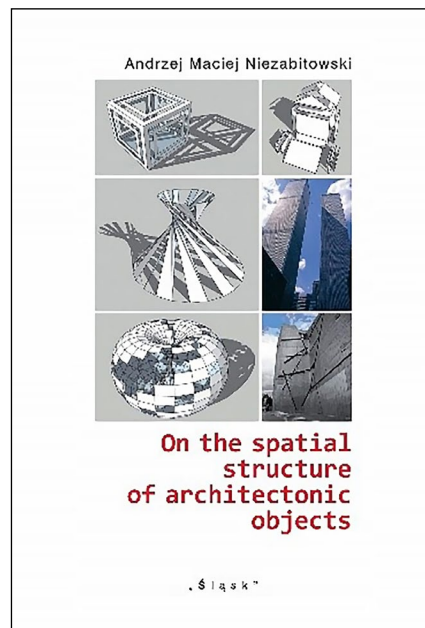


## ON MORPHOLOGY OF BUILT-UP SPACE

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Niezabitowski, Andrzej M. (2018). *On the spatial structure of architectonic objects*. Katowice: Śląsk. 556 p.

Not only construction workers but, first of all, architects should get the feeling of, and understand the building. We usually look at the building in terms of an aesthetic and compositional work of art, less often in terms of the structure; i.e. less often in terms of its architectural substance, morphology of the built-up space and, last but not least, in terms of its syntax, that is, articulation of the shell, the solid, and the interior.

Morphology in construction or architecture? This is a clear borrowing from natural sciences, from the science of forms. Morphology deals with form, anatomy, structure of something. General morphology of architecture, on the other hand, is the area of research in the architec-

tural form, focusing on the spatial structure of objects. Morphology and syntax are components of architectonics.

Architectonics stands for research into various types of construction and their character. The basic terms are: layout, structure of the building, composition, structure and methods of arranging order. Therefore, it is a discipline dealing with description, analysis and systematics of spatial objects. It uses its own research methods.

Andrzej M. Niezabitowski's new book "**On the spatial structure of architectonic objects**", published by Śląsk Publishing House in Katowice (Niezabitowski, 2018), promotes our understanding of the gist of morphology of built-up space. The book has a significant subtitle: **Foun-**

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### ***datations of the general morphology of space in architecture.***

The Author of this book was twice the Dean of the Faculty of Architecture at the Silesian University of Technology. He published about 60 standalone scientific articles and 4 books.

It is worth getting familiar with this book. The Author's many years of experience in researching spatial structures of a variety of construction objects helped him to arrive at a surprising working hypothesis:

In spite of significant differences between built structures, erected in different times, locations, and differing otherwise in many respects, there is a significant similarity between them regarding spatial structure. The recurrent characteristic is the features and types of elements included in the architectural objects, as well as types and categories of spatial relationships between them.

The Author approaches the universal system of built-up space as a phenomenon which calls for specific grammar, morphology and syntax, and, therefore, for extensive interdisciplinary research.

Such assumptions of the Author's research have serious consequences! The Author doesn't hesitate to note that the concept of style seems to be an outdated tool, as it focuses mainly on the superficial and the decorative layer of the building treated as an added value to the technical structure, therefore being a kind of makeup or costume. And here we come to the heart of the matter: this approach focuses the attention of researchers mainly on the differences between architectural objects, and ignores their important, shared features.

### **Book's contents**

The book has all the qualities of research work. The research problem debated by the Author concerns the issues of classification and evolution of architectural forms, and is of a diagnostic nature. Here, systematics is both a research tool and the purpose of scientific cognition, it is of qualitative character and, for the most part, uses descriptive narration complemented by graphic visualization.

This integral approach to important problems related to the spatial nature of building structures in one joint study is the greatest value of work. In the opinion of the reviewer, the book written by Professor Andrzej Niezabitowski offers an excellent knowledge base for classifying and systematizing architectural structures. The extensive text (566 pages) with numerous diagrams and drawings is divided into eight parts. In logically separated chapters, the Author presents his research and methodological assumptions (Chapter 1), acquaints the reader with the proposed theory of architectural space (Chapter 2) and subsequent levels of the subject matter analysis (Chapters 3, 4, 5). In Chapter 6, the Author presents his own systematics of spatial layouts in architecture, which he verifies in Chapter 7 quoting an example of a Renaissance mansion – Villa Rotonda (in Vicenza, Italy, architect A. Palladio, Figure 1). In this case, the main components of the system,

i.e. 4 porticos, the cuboid body and the pyramid roof with the dome are analysed. There are also two other examples in the summary (Chapter 8: Kukulcan pyramid – Chichen Itza in Mexico – Figure 2, and part of the Buddhist temple in Sanchi, India – Figure 3.). In addition, the Author states that buildings and structures around the world have been and still are created basing on a kind of code, which the Author calls the genetic code, founded on the combination of basic elements which, in effect, create specific types, categories and varieties of spatial objects. There is an analogy there to a diversity of living organisms or geological and landscape forms.

