model of sign will be viewed in terms of the superimposition of the signified object (i.e. the signet) on the medium (i.e. the lump of wax). The system of hylomorphic coordinates will be employed for considering the model. The components of sign will be presented using separate systems of coordinates. The sign, however, is an indivisible being; therefore, all components of the sign further should be presented in one system of coordinates.

It will be shown that the homomorphism under consideration should be called *indeterminate*, because the relation between the signified object and the sign is not explicitly considered in its model.

6.2. Model of the Signified Object

The signet and the lump of wax might be viewed as two particular things (individual entities). For concreteness, I will consider a signet made of gold with the embossed image of a crown on it (see Figure 9).

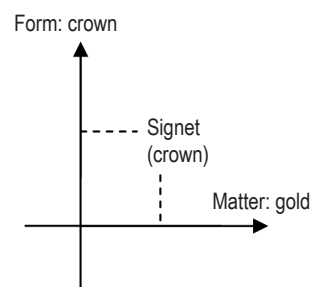


Figure 9. *The signet as an object presented in the system of ontological coordinates*

The lump of wax is also a particular thing, and it can be determined similarly, as Figure 10 illustrates.

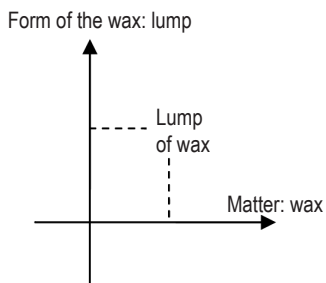


Figure 10. *The lump of wax as a particular thing presented in the system of ontological coordinates*

In the above situation of the sign, the signet is the signified object, and the lump of wax is the medium (or vehicle) for the presentation of the sign; therefore, in terms of being, they should be treated differently.

6.3. Model of the Sign Medium

I suggest viewing the difference between the sign medium and the signified object in terms of subordination in being: the medium should be viewed as a subordinate being in relation to the signified object. It should be noted, however, that the medium—the lump of wax—is subordinated to the signet in relation only to its form, but not matter, because wax loses its form

while presenting the sign, but its matter remains the same. The wax, therefore, is a *material medium* used for the presentation of sign.

The situation can be described more strictly in terms of the system of ontological coordinates. The relation of subordination existing in the system might be employed for this purpose. The relation, in particular, exists between the first and the second quadrant: the second quadrant is subordinated to the first one, because the second quadrant has a privation of matter, while the first one has both components (form and matter). On this ground, a *thing*, technically, can be transformed into a *medium* by means of moving it from the first quadrant into the second one. Graphically, this transformation can be implemented by rotating the system of coordinates as shown in Figure 11.

6.4. Sign as a Superimposition of the Signified Object on the Sign Medium

According to the earlier defined rationale, model of sign can be viewed in terms of superimposition of the system of ontological coordinates for the signified object (i.e.

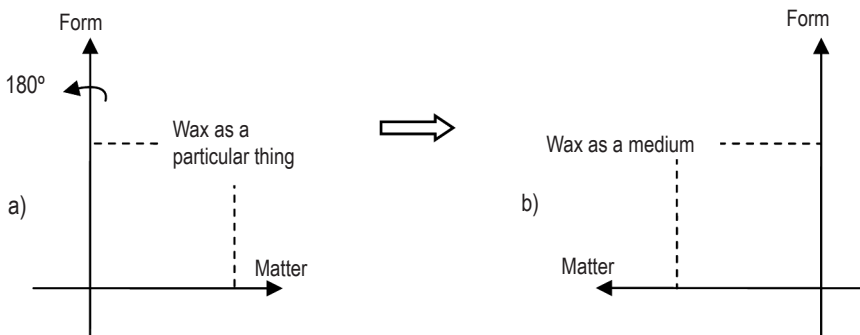


Figure 11. *Transformation of a thing into a medium by rotating the system of ontological coordinates; an example: a) wax as a particular thing; b) wax as a subordinate particular thing (the medium)*

the signet) on the subordinated system for the medium (i.e. the lump of wax as medium). Graphically, the process of superimposition is illustrated in Figure 12. Its result is a compound of two dissimilar instances of matter and one common form (see Figure 13). I suggest viewing the result as a *complex being*. Some Aristotle's commentators use the term *conformity* (or *conformality*) to denote the common form. A complex being then might be called *conformism*; this term, however, has another connotation; therefore, I propose using the term *homomorphism*, which has the Greek origin. I suggest calling its graphical presentation an *ontological (or hylomorphic) diagram of homomorphism*.

