

J.M. Bocheński's Understanding of the World and Logical-Algebraic Structures

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Introduction

Questions about reality, its limits, nature and structure are still the most fundamental and the most difficult questions put to humankind and to philosophers by humanity. Each attempt at rationalizing reality or deepening its structure encounters many obstacles. Endeavours to define it in detail depend on the point of viewing it, that is, on objective, subjective or ontological, as well as existential, perspectives, etc. This work will focus on Józef Maria Bocheński's inclination towards seeing the world and its logical structure from the point of view of ontology.

In section 2, we shall discuss the perception of the world deriving from Bocheński, while in the third section – issues of its logical structure will be dealt with. In section 4, we will present a formal framework of the structure of the world.

The World as an Object of Ontology

Let us start by determining how Bocheński defines ontology. It appears that in his *Autoprezentacja* [Self-Presentation] he defines himself as an Aristotelian and acknowledges the *prote filosofia* of ontology, admitting that it is to him “the most

abstract theory of the object at all.”¹ He declares, at the same time, that ontology as a general theory of the object (being) is for him nothing else but formal logic.² Both of these disciplines have a common object of studies, although the methods used by them do differ. Ontology, in the given framework, is not only an ontology of real objects, but also that of ideal ones, in a similar way to logic in its contemporary form. If the world is an ontological object, then it is justifiable to ask the question of how it is perceived by Bocheński.

First of all, we should state that the word “world” is ambiguous and can be interpreted in a variety of ways. The manner in which Bocheński perceives objects and the world as an ontological object (being) can be demonstrated using the following selection of his opinions (in compliance with his ontological terminology included in *The Methods of Contemporary Thought*):

The world is made up of things (elements, substances), such as mountains, plants, men, etc., which are characterized by various properties – e.g. colors, shapes, dispositions, etc. – and linked one with another by a variety of relations. The general philosophical name for everything which is or can be is “being” (*Seiendes*); even such things as properties and relationships will thus be called “beings”. It is possible to distinguish two aspects in every being: what it is – its nature, its “whatness”, its essence – and the aspect which consists in the fact that the being is, its *Dasein*, its existence.³

In another place in his self-presentation, Bocheński writes that the world consists primitively of units (substances) determined by certain properties and connected by defined, often also real, relations.⁴ Therefore, the world in Bocheński’s understanding is a whole composed of all beings with certain properties and connected by relationships. Does this mean that Bocheński perceives the world solely as a world of real objects?

¹ J.M. Bocheński, *Autoprezentacja*, trans. J. Garewicz, in: *Logika i filozofia. Wybór pism*, Warszawa 1993, pp. XXVII and XXVIII [Ger. orig.: *Selbstdarstellung*, in: *Philosophie in Selbstdarstellungen I*, ed. L.J. Pongratz, Hamburg 1975, pp. 1–36].

² Bocheński writes about the mutual relation between logic and ontology from the perspective of Western history in J.M. Bocheński, *Logika i ontologia*, trans. D. Gabler, in: *Logika i filozofia. Wybór pism*, op. cit., pp. 106–132 [Eng. orig.: *Logic and Ontology*, “Philosophy East and West” 1974, Vol. 24, No. 3, pp. 275–292].

³ J.M. Bocheński, *The Methods of Contemporary Thought*, trans. P. Caws, Dordrecht 1965, p. 3.

⁴ J.M. Bocheński, *Autoprezentacja*, op. cit., p. XXVIII.

According to him, objects are not only things, but also each object understood very broadly, that is, as something about which a statement can be made. Ontological objects are things and also their properties, as well as the relations between them. Such objects are states of affairs as well, since Bocheński writes that

if a being is modified in some way – e.g. if a thing is red, or a geometrical figure has twice the area of another – we are confronted with a state of affairs.⁵

And a little further:

States of affairs are not independent of one another. On the contrary, it often happens that if one state of affairs is the case, then another is also the case. The world may be thought of as an interrelated pattern of states of affairs. Indeed it is itself a colossal and extremely complicated state of affairs, in which everything that is or can be is connected with everything else in an endless network of relationships.⁶

The world perceived ontologically, in accordance with Bocheński's vision, is – at the same time – a complete whole of harmoniously ordered objects, which – apart from all the bodily objects – are composed of their properties and the relations established between them.