The concept of three levels of analysis mentioned before is the concept of Authors. The perceptual and visual analysis of the substance is the first level. Taking into account the latest research on the theory of ecological perception Gibson's (2014), Marr's (2010) and Biederman's (1997) theory of visual perception, as well as a large group of new generation of researchers, the Author develops his own theory of building an architectural form, taking into account functioning of space as a conglomerate of substance, morphological structure and a system with specific syntactic features.

The second level of spatial analysis is the morphology of architectural space, including the description of the object in terms of its cardinal features. The third level of analysis is the syntax, that is the articulation of emptiness, surface, solid and interior.

Clearly, from the methodological standpoint, the book draws from the general theory of systems, selected theories of visual perception, linguistics, as well as natural sciences (astronomy, geomorphology, plant and animal morphology). The research required from the Author a good deal of theoretical preparation.

While reviewing, one ought to ask the question whether there are equivalents of this book in academic literature. The only known example of a similar subject is the book entitled "Architecture: form, space & order" (Ching, 1979) which, nonetheless, is considered to be rather a popular publication, not based on any scientific methodological foundation. Similar considerations apply to two other publications: Clark and Pause (2012) and Baker (1997). The themes of books by Mitchell (1994) and Thiis-Evenesen (1987) are somewhat more similar to the issues discussed here. Both are included in references to the book being reviewed.

The research techniques specific to the subject, developed by the Author and used in his works, (Niezabitowski, 2009, 2017, 2018, 2019) are derived from these orientations and inspirations. These are, in particular:

- *contour and silhouette analysis* as the basis for the process of separating the spatial system components (or parcellation),
- *component analysis*, i.e. isolation and determination of the main components of the spatial layout,
- *primitivization and geometrization* of the entire object and its components by their perceptive reduction to the so-called geons (see Biederman, 1997),

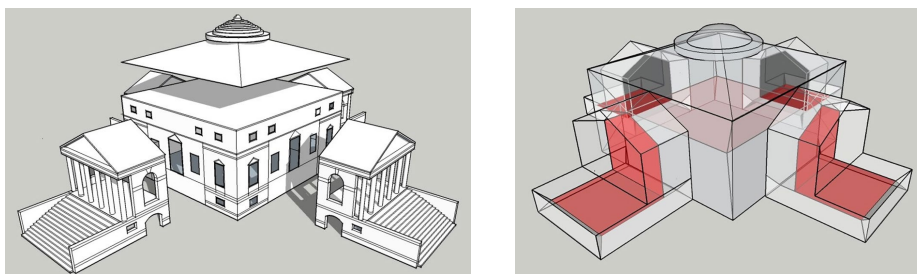


Figure 1. Villa Rotonda – deconstruction decomposition of the volumen retaining the articulation of the surface to the mini-morphemes level (Niezabitowski, 2018)

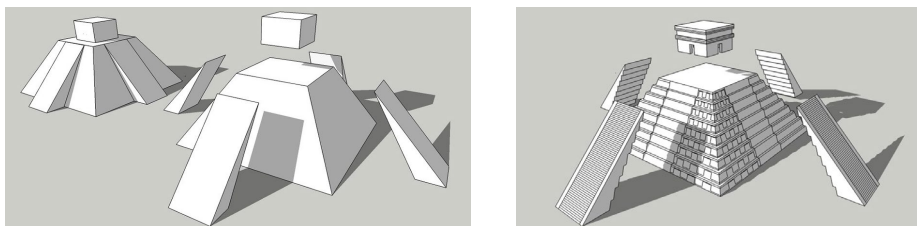


Figure 2. Chichen Itza temple: decomposition and primitivisation of the volumen into tectons – body, stairs, crowning (Niezabitowski, 2018)

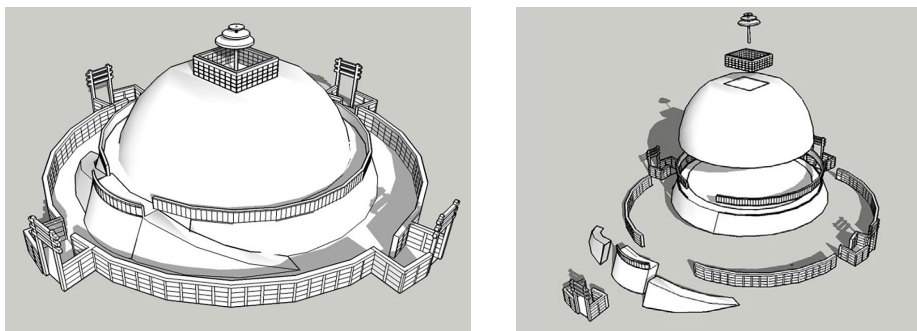


Figure 3. The Great Stupa in Sanchi – the volumen of the whole arrangement with basic surface articulation and the decomposition of various articulation levels (from tectons to mezo- and micro-morphemes) into the main formants (Niezabitowski, 2018)

– *deconstruction (decomposition) of solids* in order to make their boundaries (parcels) readable and spatial relations, or structure, clearer.