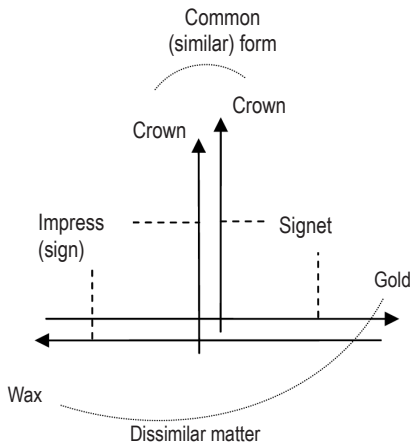


Figure 12. *Superimposition of the system of ontological coordinates for the signified object (signet) on the subordinated system of coordinates for the medium (wax)*

The described homomorphism should be called *indeterminate*, because the relation between the signified object and the sign is not explicitly considered in its model.

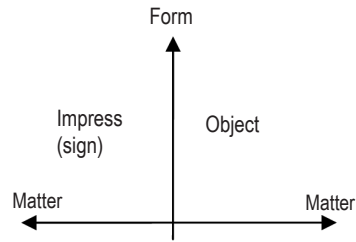


Figure 13. *Ontological diagram of indeterminate homomorphism. Two opposite arrows on the axis of abscissa indicate the dissimilarity of matter of the signified object and of the sign*

The following definition of sign can be formulated now, using the idea of homomorphism: *Sign is a being that has its own matter and the form of the signified object, but it has no matter of the object.*

7. Intentional Determination of Being and Sign

The described model of homomorphism is based on the idea of the similarity of form and dissimilarity of matter. This basis, however, does not provide a full determination of homomorphism, because the direction of representation is not explicitly defined. It should be noted that the terms *signified object* and *sign*, used in the description of sign as a homomorphism, naturally imply the existence of the direction of determination. To make the model of homomorphism more precise, the direction should be made explicit.

There can be two directions of determination. I will analyze them, taking for illustration again Aristotle's account of perception.

7.1. Physical Determination and the Sign

Aristotle compared perception with a physical process when “a piece of wax takes on the impress of a signet ring” (*On the Soul*, II, 12). The impress in the wax, hence, is made by exerting a physical force on the signet. The force is directed from the signet (object) toward the wax; the result is an impress in the wax—a sign. I suggest calling it a *physical* sign. Its ontological diagram is shown in Figure 14.

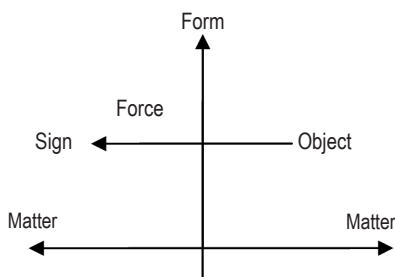


Figure 14. *Ontological diagram of physical sign as homomorphism*

A physical sign is an objective sign causally related to the signified object. It does not depend on its *perceiver*; therefore, the term of an *objective perceiver* or an *observer* is more suitable in this situation.

A physical sign as a homomorphism might be also described in semantic terms. In hermeneutics, Dilthey proposed discriminating between *understanding* (*verstehen*) and *explanation* (*erklären*) as two types of interpretation (Dilthey, 1989). The physical sign then should be treated in terms of explanation. The phenomenon of understanding belongs to the mental world and humanities (Geisteswissenschaften), while explanation belongs to the

physical world and sciences (Naturwissenschaften).

It is not common to consider physical processes in semiotics. Nevertheless, I propose including the analysis of physical sign into the scope of semiotics. Such type of sign also might be called a *mark*. Here, I have considered only one type of physical signs – a *physical sign as a homomorphism*.

