

The Art of Building at the Dawn of Human Civilization

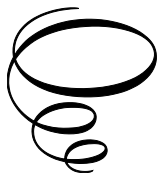
The Art of Building at the Dawn of Human Civilization:

The Ontogenesis of Architecture

By

Marta Tobolczyk

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Figure 1. Map of the Near East showing Epipalaeolithic and Neolithic sites and the earliest cities.

ABSTRACT

This book is addressed mainly to architects, students of architecture, archaeologists and anthropologists. Nevertheless, we hope everybody interested in prehistoric cultures, art and architecture will find this book attractive. The author invites you on an exciting journey into the primordial past of human architectural activity. Until recently, the prehistoric period of architectural development was not given enough importance in the education of architects, which usually begins from antiquity, when the level of civilizational advancement was very high. While the lack of written sources and limited knowledge about prehistoric cultures would excuse such a situation in the mid-twentieth century, the progress in archaeological discoveries nowadays is a reason for significant change. This book offers a new unconventional outlook on architecture by presenting its evolution, along with some moments of stagnation, initiated in prehistory, as the gradual solving of ever-more complicated spatial and structural problems that followed the successive development of the human ability to think in symbolic and abstract terms. Such an anthropological and a-historic point of view allows, according to the author, a formulation of the general principles and regularities of the development of architecture. Moreover, the new assumptions based on the last decades of archaeological discoveries give reason to initiate a new field of studies within the Theory of Architecture, called an Ontogenesis of Architecture¹. The essential issues explored are the processes leading to the birth of permanent settlements, as well as the genesis and evolution of archetypal forms of prehistoric and ancient communal/cult buildings. The purpose of the presented research is to reveal the evolutionary phenomena which determined the spatial organization of, for example, a simple household, the world's oldest antecedents of temples, and cities' urban patterns. The method of studies is based on the comparison of structures excavated in different regions with the intention of distinguishing convergently developed universal features and principles from those specifically developed locally within collective cultural creative processes. Some issues presented in this book can be perceived as a contribution to the architectural design practice as creative inspirations in the realm of organic forms of architecture.

¹ General foundations of this field of studies, introduced by the author, are presented in the book: Tobolczyk M., *Narodziny Architektury. Wstęp do Ontogenezy Architektury*, PWN, Warszawa, 2000, and in: Tobolczyk M., *The Birth of Architecture. An Introduction to the Ontogenesis of Architecture*, Urban International Press, Gateshead, UK, 2008

INTRODUCTION

The scope and meaning of the term civilization, which is used in the title, has transformed several times during its history, and even presently it is interpreted in many ways. Etymologically, the word civilization derives from the Latin term *civitas*, meaning “a city”, which explains why it usually refers to urban state-level societies, in contrast to the nomadic tribes living in temporary settlements without a state-level organization. A civilization is generally defined as an advanced state of human society containing highly developed forms of government, culture, industry, and common social norms. It is commonly used to describe human societies "with a high level of cultural and technological development", as opposed to what many consider to be less "advanced" societies. This definition, however, is unclear, subjective, and it carries with it assumptions no longer accepted by modern scholarship on how human societies have changed during their long past (Violatti 2014). The term "civilization" as it is now most frequently understood, as a complex state with centralization, social stratification and specialization of labour, corresponds to the ten criteria that distinguish a city from a village formulated by Australian archaeologist Gordon Childe (Childe 1950). Such a definition can be applied to the highly organized city-states in Mesopotamia in the Early Bronze Age, around 3000 BC. Gordon Childe interpreted the emergence of civilization as the result of two successive revolutions: the Neolithic Revolution, stimulating the development of settled communities, and the Urban Revolution. The term revolution needs to be understood metaphorically since the processes of transition from nomadic lifestyle of hunters and gatherers to settled way of living based on cultivation and pastoralism took thousands of years, so a more proper term would be evolution.

Such a definition can be justified by the level of knowledge available in the 1930s–1950s. Nevertheless, the impressive new discoveries, such as the megalithic stone circular cult enclosures in Göbekli Tepe near Şanlı Urfa, Turkey, dated to the 9th millennium BC, and the first covered cult building located in the same region in Nevalı Çori advocate dating the period called the dawn of human civilization to a much earlier stage of development. With regards to that period, it is reasonable to define civilization as a highly developed culture, including its social organization, government, laws, and arts, or the culture of a social group or country at a particular time (Adams 1966, Haviland 2013). Consequently, we pay less attention to such elements of older definitions such as social stratification imposed by a cultural elite, symbolic systems of communication (for example, writing systems), and a domination over the natural environment. That's why in this book special attention is paid to the prehistoric settlements in the Middle East, where in the area called the Fertile Crescent during the Neolithic revolution (10th–8th millennia BC) remarkable changes occurred in the art of building and various primordial forms of architecture were generated. The conducted research aims to formulate general rules that govern evolutionary processes in architecture. Opening up a new field of studies (Ontogenesis of Architecture) within architectural theory will bring new insight into the conditions of life of our prehistoric ancestors, much different from those mythically inspired views shared in the past. It is now possible to trace the early stages of the process by which true architecture grew out of man's first rude attempts at building.

PART I

INTRODUCTION TO ONTOGENESIS OF ARCHITECTURE

Considerations on the Theory of Architecture

Today we are witnesses to the tremendous changes occurring both in our environment and our minds. Contemporary building technologies and design methods give us unique opportunities to shape our architecture, which not only fulfils human needs but moreover serves as a bridge between the worlds of culture and nature, thus restoring the role it played in the distant past. Today, however, by living in our man-made reality, we have lost the original intuition and sense of relationship with nature that our ancestors had in antiquity. A deeper understanding of the processes that underlie architecture in its organic development would help to rebuild the lost connections and meet the needs of the 21st century. Unfortunately, neither history nor the theory of architecture, as they have been taught to date, can provide such knowledge. Yet we can approach this issue by exploring its roots and by seeking factors which prompted the evolution of specific functional and spatial patterns in the new field of study: the ontogenesis of architecture.

If we look at treatises written throughout the ages, the content of which constitutes what is traditionally called the theory of architecture, we can identify two specific rules. Firstly, these treatises have always appeared at crucial points in history, expressing the view that architecture has exhausted all possibilities and innovation, and with its previous media it couldn't meet new requirements. Secondly, they intended to present the principles of architecture in a relatively short time span, and as a problem-solving concept at the time. In actual fact, these treatises can be seen simply as polemics on architecture contemporary to the authors.

The well-known, outstanding work of antiquity – *De Architectura Libri Decem* by Vitruvius – generally follows this law, with some exceptions. Addressed to the Roman emperor Augustus, it intended to restore past splendour to the art of building. Written by an engineer-architect between 27 and 23 BC, it presented a theory useful in both planning and building practices considering a variety of factors: construction, terrain, orientation, wind, light, shadow, elevation, and materials, but also rigorously defined the orders of architecture and the three fundamental laws (*firmitas, utilitas, venustas* Eng. *firmness, commodity and delight*) that architecture must follow, known as the Vitruvian Triad. According to Vitruvius, theory was "the factor which, based on mastery and knowledge of proportion rules, can clarify and explain the created work." So, the treatise had its clearly defined temporal-spatial frames and practical sense. Vitruvius drew upon human sciences in his book and included in it the legacy of both ancient Greece and Rome. It is in fact the only written source of knowledge about classical architecture to have survived. He sought to set in order all the accessible material related to architecture. Thus, *De Architectura* was an extensive and comprehensive work for its time. It became a model of architectural treatise for Renaissance authors Palladio, Alberti and Serlio, and it still affects and influences the way the theory of architecture is understood today.