It follows from Bocheński's argumentation that the world to him is not exclusively a material, real world, though. As a rationalist he comprehends it not only as a palpable reality, but also as an ideal and potential one, possessing a logical structure anyway. The world is to him, like things, features and relationships, an ontological object, a being, an object of studies of ontology as a universal theory of beings.

According to Bocheński, objects are also ideal beings. He defines himself as a Platonian when he writes the following:

It is my Platonism that separates me from my positivist friends, the conviction that there exists an ideal object and not only real ones and (sharing the belief with Whitehead) that there is no explanation of what is real without reference to the ideal being. [...] Habitually, we reject the ideal object verbally only to have it smuggled in shortly afterwards.

⁵ J.M. Bocheński, *The Methods...*, op. cit., p. 2.

⁶ *Ibidem*, p. 3.

[...] From the ontological viewpoint, my Platonism asserts that there exist also ideal things, content, etc. It is true that I do not think that the things are flying somewhere around “in the world” and I am rather inclined to accept that they arise only thanks to people. But man recognizes such things. [...] they are not his thoughts [...] but the content of thoughts. They are given objectively.⁷

Advocating the Aristotelian-Kantian perspective, Bocheński accepts that “whatever is ideal, is a form of whatever is real and can be extracted from there in some way by our intellect and updated.”⁸ The ontology of the object has a few varieties in Bocheński’s view: ontology of the real object, ontology of the object and property, ontology of conditions (relational and functional), ontology of the ideal object and the like.

At the same time, Bocheński accepts the primacy of the real object over the ideal one. Earlier, as a rationalist, he wrote:

It is believed that we cannot know everything fully. It is very possible that there exist things which are cognizable only externally, isomorphously, as we used to say in logic. Obviously, such a thing is God and there may exist also other ones. My rationalism says, however, that what we are able to know about things, we know it within logic – not outside it – thanks to logical means.⁹

Thus, Bocheński differentiates the cognizable reality from the world as such, perceived as broadly as it is only possible, containing all classes of beings. Such a world includes not only the real world (treated as the set of all the cognizable objects in common experience, the world of temporal beings, beings existing in time). It comprises the world of nature as well (a concrete occupying the whole space at any given time).¹⁰ According to Bocheński, the world is the whole of reality understood as widely as possible, comprising both material and ideal beings. The world to Bocheński is heterogenic and not only homogenic (the material

⁷ J.M. Bocheński, *Autoprezentacja*, op. cit., pp. XXV, XXVI. All quotations have been translated by Jacek Jędrzejowski.

⁸ *Ibidem*, pp. XXV, XXVI.

⁹ *Ibidem*, p. XXII.

¹⁰ See A. Biłat, *The World as an Object of Formal Philosophy*, in: *Contemporary Polish Ontology*, ed. B. Skowron, Berlin–Boston 2020, pp. 87–108. The concrete (the world of nature) is here a collective, mereological set, the largest material whole; it occupies the entire space at any given time while the real world is here the set of all concretes, i.e., the empirically recognizable objects that occupy a certain place at a certain time. The real world does not include any relations or ideal objects that belong to the whole world.

wholeness of bodily beings, a collective set, homogenous as far as certain of their properties are concerned, for example, temporality, variability, etc.).¹¹

Relationships between the concepts of the world as a extensional whole (W), the real world (rW) and the world of nature (nW) in Bocheński's framework can be written as follows:¹²

$$nW \in rW \subset W.$$

where " \subset " denotes the set-theoretical proper inclusion and " \in " denotes the membership relation.