7.2. Intentional Determination of the Sign

Generally, Aristotle viewed cognition as a process directed from the subject toward the object. The directedness from the subject toward the object in contemporary cognitive science and philosophy is viewed in terms of intentionality. Sense perception, as a lower grade of cognition, can also be viewed using the idea of intentionality. Sign as a homomorphism is based on the process of perception; therefore, it also can be viewed in terms of intentionality. Such a sign then should be called an *intentional sign*; it implements intentionality as the directedness from the sign (perceiver) toward the signified object (see Figure 15).

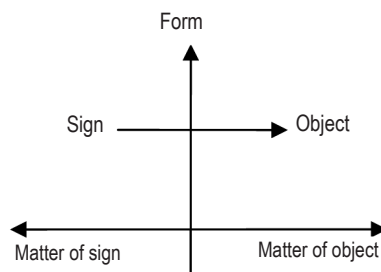


Figure 15. *Ontological diagram of intentional sign as homomorphism. The arrow from sign toward object indicates intentionality as directedness*

I suggest viewing intentionality as the key idea in defining sign as a homomorphism. It also determines the type of its meaning: the latter may accordingly be termed as an immediate, direct, literal, referential, partially deliberate, partially subjective, etc.

8. Sign as Homomorphism in the Context of Peirce’s Semiotics

In the beginning of this paper, I have provided a short overview of semiotic research related to the theories of sign. Now, approaching its end, I have a possibility to make the relation more concrete.

In this chapter, I shortly compare the model of sign as a homomorphism with Peirce’s idea of sign.

8.1. Differences from Peirce’s Approach

The described idea of sign as a homomorphism differs significantly from the one of Peirce’s. Nevertheless, there are also certain similarities. Here, I shortly analyze three aspects in the treatment of sign: relation to being, subjectivity versus objectivity, and interpretation of sign.

Sign as a homomorphism, similarly as Peirce’s sign, is defined in terms of being.

Approaches to the treatment of being, however, differ significantly. Peirce treats it in terms of his universal categories; in this paper, being is treated in terms of Aristotle’s theory (more precisely, the latter has been modified as described earlier in this paper).

Peirce treats being and sign in terms of *subjective experience*, as it can be concluded, for example, from his seminal paper *What is a sign?* Intentional sign as a homomorphism in this paper is also viewed in terms of subjectively treated being. The physical sign as a homomorphism, however, is viewed in terms of the objectively treated being. Hence, the approach to the definition of sign in this paper encompasses both its subjective and objective treatments.

Sign as a homomorphism has no component corresponding to Peirce’s *interpretant*. Strictly speaking, sign as a homomorphism is a *non-interpreted* sign. It encompasses only an *immediate* meaning; the latter might be viewed as an *interpretation of the signified object*.

8.2. Relation to Peirce’s Classification of Signs

Sign as a homomorphism is based on its relation with the signified object; therefore, it might be compared to the sign viewed

Table 2. *The place of sign as homomorphism in Peirce’s classification*

Category	II. Of relation to object		
	Degree of similarity	Similarity of form: <i>homomorphism</i>	Similarity of matter: <i>homomaterialism</i>
Firstness	Highest	Formal icon (e.g., photo)	Material icon (e.g., idol)
Secondness	Medium	Formal index (e.g., ‘M’ as size of dress)	Material index (e.g., weathervane, smoke)
Thirdness	Lowest (no similarity)	Formal symbol (e.g., @)	Material symbol (e.g., wedding ring)

in relation to the object in Peirce's classification. Each sign in the classification should be split into a pair of the sign of form and the sign of matter; sign as a homomorphism then might be compared (see Table 2) with the sign of form, and sign as homomaterialism, accordingly, might be viewed as its counterpart. Hence, instead of one index in the classification, there should be a pair of the formal index and the material index; similarly, there should be pairs of the formal and material symbols and icons, respectively.