Amongst the treatises addressed to contemporary needs, we can include the French works written on the threshold of the Industrial Revolution: the 18th-century *Cours d'Architecture* by Blondel (1771), *Essai sur l'Architecture* by Marc-Antoine Laugier (1753), the 19th-century *Traité d'Architecture* by L. Reynaud, and the more recent attempts by Luis Sullivan and Frank Lloyd Wright, who seemed to be seeking an individual, unique image of American architecture as a response to 20th-century needs. Even if we take works with a larger scope and wider perspective, like those by Lewis Mumford and Sigfried Giedion, they were still annotated reviews of the opinions about architecture prevailing over the ages. In compliance with the existing state of knowledge in which treatises on architecture are perceived as architectural theory, Kate Nesbitt (1999:16) formulated the following definition:

Within the discipline of architecture, theory is a discourse that describes the practice and production of architecture and identifies challenges to it. Theory overlaps with but differs from architectural history, which is descriptive of past work, and from criticism, a narrow activity of judgment and interpretation of specific existing works relative to the critic's or architect's stated standards. Theory differs from these activities in that it poses alternative solutions based on observations of the current state of discipline, or offers new thought paradigms for approaching the issues. Its speculative, anticipatory, and catalytic nature distinguishes theoretical activity from accomplishments.

When discoursing on architectural theories, she tries to categorize them according to their scope and the manner of their presentation. She says:

Theoretical treatises are fundamentally concerned with the origins of a practice or of an art. For example, a treatise on building might situate the origins of construction practice in the need for shelter. A treatise on architecture might place the origins of this disciplinary practice in the imitation of nature, (mimesis) and in man's innate desire to improve upon it. (Nesbitt 1999:18)

In addition to the issue of origins, she assigns five categories:

1. The requisite qualities of an architect in terms of personality, education and experience.
2. The requisite qualities of architecture (as in Vitruvius's triad).
3. A theory of design or construction method.
4. Examples of the canon of architecture.
5. An attitude about the relationship between theory and practice (Nesbitt 1999:18–19).

Then she distinguishes types of theories according to the manner of their presentation:

Theory can be described by several attitudes towards the presentation of its subject matter: for the most part it is prescriptive, proscriptive, affirmative, or critical. All of these differ from a 'neutral', descriptive position. For instance, a conventional historian might show how others have approached the issue of the moment, without explicitly advocating a position. (1999:17)

She makes the opposition between a conventional descriptive approach and a new unconventional attitude which can be prescriptive (offering solutions or manifestos), proscriptive (saying what should be avoided in design), or affirmative. In such a classification, the dominance of form over the content and the priority of subjective attitude over the objective one are not striking since, according to the author, architectural theory is just a discourse (Nesbitt, 1999:16). Is it in fact a theory or only theorizing¹ on the theme of architecture? Actually, such an approach, continued by, among others, A. Krista Sykes in another anthology *Constructing a New Agenda: Architectural Theory 1993–2009*, in which architectural theory serves as a doctrine foundation to define style or movement formation, and when architectural theoretical discourse has become more concerned with its position within culture generally, and thought in particular, is currently pretty common. University courses on architecture theory include more discussions on philosophy and cultural studies than on architectural practice. The assumption that the multiplication of viewpoints represented by different architectural critics, which has taken place over the past two decades, means significant positive transformation is misleading. The pro-practice movement of the 1990s, with its focus on “the realities of building, which has shifted architectural theory away from utopian ideals and heavy-handed cultural critiques toward the realities of architecture and building”² is only a sign of chaos and the lack of grand ideas in recently created architecture. Is a theory in the form of discourse able to meet the expectations and challenges of the 21st century? Should we interpret pluralism as “a bunch of flowers in the vase”?

Nowadays, when all previous philosophies of life, based on the mechanistic concepts of Descartes and Newton, are the subject of transformation into a more holistic and ecological philosophy, when the foundations of natural sciences, in force for 300 years, have become insufficient to elucidate new discoveries, an effort is being made to establish a new paradigm for the next stage of civilization development. It is also time to revise the way in which the knowledge of architecture is presented. It seems that the very contents of the notion of a *theory of architecture*, as well as the definition of architecture itself, need some redefining. We should take a new look at its scope and meaning; the ideas and thoughts in use up to now do not cohere either with the present knowledge of architecture or with the current scientific consciousness.

Since the mechanistic concept has presented the world as a series of elements put together in the form of a large machine in which each part could be separated from the whole, scientific order was also perceived as relying on division and segregation. A division into two distinct disciplines, engineering and architecture, carried out in the 18th century, narrowed the concept of architecture and thus it was viewed and discussed merely in terms of aesthetics. The proud name of the “art of building”, given by Alberti (Alberti 1485), was gradually reduced to the role of *decorum*. Paradoxically, at the end of the 19th century, architecture was identified merely with embellishment. The English art critic John Ruskin stated that “architecture is the art which so disposes and adorns the edifices raised by man that the sight of them may contribute to his mental health, power, and pleasure” (1849:7) and “The architecture is nothing but an ornament added to the building”. He was persuaded that it was ornament which distinguished architecture from mere building (Pevsner, 1969:22).³ Despite some later attempts to restore architecture to its primordial interdisciplinary character, it is still conceived rather in terms of art and creativity than as a building craft. Although since the 1960s designers have preferred to describe their work as “the art of shaping space”, the classical definition of architecture as the “art of building” has generally survived until today.

All these aspects and the fact that the theory of architecture was mainly practiced by art historians have had a strong impact on its definition and its content, which has been mostly derived from the theory of aesthetics and the theory of

¹ Kate Nesbitt, by using the provocative title *Theorizing a New Agenda for Architecture* tried to express “the lack of dominance of a single issue or a single viewpoint as characteristic of the pluralist period imprecisely referred to as postmodern” (Nesbitt, 1999:16).

² Krista Sykes, “*Constructing a New Agenda: Architectural Theory 1993-2009*”, New York: Princeton Architectural Press 2010, abstract presented by the publisher

³ The distinction between architecture and mere “building” was marked by Nicolaus Pevsner in the introduction to his *Outline of European Architecture* (1942): “a bicycle shed is a building; Lincoln Cathedral is a piece of architecture (...) the term architecture applies only to buildings designed with a view to aesthetic appeal.”

cognition. Phenomenologists have argued that architectural work is not a mere independent “real” object, although it is founded on one. (the 'heap of stones' forming its physical basis). Its existence requires creation by an architect but also demands the “reconstructive acts of the viewer” adopting a certain attitude towards the real object and helping constitute its aesthetic and even its sensible properties.⁴ Therefore, architecture interpreted as an artefact is usually discussed from two perspectives: *production* by the designer, and *reception* by the users (Weber 1997: 43). In the most common interpretation, the theory of architecture comprises:

1. Problems related to the work of architecture (analysis of its structure, sometimes called morphology).
2. The genesis of a work of architecture.
3. The effect of a work of art upon its users.

This classification covers the commonly accepted scope of the theory of aesthetics:

1. Study of a work of art.
2. Problems of creative art.
3. Perception of a work of art.
4. Criteria of aesthetic values.

Conceived in such a way, a theory of architecture is nothing more than the transfer of the rules of aesthetics into the grounds of architectural theory. As a result, architecture has been reduced to a series of single objects called works of architecture, generally studied as isolated from their physical, psychological and social contexts. The stress in such a study is usually put on the individuality and intentions of the author, and his or her expression in architecture. A designer is thus considered as alienated from the social and historical background. At best he or she may represent a group of artists following the same style. Consequently, we have a work of architecture (being an isolated object) on one side, and a designer (an individualist, although representing a trend or style) on the other. Does that mean the nobilitation of an architect, or the opposite – the degradation of architecture?

Such atomistic treatment, which, let us hope, will soon belong to the past, bears the unmistakable mark of the Enlightenment, when the requirements of precision and unequivocality led to the practice of studying objects separated from their context. Yet building complexes are not framed pictures. Architecture, in the historical perspective, only marginally expressed the individuality of the author. The approach to architecture derived from aesthetics interprets it in terms of “artefact”, diminishing the sense of architecture. It has ignored the evolution of creative thinking and space-shaping skills in general. The very notion of the theory of architecture has thus been reduced to the theory of the creative process. The term "theory of architecture" is most often identified with the theory of design or with theory of aesthetic perception, which is an obvious misunderstanding.