The Logical Structure of the World

In his *Autoprezentacja*, Bocheński defines himself as a rationalist and, stressing the importance of the intellect, he writes:

The intellect seen objectively is the same as formal logic. There results thus the following vision of the world: it is a colossal, to the highest degree complicated, mass of things, properties and occurrences. Still, impenetrable though it appears at the beginning, it does possess a completely defined (static and dynamic) *structure*. Indeed, the "structure" is another word that means "a network of relations." Formal logic, on the other hand, is nothing more than the most general theory of relations. This means that the world has logical structure. It even seems to me that the expression "a non-logical structure" is a contradiction.¹³

Therefore, it may be assumed that in Bocheński's framework the world has a relational structure, and it contains a network of relationships possessing formal properties that enable their description. These formal properties are the domain of the theory of relations, which is the most general section of formal logic.

The formal description of the structure of the world, its organization, does not include the description of individual properties of beings or the description of specific relations between them. The description of the formal properties of

¹¹ See J. Herbut, *Leksykon filozofii klasycznej*, Lublin 1997, p. 501.

¹² Cf. A. Biłat, *The World...*, op. cit., p. 96.

¹³ See J.M. Bocheński, *Autoprezentacja*, op. cit., pp. XX, XXII.

relations, which are components of the world's structure and types of these relations, is established in the theory of relations as a logical theory. It is this theory that serves to analyze reality and to identify the world's structure as a relational structure.

It can be supposed that Bocheński knew the works of Rudolf Carnap, who precisely defined what he understood by formal properties of a relation:

By formal properties of a relation, we mean those that can be formulated without reference to the meaning of the relation and the type of objects between which it holds. They are the subject of the theory of relations. The formal properties of relations can be defined exclusively with the aid of logistic symbols, i.e., ultimately with the aid of the few fundamental symbols which form the basis of logistics (symbolic logic). (Thus these symbols do not specifically belong to the theory of relations, but form the basis for the entire system of logic-propositional logic, the theory of propositional functions (concepts), the theory of classes, and the theory of relations.)¹⁴

Bocheński perceives himself as a rationalist. "My rationalism," he writes, "consists first of all in that I have always treated reality as cosmos, not as chaos."¹⁵ To him the world is a logical cosmos. In opposition to chaos it has an ordered structure, is an ordered whole.

Thus, the structure of reality as a network of relations is a whole, a system of logically distributed, mapped out objects connected by relations. Bocheński believes that whatever stands against logic cannot exist in the world.

Bocheński realizes that such a statement raises a great deal of questions about people, and so he answers it in the following way:

How can we know that the world is a logical cosmos? The answer to this question seems simple: The whole of human experience and – first of all – the experience of the natural sciences, assumes this thesis and it has always turned out that the thesis is confirmed. In the face of this fact it seems to me simply unreasonable to doubt the *logical structure of the world*.¹⁶

¹⁴ R. Carnap, *The Logical Structure the World*, trans. R.A. George, Berkeley-Los Angeles 1969, Part Two, Chap. A, Sec. 11, p. 21 [Ger. orig.: *Der Logische Aufbau der Welt*, Wien 1928].

¹⁵ J.M. Bocheński, *Autoprezentacja*, op. cit., p. XX.

¹⁶ *Ibidem*, p. XXI (emphasis added).

Again, in his *Autoprezentacja*, Bocheński promotes quietened theory-cognitive *optimism*, which consists in

some dose of trust in the human intellect, [...] in accepting the fact that although it is with difficulty and in an incomplete manner, we still can recognize certain states of things in the way that they are, and this without expressing towards them any fear or disgust, but through a common experience and reasoning.¹⁷

Further in his work, Bocheński states that for him, as a rationalist,

[p]aradoxically, the anti-sceptic attitude arises from the belief that the world is extraordinarily complicated and that we can recognize very little of it. The reality is not exclusively the same as we perceive it to be. It does not limit itself to human experience. It is most likely that we do not know many things, many are known only superficially, yet we do know *something very precisely and for sure*. The whole human experience speaks for rationalism, and there is nothing to speak against it.¹⁸

Bocheński advocates the rationalization of the world as one possessing the logical structure that can be regarded as its foundation, which determines it as a whole of its harmoniously ordered elements, objects, beings.¹⁹ These elements, beings or objects are not only those really existing, but also ideal ones.

