

OPINION

By **Prof. Dr. Arch. Orlin Davchev**

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CONCERNING:

Dissertation work of arch. NONA TOSHEVA TSEKOVA for awarding the educational and scientific degree "Doctor" in the doctoral program "Theory and History of Architecture", professional field 5.7. "Architecture, Civil Engineering and Geodesy", to the sector "Fine Arts", Institute of Art Studies, BAS, Sofia.

The opinion was presented in my capacity as a member of the Scientific Jury, appointed by Order №429-RD of 30.07.2021 of the Director of the Institute of Art Studies and Decision of the Scientific Jury from its first meeting.

1. Short Biographical Data

Architect Nona Tsekova graduated from the University of Architecture, Civil Engineering and Geodesy in Sofia in 2015. Her diploma project was awarded a Special Prize by Coventry University in the third edition of the City Academy 2016. Her additional qualifications include participation in a number of courses and workshops on parametric modeling and rapid prototyping. Since 2016, architect Nona Tsekova has been a PhD student at the Institute of Art Studies, Bulgarian Academy of Sciences, under the supervision of Assoc. Prof. Dr. Architect Stella Tasheva. Her parallel creative activity includes participation in teams in the development of architectural projects and competitions, as well as mentoring in several formats for architectural workshops. She works on a variety of scale and focus projects in the field of architecture - from those related to digital fabrication, prototyping, product and exhibition design (as part of the team of Transformatori and SmartFabLab), to architectural projects on a larger scale - building and urban (as part of various collectives).

2. GENERAL CHARACTERISTICS OF THE DISSERTATION WORK

The dissertation on the topic: "INNOVATIVE METHODS OF

BIONICS AND BIOMIMETICS AND THEIR TRANSFORMATIONS IN

CONTEMPORARY ARCHITECTURE" by architect Nona Tsekova, has a volume of 165 pages, introductory part, 3 chapters, conclusion and contributions. The cited literature and information sources include 11 titles bibliography in Cyrillic; 39 titles in Latin; 134 independent internet sources. Additional literature: 21 sources. After the appendices with bibliography and sources there are 2 more appendices - "dictionary of some modern architectural terms" and "catalog of images" (an additional 105 pages).

The introductory part includes the setting of the study - relevance, state of the problem, object, subject, purpose, boundaries, methodology and expected results of the study.

Chapter One: A Chronological Review of Terms and Definitions. Formulation of a degree of innovation and a proposal for a new type of classification of biomimetic methods. The first section in a chronological order discusses the main concepts and approaches that describe the topic - their introduction and development, gradation of application. In the next, second section, their categorization according to different authors is presented. An opportunity for a new type of extended classification of the considered methods of bionics and biomimetics in architecture is opened in view of the increasingly dynamic development of the field today. The proposed classification levels are tested in the analysis of the dialogue between space and material in architecture in order to clarify these relationships through the prism of nature-inspired analytical and formative methods. The author's extended categorization of the methods serves as a basis and framework in the selection of the analyzed examples and in the development of the other topics in the following chapters of the text.

Chapter Two: Bionics and Bio-Inspired Trends in the Bulgarian Architectural Environment. Analysis of Examples from World Practice. Interrelation with Sustainable Concepts. The first section focuses on the application of the considered methods in the Bulgarian environment - from traditions to modern concepts, supplementing the historical overview of the first chapter. The analysis develops again against the background and in comparison with examples and trends from the world architectural practice, with an assessment of the presence of scientific interest, potential for development and connection with parallel trends in architecture. Possibilities for connection with traditional regional architectural and construction principles are considered. The second section analyzes leading examples of architectural projects and concepts falling within the parameters described in the proposed classification. The focus of the study are the examples in which there is an accent on the application of biomimetic principles at a minimum of two levels - i.e. in which an increased degree of innovation is reported. The last part of the section compares other contemporary trends that have points of contact with the latest levels of application in the proposed author's classification. Different approaches to ecological architecture and its connection with modern concepts of biomimetics in sustainable architecture are considered.