Thinking of architecture as a series of isolated forms overlooks what is the most important – the fact that it is part of a larger environmental and cultural whole. It neglects to acknowledge the fact that architecture is the product and expression of society and time. The only way we can fully understand architecture is by considering its many aspects in the natural and social contexts, as well as in correlation with the philosophy of the given epoch. We can appreciate its value only when we become aware that architecture represents the human struggle against the limitations of matter and their own ignorance. Architecture conceived in such an anthropological perspective becomes a living organism. It becomes something more than just an item classified in a given style. Part of the architectural field includes the processes and transformations that underlie the art of building and shaping space. A theory of architecture so formulated tells us about the correlation between people and a work of architecture and provides evidence of the essential role played by the experience of building in the general and ongoing development of humankind. The establishment of a new theory of architecture formulated as a scientific discipline will help to explain these issues. This new theory, of which an integral part will be the ontogenesis of architecture, will aid the elucidation of the phenomena related to architectural development that have occurred in the past and present transformations, as well as foresee some future ones.

Looking at a definition of theory as generally held in natural sciences, the term has a clearly defined content and scientific foundation. It includes an important element of explanation.

According to *The New Encyclopaedia Britannica* (2018), a scientific theory is a

systematic ideational structure of broad scope, conceived by the human imagination, that encompasses a family of empirical (experimental) laws regarding regularities existing in objects and events, both observed and posited. A scientific theory is a structure suggested by these laws and is devised to explain them in a scientifically rational manner. [...] Thus it is evident theories are imaginative constructions of the human mind – the result of philosophical and aesthetic judgments as well as an observational information rather than inductively generalized from it.

The Brockhaus-Encyclopedia (2005) defines theory as

⁴ The work of architecture is thus a doubly founded object, which “refers back not only to the creative acts of the architect and the reconstructive acts of the viewer, but also to its ontological foundation in a fully determined real thing shaped in a particular way” (Ingarden, *Ontology*: 263).

The system of statements or laws, which in the given field serves summarizing, description, explanation and foreseeing phenomena." Theory is also "the scientifically summarizing of teaching about foundations, rules and principles in certain fields of knowledge, technique or art.

In *The Webster's Dictionary* (2018), the term "theory" is presented with both narrow and broad meanings, for example:

1. a plausible or scientifically acceptable general principle or body of principles offered to explain phenomena
- 2a. proposed or followed as the basis of action
- 2b. an ideal or hypothetical set of facts, principles, or circumstances – often used in the phrase ‘in theory’
- 3a. a hypothesis assumed for the sake of argument or investigation
- 3b. an unproved assumption: *conjecture*
- 3c. a body of theorems presenting a concise systematic view of a subject theory of equations
4. the general or abstract principles of a body of fact, a science, or an art music theory
5. abstract thought: *speculation*
6. the analysis of a set of facts in their relation to one another

As a result of the comparative analysis of scientific and philosophical methods of research, the well-known Chilean biologist H. Maturana proposed his own definition of “theory”.

A theory is an explanatory system that interconnects many otherwise apparently unrelated phenomena (experiences), which is proposed as a domain of coherent explanations that are woven together with some conceptual thread that defines the nature of its internal connectivity and the extent of its generative applicability in the domain of human actions. As such, a theory is valid for those who accept both the criterion of validation of the explanations that it entails, and the criterion of internal connectivity that makes it a fully coherent conceptual system. Due to this manner of constitution of theories, there are as many different kinds of theories as there are different kinds of combinations of explanatory criteria with criteria for internal conceptual connectivity that are used in the generation of explanatory systems. (Tetel Andresen 2014:42; Maturana 1991)

Maturana’s pluralistic approach leads to the definition of theory as a composite of micro-theories rather than one macro theory. Nevertheless, even with such a kaleidoscopic vision, he stresses the importance of the explanatory and systematized character of a theory.

There is no room in this article for a broader discussion about the notion of scientific theory but it is important to say that knowledge is transmitted through a precise set of factually ordered and logically connected statements that are supposed to meet the scientific and methodological criteria of accuracy, obligatory in any given discipline. Therefore, a theory is not just an accidental collection of opinions or hypotheses but a scientifically, logically ordered system of knowledge explaining important facts. If a theory of architecture is to satisfy the criteria expected of a scientific theory, the following definition might be proposed:

The theory of architecture is a body of knowledge explaining the facts and the principles of design and the development of architecture, which covers an architectural activity and its effects in their entirety as an element of human development. It investigates such aspects of the architectural development, which are typical and objectively conditioned by the environment, climate, society, and a stage of civilization development as well as other aspects specific to different cultures.

In such a formulation, theory broadens the perspective of viewing architecture, where the space arrangements, studied against the background of the epistemological foundations of the given time, help to establish principles and give a true vision of the time and place. Architecture examined as an expression of individual creative thought would find an appropriate historical dimension within a general discussion about architecture and its development. Thus, the theory of architectural design would function only as a part of the theory of architecture. A theory of architecture conceived in this way allows the various current trends to fall into one main principle, characterized by this very variety. Many individual styles of creation will find, in this pluralism, a common basis for discussion. The above proposed definition of the theory of architecture includes the notion of development. One may ask whether, in the case of architecture, a term containing an element of evolution in time is correct. If we study architecture only from the point of view of creativity, in respect of the former definition of the theory of architecture, there will be no notion of any progress made.

Aesthetic values may be regarded and estimated differently over the course of time in respect of the changing criteria for what is considered beautiful and depending on the various art subjects. However, actual change does not necessarily mean progress. Beauty does not depend on development. The Athens Parthenon would positively compete with and easily win any beauty contest with modern works of art, if such a comparison would make any sense at all. Architectural activity is not only the ability to shape and organize space in specific build forms. Its scope is not confined only to art and craft. Architecture is a creative discipline, but not only in a sense of artistic creativity and not only in regard to the building matter. It is creative in its relationship to the entire natural, cultural, philosophical, and social environment. Therefore, it is also science.

Although knowledge in architecture had already been conceived by Vitruvius, who had specified a range of technical and humanistic disciplines in which architects should be trained, its scientific aspect has not been sufficiently appreciated. It is important to remind ourselves of certain contemporary definitions of architecture. Brockhaus

Enzyklopädie from 1987 defines it as the art of building – the most ancient fine art. In *The New Encyclopaedia Britannica* (May 30, 2018), Alan Gowans, James S. Ackerman, Peter Collins, and Roger Scruton write that architecture is

the art and technique of designing and building, as distinguished from the skills associated with construction. As with some other arts, the practice of architecture embraces both aesthetic and utilitarian ends that may be distinguished but not separated and the relative weight given to each can vary widely from work to work. Thus, at one end of the scale are purely functional structures (that may nonetheless possess certain aesthetic qualities, intended or not), whilst at the other are purely decorative ones with no genuine practical functional at all.

Taking into consideration the various definitions, we can conclude that the term architecture used to embrace such skills as shaping space, and only those types of objects that have been built in order to fulfil humankind's widely understood needs and meet aesthetic criteria. This definition seems to carry the stigma of the Enlightenment epoch and doesn't meet the demands made by the new century. Moreover, it doesn't include all the manifestations of architectural activity. Such a mark of a former epoch is the emphasis placed on human needs. It signals the anthropocentric attitude, not matching the recent ecological view of life. Today we would say less egoistically that we build for ourselves while maintaining the values and balance of the entire environment. When defining architecture as the art of building without clarifying the term "building", we omit the entire field of natural objects adapted by people for their needs, thus excluding, for instance, marvellous works of architecture hewn in rock. In the light of the aforementioned, the following definition is proposed:

Architecture is the art, science and wisdom of reshaping the environment in order to fulfil widely understood human needs and to maintain the ecological balance; it is manifested in built forms or transformed forms of nature.

This conception of architecture not only changes the view of our environment in a creative and wise way, which elevates its former qualities, but it also participates in and contributes to the resolution of social and demographic problems. These tasks call for more effective solutions, and the development of new technologies and building materials, technical infrastructure, and even new design methods.

If we assume a very broad view of architectural activity, the notion of development is out of the question. However, the concepts of progress and evolution in architecture do not only depend on technical improvements. The notion of progress relies on something quite different. The way in which problems are perceived changes accordingly with technological advancement. The introduction of steel and reinforced concrete revolutionized building and architecture not only because it was possible to build higher structures and conquer wider spans but because the real revolution lay in the fact that these new technological discoveries opened up new horizons for human imagination. It was possible to search for new solutions on a scale not previously imaginable, crossing local, national and international borders. Thus, not only productive techniques evolve in architecture but also notional concepts and ideas, spatial patterns, and the manner of resolving design problems.