The world *W*, according to Bocheński, has a rational, logical and relational structure, which means that its foundation, a logically ordered system of coordinated elements, is a set of hierarchically ordered beings. It is a certain whole conditioned by a stable logical ordering of its components and linked by means of relations. Its components, elements are things and states of things as well as ideal individuals (zero-argument relations), possessing certain properties or features (one-argument relations) and connected by many-argument relations. This order of the components, elements of the world is the source of the *cosmic order*, harmonies which are revealed through the laws of nature.

¹⁷ Ibidem, pp. XXII–XXIII.

¹⁸ Ibidem, p. XXIII(emphasis added).

¹⁹ Cf. B.K. Krzych, *Struktura rzeczywistości: jednowielorakość?*, “Amor Fati” 2017, Vol. 2(8), pp. 301–319.

The Formal Structure of the World

The considerations of the previous parts of this work can be given a formal, logical shape. In this respect, something is a structure when it constitutes a formally determinable relational structure.

The relational *structure*²⁰ of the world W (reality) is an ordered triple:

$$W = \langle W, \{R_i\}_{i \in U}, \{O_j\}_{j \in S} \rangle,$$

where the world W (called domain) is a non-empty set of all things, states of things and ideal individuals, U and S are subsets of the set N of all natural numbers, $\{R_i\}_{i \in U}$ is an indexed set of all unary relations (properties, features) on W and many-ary relations on W , while $\{O_j\}_{j \in S}$ is an indexed set of operations on W . If it is empty, the structure W is a pure relational structure, and if the set of relations is empty, this structure is an algebra.

As we have already mentioned, the world W , according to Bocheński, is a logical cosmos. As such, standing in opposition to chaos, it is organized by some hidden, internal natural *order*,²¹ by a certain solid relation ordering the nucleus of the world's structure and all of its elements.²² The leading philosophers and ontologists of our "Western" cultural circle basically agree that that cosmos – in the language of philosophy – is a world conceived as an internally ordered whole, in contrast to chaos. Reconstructing Bocheński's conception of the logical structure of the world in a formal way, it needs observing that the relational structure W of the world W assumes that the components of its domain W are ordered. We denote the ordering relation W by \leq ; it cannot be a relation belonging to the world W .²³ Then, in Bocheński's framework, the logical structure of the world W is represented by the following, slightly enriched system:

$$W' = \langle (W, \leq), \{R_i\}_{i \in U}, \{O_j\}_{j \in S} \rangle,$$

²⁰ See W.A. Pogorzelski, *Notions and Theorems of Elementary Formal Logic*, Białystok 1994, p. 386.

²¹ See A. Grzegorzczak, *W poszukiwaniu ukrytego sensu. Myśli i szkice filozoficzne*, Lublin 2018, part 3.1: *Ukryty porządek świata*, pp. 211–219.

²² It needs noting that among the relations R_i in the structure W there can be found many relations which order spatially, temporally, causatively or in any other manner. They are not relations which order the whole universum W , though.

²³ It can be understood as a *universal* relation holding between all elements of the whole world W . Relations R_i belong to the world W and they are defined for some classes of elements of the world W .

in which \leq is a binary ordering relation on W , that is, a reflexive, asymmetric and transitive relation on W .