9. Conclusions

The present paper demonstrates that the basic ideas of Aristotle's theory of being and cognition can be used in developing the theory of sign. The sign, as well as other aspects of reality, can be treated in terms of form and matter (content). Aristotle's theory of form and matter is further developed and modified by means of merging it with the logic of the system of Cartesian coordinates. The latter introduces more strictness in the articulation of being, treated in terms of hylomorphism. Limitations of the merging are discussed. A model of the ontological diagram is proposed on the basis of a conjunction of Aristotle's and Descartes's ideas. It allows constructing and presenting model of sign in a new way, which is stricter than the graphical means traditionally used in semiotics (e.g., sign triangle).

The proposed account of sign shows that all its ingredients—the signified object, the sign medium, and the sign itself—can be derived using elementary ontological ideas. No other theory in semiotics provides such a possibility.

The following general definition of sign as (ontological) homomorphism is proposed:

1. Sign is a complex mode of being, resulting from the composition of two simple modes—the signified object and the sign medium, both consisting of their own form and matter.
2. Sign should be considered in terms of three ontological components: two instances of dissimilar matter and one form which is common (similar) for the signified object and for the medium.

A sign as a homomorphism is an intentional being for its perceiver. Intentionality should be viewed as one of the key ideas in the theory of sign.

The proposed model of sign has certain limitations. Firstly, it considers sign only in terms of form, leaving aside its alternative—matter. A model of sign as a similarity of matter should also be developed as a counterpart for the sign as a homomorphism.

Another important limitation of the proposed account of sign is related to the aspiration to treat the phenomenon of sign by using only two principles of being—form and matter. They present only the static aspect of Aristotle's theory. Correspondingly, they could explain only static phenomena in semiotics. In particular, form and matter directly are not applicable and insufficient as the basis for the account of the behavioral aspect of sign. Limitations related to statics, however, might be overcome by supplementing the theory with two other principles of Aristotle's hylomorphism, namely the *actus* and *potentia*, implementing the dynamical aspect of be-

ing. It should be also noted that Aristotle's hylomorphism has its limitations. They were not analyzed, because the purpose of this paper is not the analysis and evaluation of Aristotle's theory.

The results of this paper might be regarded as a little step towards developing a strict and precise general quantitative theory of sign.

Overall, this paper might be considered as a description of an earlier unnoticed path

toward developing a fundamental theory of sign. The path is rooted in antiquity. Insights into Aristotle's account of being and cognition allowed uncovering the path. The undertaken approach, however, was not limited to philosophy. The application of the Cartesian system allowed describing the sign in a stricter and more precise way. This paper, therefore, might be regarded as an attempt to introduce the methodology of exact sciences into semiotics.

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ARISTOTELIO ESATIES TEORIJOS SEMIOTINĖS ĮŽVALGOS

Algirdas Budrevičius

S a n t r a u k a

Pagrindinis šio straipsnio tyrimo dalykas yra ženklas kaip žymimojo objekto homomorfizmas – tai yra ženklas kaip formos panašumas. Pagrindinis tikslas – sukurti ženklo kaip homomorfizmo modelį, kuris būtų griežtos, pamatinės ženklo teorijos pradinė dalis. Daug įvairių ženklų gali būti nagrinėjami kaip homomorfizmai: fotografijos, paveikslai, skulptūros, diagramos, žemėlapiai ir kt. Pasiūlytas homomorfizmo ženklo modelis išvestas naudojant Aristotelio esaties teoriją. Kaip elementariosios sąvokos jame naudojami du Aristotelio esaties teorijos principai –

forma ir materija (medžiaga). Dėstomo požiūrio ypatumas semiotikos atžvilgiu yra tas, kad ženklas ir žymimasis objektas traktuojami kaip išvestinės sąvokos; jos konstruojamos kaip formos ir materijos junginiai. Siekiant, kad modelis būtų griežtesnis, jam sudaryti naudojama Dekarto koordinacių sistema, pritaikyta esaties artikuliavimui. Homomorfizmo ženklo apibrėžimo kertine laikoma intencionalumo sąvoka. Straipsnyje pateiktas požiūris į ženklo apibrėžimą gali būti laikomas ontologine alternatyva Peirce'o požiūriui.