Today we are challenged by the new problems awaiting us in the near future. The excessive human intervention in the world of nature has begun to turn against us. This course of world development was foreseen in 1972 in the well-known report by the Club of Rome, entitled *Limits of Growth*, which warned that uncontrolled economic growth disturbs the ecological balance. The catastrophic tone in this report caused an avalanche of further publications, which also presented a nightmare vision of the future. This alarm also triggered a positive reaction. Some designers began to seek new pro-ecological solutions, which initially concentrated on fragmental matters of a technical nature without creating a complex vision. A fear of self-extinction has impaired our unshaken belief in technical progress and, in a sense, the need for economic growth. In the 1970s, the idea of progress itself and of pushing forward without looking back was called into question, not for the first time and probably not for the last. More recently, a conviction has prevailed that the point is not to reject progress as such; since it is thanks to progress that we have been able to improve, for example, structural and environmental control systems. The point is to understand progress in a new, more comprehensive manner. In view of this new perspective, the anthropocentric vision of the world needs to change into an ecological one. The time has come to again assume that humans are only participants, not usurpers. We have already stopped celebrating the victory of our separation from nature and we are now trying to renew the broken ties in such a way that will support the reestablishment of the disturbed balance. Is this a new utopia or a real chance?

Paradoxically, the sense of a respect for nature, an intrinsic and intuitive part of human nature, requires urgent rebuilding in a rational way. In this reorientation it is worth turning our attention to the prehistoric and ancient cultures, especially those of the Far East. The traditional attitudes of the Chinese, Japanese and Indian people, based on a wise coexistence with nature and respect for the values of the heritage of previous generations, represent values rejected by the West a long time ago. The pluralism of the modern world provides the challenge of deriving the most precious experience from every culture. We can no longer only think of Far East cultures in terms of attractive exotic people. It is imperative that we learn how to appreciate and integrate their heritage as an international legacy. The time has come to stop evaluating other cultures according to our own belief and value systems. It is time to realize and concur that adopting a solely Eurocentric and Christian point of view and overestimating the achievements of the West are not working well now and nor will they do in the future.

Dispute about Man and Nature

Since Socrates and Plato used the allegory of a cave to demonstrate human limitations in terms of world perception, in which the constricted and dark "cave" of sensual cognition was contrasted to the open and enlightened world of science, attainable by the mind, a stereotypical type of thinking has been established in the Western culture which identifies progress with liberation from nature's yoke. The message transmitted by this allegory, showing people as shackled slaves unable to participate in real outdoor life, consigned a pejorative meaning to the cave concept. Since that time, it has become a synonym for ignorance, obscurantism and primitivism.

The Eastern tradition, in contrast, introduced a positive symbolic meaning to the cave. A grotto in Chinese mythology was seen as a mysterious place, an intermediary between the human world and the sacred or spiritual one. It was in a cave, lit up by a beam of light, that the Nephrite Caesar gifted the future Caesar Yu with the power of supernatural wisdom and with ability to rule. Therefore, the cave became a point of departure leading to two completely different philosophical metaphors, proving the opposite understanding of the connection between man and nature. It imposed in the Western culture a vision of nature as that which constricts and limits liberty and progress, whilst in the East, nature is seen as the source of wisdom and principles.

The Chinese created the concept of feng shui – the art of geomancy – which was applied to seeking the most auspicious location for buildings, cemeteries and so on, and to giving instructions regarding planning and design. The practice of feng shui could indicate or reveal where and how to build and arrange the interior of a house so as to live in harmony with the environment. Feng shui was moreover a way of life believed to create harmony between people and nature. It was believed that feng shui or, as in the literal translation, wind and water, the two basic forces that shape the natural environment, has the same power in respect of influencing people's fate. Feng shui is a specific natural and moral code based on the art of recognizing the laws and manifestations of natural phenomena for practical use in life.

Therefore, it is a complex system which merges human fate and the effects of human activity with the order of the universe. The spatial order of architecture is conceived as part of the general order of nature, which also held power over the life of people; for example, the inappropriate construction of a house, that is to say, a house built in discord with the rules of feng shui, could bring misfortune to the family living in it. An anecdote quoted here (O'Brien J., Man Ho K. 1993:14) relates the story of a family from Hong Kong who had been living happily on a farm until they carried out a renovation of their house after 50 years. Suddenly, in one year, three members of the family died. The feng shui master was called in; he instructed the new extension to the house to be demolished. It was, in his opinion, the cause of all the family's problems as it had been built in the wrong place, and thus had disturbed the existing balance.

The ancient Greeks and Romans established the principles of the location of the settlements based on strictly rational premises. In a Vitruvian description of a ceremony preceding the building of a city, there are indications of a divination tradition. An author of that time quoted the practice of examining a sacrificial animal's liver. If repeated sacrifices and examinations revealed that the livers of the animals which had been fed on specially selected fields were healthy, this area was then assigned for the construction of the future settlement. The character of these magic examinations seemed to be convergent with scientific studies and led to clearly rational conclusions. According to Vitruvius, cities were to be located on land affected by fogs and frost, far away from swamps, on moderately insulated slopes, in those regions abundant with food, and well equipped by roads and water routes. Today we respect and admire the logic course of Vitruvian thought stressing the sanitary aspects of newly erected cities. However, the rational principles of urban planning he proposed were aimed more at fulfilling the needs of people rather than at harmonizing man-made structures with the higher order of nature. The Greeks, like the Chinese, had a strong conviction about humankind's connection with the entire system of the universe, but they assigned a predominant role to people. They initiated a path, which we have been following until now, and which has brought us to the current situation. We live now in built environments and have increasingly less contact with nature.

If we examine the principles of feng shui thoroughly and search beneath the surface of superstition and magic and compare it to Greek geomancy, we will discover, surprisingly, that with regard to site location and building/structural decisions, the Chinese and Greeks arrived at very similar reasonable conclusions and universal truths. For both cultures the art of geomancy has grown and developed as a response to general human needs, as well as to environmental and climatic conditions. For instance, the feng shui advice to not build a house on a triangular lot will be understood by people from the West and the East since it is obvious that such a house is difficult to design and its interior difficult to arrange. Chinese wisdom and cultural philosophy differ greatly from that of the Western world, and its application to everyday life is carried out with more than just the meeting of practical needs in mind. The practice of feng shui refers more to the emotions than to mind. It utilizes irrational and intuitive impulses and aims to merge human activities and man-made structures with the natural order of the universe. On the other hand, Greek philosophy is a more pragmatic wisdom, which leans towards an emphasis on meeting and fulfilling people's needs at a more practical level whilst maintaining a "safe" distance from the underlying truth of achieving the necessary harmony between humankind and nature. We are reminded of two maxims by Protagoras (5th century BC): "Everything that is recognized by man exists" and "Man is the measure of all things".

It is clearly observed, however, that the effectiveness of the Chinese art of geomancy has a considerably greater effect on planning. With reference to the aforementioned anecdote, the threat of death will better motivate people to keep interrelated building structures in order and in a positive or "right" connection to the land than any other reasoning, such as it just being the right thing to do in respect of the practice of geomancy. The Greek rationalism prepared the ground for our modern attitude and approach, which is anthropocentric and glorifies the mind, whilst the Chinese

principle and practice of feng shui has kept alive the most primordial position of people who intuitively consider themselves as dependent on nature and who use both rational and irrational means of cognition. Today we are paying a high price for our choice. Our nonchalant treatment of nature has turned it against us. Spatial chaos and our evasion of dealing with and controlling our pollution of the earth's atmosphere are the conditions and circumstances we are in the process of trying to counteract, but without giving up the anthropocentric position.

