

## OPINION

On the Dissertation *Innovative Methods of Bionics and Biomimetic and Their Transformations in Modern Architecture* for awarding the educational and scientific degree "Doctor" to Nona Tosheva Tsekova

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Nona Tsekova's dissertation *Innovative Methods of Bionics and Biomimetic and Their Transformations in Modern Architecture* covers the field of the most current problems in architectural theory and practice. I am not a specialist in the field of architecture, but as tempted in the wide field of visual research I appreciate the doctoral student's goal to present and analyze innovative solutions worldwide, to seek connections with modern trends in Bulgarian architecture, to specify concepts, terms, classifications.

On this relevant topic Nona Tsekova cannot rely on terminology and procedures of analysis established in architectural research in our country, therefore it was necessary for her to define the main terms in her work - "bionics" and "biomimetic" and their derivatives, to develop them, to develop author's criteria and principles for classification and comparison. These circumstances make the author's task especially complex, but also attractive, with opportunities for real contribution in the Bulgarian environment.

In the introductory part it is declared that the term "bionics" was introduced in 1958 by the American Dr. Jack Steele in connection with systems with natural or similar characteristics. And the term "biomimetic" - was introduced in the 1950s by the American biophysicist Otto Schmitt and is associated with "design and manufacture of materials, structures and systems modeled on biological objects and processes."(P. 5) Tsekova notes that "In our time, methods related to bionics and biomimetics are

increasingly intertwined and seek symbiotic relationships, both with each other and with other different fields of science." (p. 6). It turns out that these intertwining and interrelationships are practiced creatively not only in architecture and design.

The dissertation is organized in three chapters:

The first chapter presents essential clarifications of terms and definitions, which unfold the argumentation and thesis, as well as a proposal of the dissertation student for a new type of classification of biomimetic methods. This elaboration of the basic concepts for the research is supplemented by the application *Glossary of some modern architectural terms* at the end of the text part of the dissertation (pp. 164-169). The author proves that she has mastered a basic expectation for any scientific research, namely the perfection of its terminology and conceptual environment. I must admit that as a non-specialized reader, I have repeatedly turned to the dictionary for explanations.

The second chapter discusses the trends in bionics and in a wider field inspired by it in our country and in world practice. In Bulgaria, the author points to examples of ecological and sustainable architecture that have similar goals to bionic methods. Among the many world examples are highlighted projects and realizations of the Israeli-American architect and designer Neri Oxman and the British architect Michael Pawlyn. Here the doctoral student's skills for in-depth case studies are impressive.

Chapter three discusses transformations and their potential in biomimetic methods in architecture. Nona Tsekova introduces "author's criterion - criterion for symbioticity" (p. 108) and discusses the possibilities for experiments related to symbiosis. The theoretical arguments are supported by numerous examples from construction and architectural practice. At the end of this chapter, the author proposes a "final discussion of possible transformations of traditional architectural concepts with the intervention of bionic models and principles", with the idea of setting a starting point for new directions of research (p. 145).

The organization in sections and subsections of each of the three chapters, as well as the many author's schemes, testify to the dissertation student's tendency and ability to structure/think in structures. This choice of systematization of the argument, leading to

the main thesis - the potential for transformations of bionic principles, seems convincing to me. I would recommend in the conclusion, along with the detailed "Summary of modern transformations of the methods of bionics and biomimetic in architecture. Socio-cultural reflections of bionic concepts", the main thesis of the dissertation to be more clearly worded.

The visual material is very rich, well selected, researched (some of the photos are by the author herself) and organized with the idea of comparisons. The photographs and reproductions in the text are linked by references to the catalog, which contains descriptions and correctly cited sources. Thus, the visual content is not only an appendix to the text, but an essential part of the dissertation. It also draws the attention of readers who are outside the field of specialists - architects and designers, and contributes to the approach to the issues and achievements of the study.

The bibliography and the internet sources in Bulgarian, English, Russian and German (pp. 156-163) convince us that the dissertation student has a wide knowledge and in the subject that she is covering.

The general recommendation for the dissertation that I can make is for some language editing (for example, I would replace the word "collaboration" with "coloperation"), as well as for a general proofreading. After these language interventions, I recommend that the work be published.

### **Conclusion:**

The dissertation is undoubtedly a novelty in the research field in our country. The clarifications of the terminology, the proposed author's categorization of the methods of bionics and biomimetics, the approximation of Bulgarian examples to this issue, the developed author's criterion for symbioticity, as well as the hypothesis with potential for research development proposed in the last part. Congratulations to the PhD student and her supervisor. Thus developed, the theme is attractive and significant for both architects and designers and visual artists.

It has potential for development and application in the field of education. As part of this wide readership, I evaluate the dissertation as successful.

The 49-page abstract clearly reflects the content and structure of the dissertation. The author's contributions are summarized correctly.

Nona Tsekova has participated in international forums with three reports, one of which was presented in Barcelona. The doctoral student has six publications on the topic of the dissertation, among them one published by the Institute of Art Studies - Art Studies Readings 2018 - "Art in Europe - Models and Identities", Institute of Art Studies, Sofia, 2019. Thus, she has exceeded the mandatory requirements for public presentation of her research.

The described contributions and merits of the dissertation give me a reason to vote convincingly to award the educational and scientific degree "Doctor" to Nona Tosheva Tsekova.

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