Specific research procedures result from the adopted methodological approach and endorsed research techniques. They depend on the level of spatial analysis, i.e. the level of detail.

### Language

An important aspect of studying the structure of spatial systems is the degree of formalization of the language. The description of space is generalized and based on basic geometric and topological categories. The Author avoids mathematical approach. Nevertheless, the language of the book is a scientific and requires a degree of focus and attention from the reader. Nonetheless, it is not hermetic, especially since it describes spatial phenomena in the world around us. To find out how complicated is the lan-

guage introduced by Professor A. Niezabitowski is, it is enough to look at captions to Figures 1, 2, 3.

The vocabulary used in the book is its added value and also its burden. To facilitate the reception of the subject matter, the Author has prepared (an original and interestingly developed) dictionary of the most important concepts and terms used in the book, nearly a hundred altogether.

So how does one read this book? It is structured in such a way that only becoming acquainted with the entire text gives an adequate picture of what it really is. It is a systemic approach, therefore bypassing any of the subsystems (chapters) may make it difficult to understand the concept as a whole.

### Illustrations

Illustrations play an important role in the book, and there are as many as 662 of them! They can be “systematized”

into three groups. The first consists of flat diagrams, abstract in character, illustrating certain concepts related to space, but in a general way. The second group includes drawings of three-dimensional objects. The third group comprises photographs of specific structures which are examples of the concepts being discussed. The selection of illustrations is extremely accurate, they perfectly complement theoretical considerations. This is rather unfortunate, but the quality of the illustrations could definitely be better. I think that in a different quality edition both the illustrations and the book would be much better appreciated.

## Conclusions

The problems of morphology of built-up space as well as architectonics have extensive applications in architectural studies of spatial structures. Those issues find applications in the basics of generative and parametric design. After all, the roots of parametric design, of 3D (and subsequent) modelling are in the morphology of space and in strictly defined structure.

Another possibility is to extend the usage the system of concepts developed by the Author in the research on the impact of spatial aspects of the architectural form on human psyche and human behaviour in a built-up environment. Neuroscience, especially neuro-aesthetics, may also be a potential area of application of this conceptual system.

It is difficult to imagine lectures on Theory of Composition, and Theory of Architecture, and Introduction to Design without familiarity with architectonics and space morphology.

Publishing this book, the Śląsk Publishing House in Katowice gave itself a splendid present for its 25th anniversary. Nonetheless, it is a low-circulation publishing house, so it would be worth it to attract attention of other publishers to ensure wider dissemination Professor Andrzej Niezabitowski's research.

## References

- Baker, G. H. (1997). *Design strategies in architecture: An approach to the analysis of form* (1st ed.). London: Taylor & Francis.
- Biederman, I. (1987). Recognition-by-components: a theory of human image understanding. *Psychological Review*, 94(2), 115-147. <https://doi.org/10.1037/0033-295X.94.2.115>
- Ching, D. K. (1979). *Architecture: form, space & order* (1st ed.). New York: Van Nostrand Reinhold.
- Clark, R. H., & Pause, M. (2012). *Precedents in architecture: Analytic diagrams, formative ideas, and partis* (4th ed.). Hoboken, New Jersey: Wiley.
- Gibson, J. (2014). *The ecological approach to visual perception*. Oxford: Focal Press. <https://doi.org/10.4324/9781315740218>
- Marr, D. (2010). *Vision: a computational investigation into the human representation and processing of visual information*. Cambridge: The MIT Press. <https://doi.org/10.7551/mitpress/9780262514620.001.0001>

- Mitchell, W. J. (1994). *The logic of architecture. Design, computation and cognition*. Cambridge, Massachusetts: The MIT Press.
- Niezabitowski, A. M. (2009). Architectonics – a system of exploring architectural forms in spatial categories. *ArchNet-IJAR: International Journal of Architectural Research*, 3(2), 92-129.
- Niezabitowski, A. M. (2017). *O strukturze przestrzennej obiektów architektonicznych*. Katowice: Śląsk.
- Niezabitowski, A. M. (2018). *On the spatial structure of architectonic objects*. Katowice: Śląsk.
- Niezabitowski, A. M. (2019). Architektonika – ogólna morfologia przestrzeni architektonicznej. In S. Gzell (Ed.), *Architektura, urbanistyka, nauka* (pp. 15-48). Warszawa: PWN.
- Thiis-Evensen, T. (1987). *Archetypes in architecture*. Oslo: Norwegian University Press.