Perspective of the Outlook of Architecture

In this time of plurality and the holistic approach to scientific problems, we are far from the separation of sciences created in former ages. It has been accepted that natural sciences deal with general concepts whilst human sciences with more specific ones. This division was established in the 19th century, when human sciences were separated from the natural sciences and became an independent field of study. Two German scientists, Wilhelm Dilthey and Wilhelm Windelband, were the main contributors to the establishment of the methodological basis of the human sciences. They built specific instrumentation for study in this new field by comparing the subject and methods applied in both the natural and human sciences. Whilst concentrating on differences, they aimed at identifying distinctions and oppositions in both areas rather than common features.

Dilthey thought that the subject of study in natural sciences was nature, and therefore what was exterior to people, whilst the subject of human sciences was connected with the historical and sociological realm, that is to say, what was more closely related to people's spirituality. In the first case, the point was cognition; in the second one – understanding. Windelband introduced the possibility of distinguishing between these two fields as a result of the method of study employed. Science, in his opinion, may have a generalizing character or individualizing one. In the first instance, it approaches the subject scientifically whilst in the second one – historically. The biological aspect is given to science by what is searched in general and the historical one by consideration of what is particular and individual.

The search for contrast between human and natural sciences has been expressed by many scholars, one of whom is the famous sociologist Florian Znaniecki. He clearly defines the differences between both fields by contrasting them. The natural scientist, as he says, studies objects and facts that exist independently from human activity and experience, and have some properties not defined by the fact that they have been shaped by humankind but by their objective nature. In contrast, the most essential and general characteristic of the objects and facts studied by the human sciences is that they “belong” to “somebody”, so they exist as a result of the activity and experience of people and exhibit the properties given by these active and experienced people and through their actions and feelings (Znaniecki 1973:28).

Such separation of the human sciences from the natural ones was sensible at the end of the 19th century since it allowed the setting in order and definition of the specific structures of both fields of study. In former times, however, for example, in the Positivism period, efforts were made to transfer the methods of natural sciences to human sciences. Achieving this distinction returned lost prestige to the human sciences, which in the 19th century decreased in the wake of the natural sciences receiving epochal acclaim as a result of special achievements, for example, identifying and separating the cell. This development, however, introduced a climate of competition between both sciences. Isaiah Berlin (Hardy (ed) 1980: p. XXVI) defines it as a collision of the “two cultures”:

this what is specific and unique contra what is recurrent and general, and concrete as opposition to abstraction, constant movement contra repose, interior against exterior, quality against quantity, culturally dependent rules contra eternal principles, struggle of mind and internal transformation perceived as a stable element of human nature contra possibility and desire of calm, order, definite harmony, and of fulfillment of all human desires – these are some of the manifestations of this contradiction⁵.

Such a bisection of science suggests that each discipline has to be assigned as belonging to either of these two fields. How should the architecture and the science of architecture be qualified?

Because of the interdisciplinary character of architecture, making such a qualification has always been difficult. Its scope and role have changed over the course of time. Therefore, the connections between architecture and other related disciplines were stronger once, and then they gradually weakened. The ancient Greeks did not doubt that it belonged to the fine arts since, like painting and sculpture, it relied on following some of the principles. This approach gave it a position in the practical arts, next to a craft. Architecture then was not viewed as creative since the classical Greeks did not think about creativity in the way we currently do. The word “creation” derives from the Roman *creatio*. Architecture could not, as with painting, reproduce natural reality as it creates new objects, which are, by their very nature, character and purpose, different from natural ones. In order to ensure that architecture remained in and maintained harmony with the universal order, it was seen as imperative to create structures which complemented those already existing in nature.⁶ It, therefore, attempted to follow the rules read in nature but translated into the language of mathematics and measurement, thus developing a scientific aspect to architecture, which was integrated into architectural practice.

In the Renaissance period, architecture was conceived as an art, along with the fields of science and engineering. Even art itself was considered a science by the great masters of that time: viz. Alberti and Leonardo da Vinci. Art was, in their opinion, the most important means of cognition. It was in the 17th century that the process of the categorization

⁵ A translation from the Polish version of that book

⁶ As Aristotle said, "Arts either supplements nature by what it was not able to make, or imitates it" and "Art completes what nature cannot bring to finish. The artist gives us knowledge of nature's unrealized ends".

of architecture into separate fields began. Since that time, architects were seen as both artists and engineers (but not scientists), and in the next century, after the seceding of engineering, they were viewed simply as artists. This narrow definition of the architectural profession led to the absurd division of the work of art, which was in former periods a unified whole, into decoration and structure. The 19th-century Polish philosopher of architecture J.S. Zubrzycki wrote: "Building is a foundation of architecture, and architecture is an embellishment of building." And then he explained: "Although architecture is a separate and only an aesthetical part of a building, it does not mean that the architect can forget about structure and not take it into consideration or completely ignore it" (Zubrzycki 1894:104).

Unbelievably, it did become possible to forget about structure! Moreover, this happened in the time of the development of the steel structure technologies and other adventurous, innovative techniques. Such a view of things was the result of separating human cognition into two spheres. Technology was, in Zubrzycki's opinion, a matter of mind whilst aesthetics was concerned with emotions and feelings. So, the material scope of architecture, belonging to the physical context and perceived by our senses, was by no means connected with its spiritual content. The consequences of such a dualism were obvious: the separation of the façade from the rest of a building in 19th-century architecture, superficial decoration, and the lack of a relationship between appearance and structure, the interior and exterior, the structure and form; in other words, the general decline of the organic features of buildings. The delimitation of architectural tasks and aesthetic issues led directly to the situation where architecture was viewed only in terms of styles.

The criteria for the division in natural and human sciences have until now caused disputes in academic circles. There is a tendency to lay down a crossbar between generalizing and individualizing methods of study, considering them as opposites and mutually exclusive. It is believed that such separation is necessary if the precise scientific examination is concerned. The outstanding physicist Thomas Samuel Kuhn compares history and the theory of science and defines the former as individualizing and employing the use of narrative whilst the latter aims at generalizing (Kuhn 1977:5–6). Kuhn comes to the conclusion that unifying history and the theory of science into one discipline would destroy both branches of knowledge. In saying this he is more afraid of the possible loss of each discipline's autonomy, rather than the loss of the clear transmission of thought. He seems to be mostly concerned about the purity of science. There is the question whether such divisions best serve an objective truth or whether they create a false view of reality.

Michael Carrithers, in his book *Why Humans Have Cultures*, comes to the conclusion that employing a study method of natural science in the study of anthropology of culture led to a false image of ethnic cultures, portraying them as completely excluded from development and existing outside time (Carrithers 1994: p. 33). The vision and development of the world, as we learn from the traditional history lessons, which present facts and events in chronological order, with the emphasis placed on the role of political leaders, also presents an unclear view of things.

Selecting a study method results in adopting a particular perspective when looking at the examined realm. Our choice is also influenced by time. Therefore, choosing a study method means an enquiry into the temporal and spatial views of a fragment of the world, a world which is, in fact, in constant movement and maintains various relationships with the environment. Depending on the way we see things, either through a magnifying glass or a telescope, either at a movie or simply looking at paintings or photographs, we may perceive the same reality quite differently. These are not opposite truths but they can give an incomplete image. Thus, some facts can be misinterpreted.

The question, therefore, arises as to whether or not we can present a readable view of architecture by assuming an appropriate distance. Whether or not selecting a generalizing or an individualizing study method will best serve this task. The question remains – can the selection of a particular method establish a clear criterion which will serve to separate the theory of architecture from its history? So far, the only discipline that seems to have clearly defined foundations is the history of architecture. Within its general history, it employs narration, but it has its own very specific aspects, relying also on significantly important visual information. It introduces and describes chronologically ordered images of selected objects, which are considered works of art, and defines and qualifies their characteristics to a given style.

The history of architecture adopted an individualizing approach in emulation of the approach taken by the field of general history, paying special attention to the achievements of the outstanding masters in the field. Sometimes we get the impression that this is just a kind of relay race of distinguished creators who build the course of architectural development and establish new trends. This field of science is in one way a generalization of the subject matter since it defines the general foundations of all routes, branches and tendencies within the field of architecture itself. It generalizes in reference to the distant past, when architecture was considered more a collective work of art than a result of individual creativity. Even when generalizing, the history of architecture seeks the specifics of a given style rather than attempts to explain architectural development as a cultural, a group, achievement involving a cross-transfer and the integration of socially accepted values or an expression of a phenomenon. This issue represents a gap in the field, which, I hope, will be filled in the near future.