To Bocheński, the structure of the world is a network of relations, a configuration of beings which are mutually connected to one another by the relations, suitably logically distributed, mapped out in the substructure (W, \leq) of the structure W' . It can be supposed that the structure (W, \leq) forms a logical *algebraic lattice*.²⁴ At the same time, both the temporal world – a dynamic one with the domain of temporal beings (beings existing in time) – and the static world – one with the domain of static beings treated as an extensional whole – have a logical structure. It is disputable whether its structure (W, \leq) has the form of a logical-algebraic lattice.

Reconstructing formally the conception of the logical structure of the world on the basis of the views put forward by Bocheński in several of his letters, I embarked on faithfully recreating his ideas or viewpoints on the world and its structure. Some general stances on the world and its extensional whole had already been worked out by European philosophers in antiquity and in the Middle Ages. In the last century, the best-known idea of the conceptual structure that categorized the world from the perspective of ontology and logic was expounded in Carnap's seminal work *Der logische Aufbau der Welt* (1928).²⁵ Apart from this, an outline of the general conception of the world's structure can be found in works of contemporary philosophers. For example, we find some ontological-logical considerations dealing with the world as a set of things possessing different properties and being connected by relations, as well as forming different sets, in the book *Mała propedeutyka filozofii naukowej* [A Short Introduction to Academic Philosophy] by Andrzej Grzegorzczak.²⁶ In this author's framework, the world is not only, as Bocheński argued, a world of real beings, observable, but also possesses ideal ones (non-observable, imagined or merely thought about), which hold certain properties.²⁷ In frameworks and descriptions of the logical structure

²⁴ This supposition is based on the observation that the word "structure" was and still is used in philosophy, logic and algebra in a variety of meanings, specifically just like that of "lattice," meaning an ordered set in which each two elements have *infimum* and *supremum* (see, e.g., S. Krajewski, ed., *Słownik pojęć filozoficznych*, Warszawa 1996, p. 187, and G. Birkhoff, S. Mac Lane, *Przegląd algebry współczesnej*, Warszawa 1966, pp. 375, 376).

²⁵ R. Carnap, *The Logical Structure of the World*, op. cit.

²⁶ A. Grzegorzczak, *Mała propedeutyka filozofii naukowej*, Warszawa 1989, Chap. 2: *Ogólna struktura świata*.

²⁷ *Ibidem*, p. 23.

of the world that are known to me, indeed, it is hardly possible to come across a formal reconstruction of such a structure that would comply with the ideas of Bocheński's conception, which can be "fished out" of his letters.

Man in Bocheński's World

The world as a whole, according to Bocheński, consists of things, states of things and ideal objects. Man occupies an important place in this world. He is not the creator of the world but its co-creator and as such bears responsibility for the world, is obligated to take care of its being and his own in particular. Consequently, he is faced with certain tasks and commitments. The care for the being is made real in his rational, wise acting and behaving, and invests him with a sense of the reasonability of his whole life. The greatness of man consists precisely in that he is capable of creative reacting to his own fate, making sensible choices, shaping his existence and rational participation in the existence of community.

The peculiar greatness of Bocheński consists in the fact that although he performed many different roles,²⁸ "he was a scholar, soldier, priest, monk, teacher, advisor to governments, political activist, publicist and journalist, pilot, driver, preacher, 'star' of international congresses, organizer and builder [...] and acted well beyond each of them," he was able to describe in a simple manner indications relating to man's struggle with secrets of the world and life. Bocheński writes about man's place in this world, among others, in the *Introduction* to his *Podręcznik mądrości tego świata* [A Coursebook on the Wisdoms of This World], in which we read:

Man himself and all his creations in the form of nations, cultures, achievements of science, etc., are fragments of no importance in the Universe. The world is in particular a real cemetery of dead civilizations and nations. Everything sinks in nothingness. What is more, our inner lives depend to a great extent on this world, on the laws of nature. [...] Man is a tiny, helpless fragment of the world, existing only during a fraction of the cosmic second, yet