Chapter three: Transformation and Transformative Potential of Biomimetic Methods in Architecture. Symbioticity and Author's Criterion for Symbioticity. New Opportunities for Experiment and Symbiosis - a Combination of Tradition and Innovation - Discussion of Hypotheses. In the first section an author's criterion for symbioticity is introduced. The possibility of its use as an auxiliary tool in

architectural design and research tasks for the purpose of optimization analysis through a bionic prism, as well as for the direction of opportunities for new design approaches, for innovative, experimental combinations with increased sustainable characteristics are being discussed. The symbiotic criterion proposed by the author is tested by using it in the analysis of selected natural materials and to what extent their use can have such a character. The focus of the second section is in the final discussion - "guidelines for types and nature of possible transformations of traditional techniques through bionic analytical principles and design approaches". The possibilities for a combination of biomimetic and sustainable approaches for the use of natural materials in architecture and their symbiotic and transformative potentials are discussed. Based on reasoning and comparative analysis, hypothetical alternative directions of development and design are proposed - potential transformations based on a combination of regional influences and innovative bionic strategies.

Final part of the dissertation, which summarizes some main lines of development of bionic methods and transformations reported in the analysis process. Some cultural and social reflections of biomimetic concepts in architecture are also presented.

Contributions. The author's contributions are based on the set goals and objectives. The performed tasks correspond to the set ones.

The main contributions from the dissertation are scientific-theoretical and of

Scientifically-applied nature:

- A revision of basic and actively complementary terminology has been carried out - in order to clarify its mutual semantic connection from a contemporary point of view, and to trace its positioning in an architectural environment.
- An author's categorization of the methods of bionics and biomimetics in architecture of four main stages has been created.
- The modern bionic tendencies in the Bulgarian architectural environment are traced and summarized.
- A comparison has been made between the high levels of application of the considered bionic methods with other modern architectural trends (such as ecological and sustainable architecture), common characteristics and directions of complementarity have been identified.
- An author's criterion for symbiotics in architecture has been developed. It is also considered as an additional tool for heuristic analysis and guidelines for optimization in general architectural theory and design.
- Two hypothetical transformations are proposed - bionically inspired and based on architectural approaches based on traditional techniques - a new combination of materials and strategies for increased efficiency and improved behavior and sustainable characteristics of the architectural "organism".

- The directions and levels of transformation of the considered bionic approaches and the potentials for future development and subsequent research are summarized.

3. EVALUATION OF THE PUBLICATIONS on the dissertation.

The author's publications are six, developed independently and published in the period 2016 - 2019. Three of the titles are related to the doctoral student's participation with reports in national and international scientific forums. All publications are related to the topic of the dissertation, reflect parts of the research and show its relevance.

4. ABSTRACT. The presented abstract of the dissertation has a volume of 50 pages. It is composed according to the established requirements and objectively reflects the key points of the dissertation. The presented content correctly refers to the developed ones, which gives the opportunity to outline the achieved scientific and applied contributions, which I fully accept.

5. RECOMMENDATIONS

I wish architect Nona Tsekova to continue to maintain a high level in her future work in the development and publication of important scientific works for the profession and to prove herself as a bright specialist in theory and practice with strong interests in the problems of biomimetics in modern architecture. Proof of her scientific and creative potential are a number of well-deserved awards, international specializations, active participation in various architectural initiatives and workshops. Arch. Nona Tsekova demonstrates a deep interest in the manifestations of architectural themes in a wide range of scales and design categories. As awarded projects from her work in the field, we can mention - Second place in the competition for renovation of the Youth Center, Varna, 2016, as well as the first place in the Architectural Plein Air "CATCH IN THE POUND NET" 2017.

I am convinced that the presented work will find wide application as a theoretical and applied material in the education of students and raising the qualification of graduates. For these reasons, I recommend that the dissertation be published in the future.

6. CONCLUSION

The materials provided by arch. Nona Tsekova for opinion give me reason to confirm that a quality, relevant and useful for theory and practice dissertation has been presented to us, and the author has shown with this work that she can analyze and synthesize problems, formulating important conclusions and ideas in the field.

I fully accept the author's contributions presented in the dissertation, which have been achieved with a lot of work, thorough research and consistency. The requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria (LASRB), the Regulations to it and the normative documents of BAS have been complied with.

All the above gives me reason to accept the dissertation of arch. Nona Tsekova for fully completed.

As a member of the Scientific Jury, I give my positive vote "FOR" awarding the educational and scientific degree "DOCTOR" to arch. NONA TSEKOVA.

Sofia, 23rd October 2021

Prof. Dr. Orlin Davchev