A further individualizing characteristic of architectural history is also the result of narrow specializations. It is typical for our time that there is a tendency for academics to research and explore a limited area of their expertise. A reliable and competent expert is someone who is specialized in a certain field. As a result of this approach, we have a historical view of architecture as a collection of independent, very detailed perspectives of different cultural circles, with no tangential points between them, and with no conclusions with regard to the general rules of architectural evolution. Since history appears rather individualizing in character, we would expect that the theory of architecture should generalize and explain phenomena related to the development of architecture. Neither the theory of architecture, however, nor the theory of design (which is sometimes identified with the former) has a generalizing character. Their

assumptions are usually formulated on the basis of the relationship between a creator and his work and addressed to an actual design practice. Many publications which aspire to be related to the theory of architecture deal with some fragmental architectural issues; therefore, they do not provide a complex view of its development. There are books, for instance, focused on sustainable and ecological architecture; others on specific types of architectural design such as housing and public buildings. They base their analysis on examples of different solutions so they discuss architecture in detail. At the same time, there is a group of authors seeking ideological foundations, thus leading to generalizations but in a limited, specific area of study. Publications on visionary, experimental or poetic architecture can be included in this group. Although they approach architecture with a problem, and so tend to generalize, they give only a fragmental view of the architectural reality. We, therefore, deal with many micro-theories in the field of architecture, and thus the theory of architecture has not developed on a macro scale. It would seem that we are still in the very early stages of developing this theoretical path.

The theory of architecture, which should explain the role architecture played in the cultural development of man, when limited, as it is, to a scale of individual achievements, has lost the wider view, beyond the historical perspective. It does not provide sufficient knowledge about the evolution of human skills in the field of space shaping. We can obtain more complex views of these issues if we cross the boundaries between biology, geology, anthropology, archaeology, the history of architecture, and cybernetics. The truth lies at the juncture between the many disciplines. The tendency to separate and classify things, which is rooted in the 19th century, made it impossible to achieve full recognition and formulation of the rules underlying the evolution of man's architectural activity from its inception until now, as well as foresee its future development.

In light of what was aforementioned, it is clear that one unilateral method of study does not give a full and true vision of architecture. An individualistic approach falsifies it, but, equally, a generalizing study method only would also be wrong since architecture is an interdisciplinary field, manifested by practice and based on creativity. It remains wise to maintain the association of these two methods, which would establish the right relationship between the general, objective factors affecting the development of any style or trend and the contribution of individuals.

Discussing architecture in categories of individual creativity has become subject to criticism. There is an international tendency to broaden the scope of the study on architecture by linking it with other fields, especially with the anthropology of culture. Otto Bollnow, the author of the book *Mensch und Raum* (1963, Eng. version *Human Space*) started a new chapter in such interdisciplinary research by creating a new field of science: the anthropology of space. The other new discipline – architectural anthropology – emerged in the 1980s as a branch of anthropology of culture. This new discipline has been mainly propagated by Nold Egenter, Swiss scientist, ethnologist and anthropologist of architecture.

This penetrating critic wants to ensure that as a result of all his scientific and publishing activity, designers and architectural theoreticians would realize the need to include the results of any study of the anthropology of architecture in the theory of architecture. He is convinced that they can help to resolve the problems architects currently encounter in a practical sense. These are very valuable contributions to the interdisciplinary approach towards architectural issues. It seems, however, that the term *architectural anthropology* relates more to the anthropology of culture than to the theory of architecture. It appears to serve the development of man's cognitive abilities through architecture rather than as an explanation of the phenomena assisting architectural evolution. Results of studies in the anthropology of architecture are a valuable source of information for history and theory of architecture, but the process of conclusion itself will take place, in some sense, beyond the anthropology of architecture. It cannot, therefore, in view of this issue, be part of architecture theory.

New needs that have emerged on the threshold of the third millennium call for the establishment of a different field of knowledge. It is necessary to study the interactive factors and processes that will affect the future vision of our built environment. That the new interdisciplinary sciences stimulate the progress of civilization has been already proved. Thanks to the study of the field of cybernetics, which investigates analogies between the control systems in living organisms, machines and organizations, it was possible to build computers and produce new methods of steering and digital control.

The essence of the organic process of architectural development relies on the feedback that occurs and is received on an ever-higher cognition level between people and their environment, their community and the built objects. All this takes place as a result of the simultaneous interaction with the environment and other fields of creativity, which permits the creation of some ideas by association and analogy, sometimes coming from completely unexpected sources. By understanding these principles and applying them in the field of planning and design, we can have a better impact on the future shape of the built environment.

In order to study and resolve these problems, there is a need to create a new branch of science: the ontogenesis of architecture. This field of knowledge, as part of the theory of architecture, aims at formulating rules that govern the origins and transformations of organically evolved architectural forms and patterns, structure and circulation systems. It examines channels of abstract and creative thinking, and it can be applied to both old and contemporary architecture. It discusses the different methods and processes of initiating and developing archetypal spatial and formal models, and, therefore, does not only depend on those that originated in primordial or primitive craft form. The scope of this new field of study is much broader than that of the anthropology of architecture and can better serve architectural practice.

Ontogenesis of Architecture

The ontogenesis of architecture deals with problems connected with the origins and the processes of development that brought some functions, structures, and forms of buildings and spaces, as well as some architectural ideas, to existence. The name **ontogenesis** comes from the Greek word *on*, (*óntos*), meaning existence, and *genesis* – origin. The concept of architecture is treated here in its broad sense, as an aspect of humankind's building activity and as the art of solving many interdisciplinary problems related to space shaping.

The study of ontogenesis presents the art of building as a living process which undergoes constant changes. It shows people as creatures who, on the one hand, are determined by the widely understood natural, social, historical and cultural environment, and, on the other, are exposed to many accidental influences. As an active participant of the environment, people also face the challenge of goals they set for themselves.

The artificial classification into "higher architecture" and "mere building", introduced by the art historians, makes it difficult to study the problems of transformation and progression that occur in architecture. As Nold Egenter correctly states: "This sounds rather like a zoologist who would only care for beautiful animals!" (Egenter 1992: 147).

It is only when we reject this division into "works of art" and "mere buildings", and when we stop turning shyly away from our prehistoric past, that it will be possible to complete the missing link in the history of *homo aedificator*, to build the bridge missing between natural and man-made architecture.

The term "ontogenesis" is used in biology to define the evolutionary growth of an animal's organism, including all the changes that take place from the embryo to the adult. When tracing the history of architecture, one can see a surprising parallel between the processes occurring in living organisms and those related to architecture. The continuous growth of an organism begins when it is an embryo. The subsequent process of division and differentiation leads to the development of very complicated and complex systems: a skeleton; blood vascular, muscular, nervous systems; and so on. Each of them has a unique function but only when they work together does the organism become fully alive and functional. The development of a specimen includes the broader evolutionary process of the whole species.

All the evolutionary phenomena that take place in architecture and urban planning, such as the progressive development of archetypal forms – the development of functions, spatial and circulation systems – appear very similar to those of a living organism. One can also notice analogous processes of development and differentiation. Exogenous aspects of this evolution lie in the social and civilization transformations, which create new needs and new opportunities. The endogenetic factor in this process is anthropogenic activity, which increases with experience and consciousness. Within the wide frames of the process of nature, people found an enclave – a world of culture in which they perceive themselves as creators, independent of the world of nature. Consequently, architecture used to be conceived simply as an element of culture. It is often discussed narrowly in terms of its style or fragmentary problems whereas the so-called "civilization" of the 21st century requires a very different approach on a very different scale. Today, we can only see little evidence of the real threats that we will face in the near future.