²⁸ See Cz. Porębski, ed., ...*Skoro Pan Bóg raczył mi w swojej dobroci dać trochę rozumu, to po to, abym go używał...*, "Znak" 1995, Vol. 481, p. 14.

this fraction is everything we have at our disposal. How to proceed so as not to waste it – this is taught to us through commandments of wisdom.²⁹

Father Bocheński considered the commandment “Proceed in such a way as to live a long and prosperous life” to be the fundamental, the first and the most significant principle of wisdom. Several dozen other principles follow from the above-quoted one, with the inclusion of experimental data.³⁰ It is in them that Bocheński provides recommendations on how to live in the modern world and shows what the sense of individual beings is.

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Bibliography

- Biłat A., *The World as an Object of Formal Philosophy*, in: *Contemporary Polish Ontology*, ed. B. Skowron, Berlin–Boston 2020, pp. 87–108.
- Birkhoff G., Mac Lane S., *Przegląd algebry współczesnej*, 3rd ed., Warszawa 1966 [Eng. orig.: *A Survey of Modern Algebra*, New York 1954].
- Bocheński J.M., *Autoprezentacja*, trans. J. Garewicz, in: *Logika i filozofia. Wybór pism*, ed. Z. Garbowski, Warszawa 1993, pp.VIII-XXIX [Ger. orig.: *Selbstdarstellung*, in: *Philosophie in Selbstdarstellungen I*, ed. L.J. Pongratz, Hamburg 1975, pp. 1–36].
- Bocheński J.M., *Logika i ontologia*, trans. D. Gabler, in: *Logika i filozofia. Wybór pism*, ed. Z. Garbowski, Warszawa 1993, pp. 106–132 [Eng. orig.: *Logic and Ontology*, “Philosophy East and West” 1974, Vol. 24, No. 3, pp. 275–292].
- Bocheński J.M., *The Methods of Contemporary Thought*, trans. P. Caws, Dordrecht 1965 [Ger. orig.: *Die zeitgenössischen Denkmethode*, Bern 1954].
- Bocheński J.M., *Podręcznik mądrości tego świata*, Kraków 1994.

²⁹ J.M. Bocheński, *Podręcznik mądrości tego świata*, Kraków 1994, pp. 2, 3.

³⁰ Bocheński lived to be 93 years old and wrote the coursebook when he was over 90.

- Carnap R., *The Logical Structure of the World*, trans. R.A. George, Berkeley–Los Angeles 1969 [Ger. orig.: *Der Logische Aufbau der Welt*, Wien 1928].
- Grzegorzcyk A., *Mała propedeutyka filozofii naukowej*, Warszawa 1989.
- Grzegorzcyk A., *W poszukiwaniu ukrytego sensu. Myśli i szkice filozoficzne*, ed. R. Grzegorzcyk, Lublin 2018 [orig.: *Schematy i człowiek. Szkice filozoficzne*, Kraków 1963].
- Herbut J., *Leksykon filozofii klasycznej*, Lublin 1997.
- Krajewski S., ed., *Słownik pojęć filozoficznych*, Warszawa 1996.
- Krzych B.K., *Struktura rzeczywistości: jednowielorakość?*, “Amor Fati” 2017, Vol. 2(8), pp. 301–319.
- Pogorzelski W.A., *Notions and Theorems of Elementary Formal Logic*, Białystok 1994.
- Porębski Cz., ed., ... *Skoro Pan Bóg raczył mi w swojej dobroci dać trochę rozumu, to po to, abym go używał...*, “Znak” 1995, Vol. 481, p. 105.

Summary

This paper will focus on J.M. Bocheński's inclination towards seeing the world and its logical structure from the point of view of ontology. Accordingly, on the basis of Bocheński's selected utterances we will present and discuss the perception of the world proposed by the scholar, and then we will deal with questions pertaining to the logical structure of the world and examine a formal framework of this structure.

Key words: Bocheński, ontology, being, world, structure of world, algebraic relational structure