The level of our short-sightedness is demonstrated by the fact that ecology was usually understood as the knowledge of how to preserve the earth's resources, of unpolluted air, water and soil. But to meet the needs of the future, we should view people and their role in the transformation of the environment from a biological perspective. Such an approach does not diminish the role of architecture as a cultural heritage. A person creates a single thing but the sum of their thoughts and ideas becomes the common heritage of humankind in the biological and civilization processes. The close bond between the world of culture and nature is of great importance for the creative process. Roman Ingarden (1972:24) rightly says that

the creative force of man is limited. It is not able to produce works autonomous in its existence and independent of our consciousness. It is too weak to convert primordial nature into human reality. This reality is only a certain layer intentionally created and imposed, as it were, the ground of real nature. It is never as transparent and impenetrable that a real aspect of Nature could never shine through it and reveal to us its amazing and cruel face.

Now the point is to include and involve the process of individual human creativity and thinking into a system of organized transformations of our environment. The deliberate activity of humankind is a part of the "mind" of nature. Its development began in prehistoric times.

The Subject and Method of Study

The **ontogenesis of architecture** investigates how and why some functional, spatial, and structural patterns used in architecture come into existence. It studies how the human ability of abstract thinking gradually develops and in what manner people's experience and past – both the historical and biological – have been recorded in the art of building and shaping space. Many scholars would find such research almost impossible since there are too many gaps in our historical knowledge, too many things connected with prehistory which are unknown and uncertain. In addition, we touch here upon such intangible issues as perception of space and the development of human thought. After all, we can usually only guess the intentions of the designers and builders of the past. Taking up these fields of study, therefore, may resemble walking a tightrope.

However, I believe that not only are we free to do so but we are also required to do so, and to arrange our knowledge of architecture in comprehensive order. The fragmentary study of architecture, either from a historical or anthropological perspective, does not reveal the entire truth about the organic development of form, structure, and spatial patterns. The subject of ontogenesis, on the one hand, incorporates inanimate things, which are the objects of natural or man-made architecture, and, on the other hand, people, with their imagination, doubts, fears and everything that impacts their building decisions. The objects don't interest us as merely things but as a sign of the development and progress in which people are a link in the chain of Nature - People – Architecture.

The area of exploration is very broad. It covers cultural anthropology but also a widely conceived sphere of human creativity. It employs the achievements of various fields of knowledge such as geology, archaeology, the history of art, the psychology of space, the study of religion, and philosophy.

Archaeological discoveries, especially those of the last few decades, significantly contribute to our knowledge of the development of humanity. The earliest settlements in the Near East provide us with evidence of the dynamic evolution of human building skills. The successive cultural layers reveal an increasing ability to resolve more complicated spatial problems and mark the invention of circulation, which later developed into a whole system – a type of "blood circulation" in the city's organism. The strong ability to think abstractly, which allowed seeing the concept of circulation as an issue selected and separated from the complex whole, found its later expression in the third millennium in the planning of the cities of Mesopotamia. The moment circulation was abstracted from all of the issues related to the building of settlements can undoubtedly be called revolutionary as it marked an important turn in the evolution of humanity. The other problem requiring some study in its continuity from the Neolithic time to the present is the development of modular systems, which began in early settlements (amongst others, in Çatal Höyük) and was stimulated by the use of mounded brick-and-wood-framed structures. What needs to be explained is the role played by the transformation of a one-room, circular nomadic shelter into multi-roomed houses with a rectangular plan, fulfilling the complex functions of a sedentary life in this process. This change called for the use of congruent figures, which would help to improve the spatial coordination of more complicated floor plans.

There are many problems to be discussed in the ontogenesis of architecture. For example, urbanization and the need for security; the development of new needs and functions in the course of the growth of civilization; the organic evolution of building technologies and architectural forms and patterns; correspondence and continuity between natural forms of landscape and man-made architecture; the expression of rites and religious traditions in the shape and composition of architectural complexes; and the development of different systems in the disposition of buildings in space based on the principles of human cognition.

Discoveries in the field of mathematics and geometry, especially the establishment of Euclid's system, had an impact on the way architecture evolved throughout the millennia. For example, orthogonal layouts, which became predominant in man-made architecture, differed greatly from the shapes met in nature. Currently, the mathematical study of a space and the structure of chaos, and the achievements of fractal geometry, offers a new approach to the dynamic forms existing in nature. This could mean the possibility of a new and significant leaning towards organic architecture.

Classical research methods based on inductive and deductive⁷ thinking are not sufficient for the field of the ontogenesis of architecture. They are not applicable in relation to the problems of creativity. An implication formula, based on a direct inference "if...then", "always when... then", is entirely useless in this matter. Creativity is an organic and synergetic⁸ process. Architectural creativity is, moreover, a process giving as a final result a tangible, material and spatial object. Under the influence of many impulses coming from different sources, through mental and manual action, through constant checking and correcting the effects, a new quality product comes into being, different from the initial data, otherwise this would be a simple imitation. The hypothesis explaining the essence of creative thinking is not verifiable. This fact, however, does not provide us with an excuse to stop trying to study this problem.

The famous physicist Stephen W. Hawking (1988:10) said

Any physical theory is always provisional, in the sense that it is only a hypothesis: you can never prove it. No matter how many times the results of experiments agree with some theory, you can never be sure that the next time the result will not contradict the theory. On the other hand, you can disprove a theory by finding even a single observation that disagrees with the predictions of the theory. As philosopher of science Karl Popper has emphasized, a good theory is characterized by the fact that it makes a number of predictions that could in principle be disproved or falsified by observations. Each time new experiments are observed to agree with the predictions the theory survives, and our confidence in it is increased; but if ever a new observation is found to disagree, we have to abandon or modify the theory.

Modern science is giving up the static vision of the world for the benefit of a dynamic and evolutionary one, employing the notion of entropy. Since old methods applied in scientific studies are not sufficient, many scholars today are seeking new ones. It is also doubtful whether we can unequivocally define a research method applicable to the ontogenesis of architecture.

⁷ Induction: in logic, the process of reasoning from the particular to the general as opposed to the inverse process of deduction. The basis of induction is the assumption that if something is true in a number of observed instances, it is also true in similar but unobserved instances. Deduction: the form of reasoning by which particular conclusions are inferred from certain accepted general principles, or premises. Historically, deduction was derived from metaphysics.

⁸ Synergy: < gr. *synergetikós*> joint and mutual action of similar factors, increasing their effects.

Former methods based on a static selection fail in the study of dynamic processes. Biologist Gregory Bateson, in his book *Mind and Nature, a Necessary Unity*, argues that the cause-effect sequence, described by the "if...then" formula, when used in a closed circuit leads to an absurd. When applying the principles of classical logic, based on a chain of causal relations, it is difficult to describe the action of an accidental event. Yet, as Bateson claims, in stochastic processes, whether evolutionary or mental, the new can only be extracted by chance.⁹

In classical logic there is no room for the so-called *synaptic summarizing* (Bateson 1996:100). This phenomenon, known in neurophysiology, relies on the simultaneous stimulation of one neuron by two other neurons. Classical logic will be even more inadequate if used to describe the phenomenon of the **synergy of the creative process**, which relies on the joint work of many interactive impulses coming from different sources and helping each other.

In terms of classical logic, this phenomenon will seem ambiguous. Ambiguity, however, is considered a logical error. Yet the equivocal meaning, multilayered record and complexity included in architecture determine its worth. In the face of these methodological doubts, it seems necessary to explain the nature of the process we are dealing with in the ontogenesis of architecture. It is a collective **cultural creative process**.

The collective **cultural creative process** that led to the creation of a given archetype of architecture in antiquity, for example, a temple, differs from that required to produce an individual piece of creative art as it is understood nowadays. Nevertheless, we can find some analogies. In both cases we are dealing with a process the result of which is an artwork. An artist creates a painting or a sculpture; a mastered canon in a temple becomes a collective achievement and the hallmark of a given culture. The path that leads to this whole new value is not directly derived from one given source. The new is never the literal imitation of existing patterns unless it is intentionally copied. In encountering the opinions of different specialists on the genesis of archetypical forms in architecture, I often have the impression that they are searching for a single source of direct influences. This is probably caused by the assumption that such investigation means a search for the truth. As a result of following the rules of classical logic, we, people of the West, have the deeply rooted conviction that there is only one truth.

Various factors, not dependent on humans, affect the creation of a given architectural form; however, it could not be accomplished without our contribution. Since we are investigating the effect of a collective creative process, we are entering the zone of human mentality. It is thanks to the ability of human mind to perform abstract thinking that the transformation of a number of impulses (both rational and intuitive) takes place. Magdalena Abakanowicz, when asked about the source of the inspiration for her art, said that it was the sum of everything she had experienced and known in her life. Many artists would subscribe to her declaration. This statement concerns individual creation but we can also refer it to the **cultural creative process**, which contains the experiences of a given nation, determined both by what is consciously recognized and what is vaguely and even, perhaps, unconsciously recalled from the distant past, surviving only in symbolic forms. This experience has its roots in the local building tradition as well as in the knowledge of foreign cultures and the surrounding landscape. Depending on the time and place, some factors are more, and others less, significant. Within these wide limits defined by the determining elements, serendipity and creative expression play an important role. It is coincidence and creativity that mostly contribute to the birth of a new quality. An impulse, which releases a new quality, does not come from the architect or founder alone; social demand must be present, supported by economical possibilities.

In individual creative art – for example, that of a sculptor – not everything is preconceived in the mind. The initial concept is turned into a masterpiece only by the artist's hands. As a result of several corrections and the active participation of the senses and intuition, a complete object comes into being. We can see an analogy to the individual creative act in the **cultural creative process**, where the functions of the artist's mind and hands are taken over by **evolution**. Henri Bergson, to whom we are deeply indebted for the theory of **creative evolution**, discovered interrelations between nature and the mind. Variety and constant change – according to Bergson – characterize nature as well as the human mind. Gregory Bateson represents a similar view, assuming that thought as a stochastic process resembles evolution.

Biological evolution is a process in which, as a result of an organism's adaptation to exterior conditions, gradual transformation to more complex forms occurs. It is a slow change extended in time, during which incessant feedback and exchange between an organism and the environment take place. Similarly, the same happens with the transformation that takes place in the process of creating, for instance, the canon of a temple. From an embryonic form derivative both from a family house and a worshipped object of nature, a mature temple form emerges over a course of years. While dealing with a complete structure, experiencing its space, dimensions, and character, an individual comes to new conclusions that enable them to improve proportions, size, function, and construction in further building. Thus, in successive temples the imperfections of the former ones are corrected. This is the process in which the feedback occurring between the matter, environment and human thought – the most active factor of development – plays a very important role.

The found form influences the elaboration of thinking, and new ideas contribute to further changes in the existing form. This is a synergetic process which can incorporate new, unforeseen creative elements, new sources of ideas, which serve to enrich the final effect. This process continues until the whole system is interrupted by a change that transforms the standing paradigm. Such a change will start a new and similar process, beginning from a different, higher level of general human experience. Individual creation is a short, subjective process, grounded however in both

⁹ Stochastic (from Greek *stochazein*, to aim with a bow: this means to scatter events partially by hazard, so some of them can result an expected effect (Bateson 1996:66).

the social and national realities of time and space, whilst a collective process is longer-lasting and more objective. Yet both processes have an organic character.

The publications dealing with the genesis of ancient architecture leave us unsatisfied. Since the scientific investigations are based on exclusively verified facts, their outcomes may only be partial. The authors often formulate categorical questions and categorical answers based on the principle "*either... or*". Something is either drawn from a different culture or has come into existence as a result of the local tradition. The safest way, then, is to refer to the opinion of an authority. Thus, we receive various alternatives and the whole deduction is a sort of informative "mixture". The **cultural creative process** is not perceived as a synergetic transformation of all those elements. Nor is it generally observed that the adoption of the patterns and symbols of different cultures was possible because they conveyed a universally comprehensible message. Factors such as the recognition and acceptance of the fact that people growing up in a given environment are shaped by it are not taken into account, either. The genesis of any architectural ensemble can very often be better explained and interpreted by visiting the site directly than by referring to scientific dissertations.

All this interpretative chaos occurs because research methods based on classical principles of logic do not suit the object of our investigation, i.e. the **cultural creative process**. Architecture by its very nature uses a different language than that of other fields of human creativity; for instance, literature. To understand the genesis of some three-dimensional forms, we do not have to rely entirely on written documents. Archaeology, which every year contributes new data concerning the earliest records of human existence, provides us with an enormous volume of material, which an architect will interpret differently than an archaeologist. As an artist and practitioner, they can provide an alternative point of view of the genesis of some ancient solutions, which try to reconstruct a similar process of the human thinking that took place in the past. Architectural creation means solving multiple problems by reshaping the environment. The realities of old times were different, and we should investigate those conditions very thoroughly; the process of creative thinking is, however, based on some universal rules enforced by the actual activity of the human mind. The research method, which is applied in this case, is a kind of psychological and philosophical deduction, but such an approach requires considerable caution. It is easy to misinterpret the creative process that occurred in the past when we examine it in contemporary terms. When we read books written in the 19th century, or even in the 1960s, we can notice a multitude of similar errors in interpretation. One of them is that of describing primordial or organic forms of architectural creation as primitive.

What is presented above is an introduction to a new field of science: the ontogenesis of architecture. It aims to formulate general principles, stressing all those aspects of human activity that are common to different cultures as a result of the biological and environmental conditions of human existence, and as a consequence of the growing mental abilities of humankind. The study of some problems related to architecture and urban planning intends to explain the manner of organic thinking and building, which can be used to lay down the rules of such design, which aims to achieve the broadest and most comprehensive harmony with the environment. It is an extremely exciting task to investigate these processes and to search for the moment something is about to come into being. It is exciting to "catch" those elements that have had an impact on the comprehensive development of humanity and its creative ability, and then to discover how this new skill was subsequently used in the art of building.

It was during the period of the first human settlements that the process of building was really formative. Completely new forms, not existing in the environment, were generated. With humankind entering into increasing intercultural contact, it became more difficult to clarify the actual genesis of architectural forms because more foreign influences appeared. The creative process thus began to lose its clarity and organic character in favour of adaptation and eclecticism. Yet the seeking of new forms of expression in architecture is a continuous and infinite process. We are also now witnessing the birth of new, so far unknown, archetypal forms, new approaches and methods used in the shaping of space.

The Middle East, on the borderland of Anatolia and Levant, Iraq, and Iran, has played an extremely important role in the study of architectural ontogenesis. It was here, around 10,000 BC, at the time of the so-called Neolithic Revolution, that the beginnings of agricultural economy were founded,¹⁰ and equally revolutionary changes occurred in the ability to build human settlements. The majority of examples illustrating these issues in this book come from the abovementioned region and era, as well as from the later significant period described as the urban revolution, generally covering the time span between 8000 and 3500 BC. Some phenomena were also explained based on examples coming from other regions of the world, viz: Europe, America and Africa, and from different times. When researching analogies, the author would seek to keep the rule that all compared objects represent a similar level of development, even if thousands of years in time separate them. This principle does not apply to examples, which currently illustrate the continuity of some prehistoric traditions.

Since new methods of archaeological dating have been introduced in recent decades, the chronology of Neolithic sites is under constant reconstruction, which the author – an architect – has found difficult to follow. The majority of calibrated dates relating to the Anatolian and North Mesopotamian regions, updated in 2006, are taken from the CANeW 14C Chart (<http://www.canew.org>); the chronology in Levant and Cyprus from Cauvin (2003) and Peltenburg and Wasse (2001), as well as from recent reports related to the particular sites.

¹⁰ A new discovery by an international collaboration of researchers from Tel Aviv University, Harvard University, Bar-Ilan University, and the University of Haifa is the first evidence that trial plant cultivation began far earlier – some 23,000 years ago. Source: Ainit Snir, Dani Nadel, Iris Groman-Yaroslavski, Yoel Melamed, Marcelo Sternberg, Ofer Bar-Yosef, Ehud Weiss. *The Origin of Cultivation and Proto-Weeds, Long Before Neolithic Farming. PLOS ONE*, 2015; 10 (7): e0131422 DOI: 10.1371/journal.pone.0131422

PART II

SELECTED PROBLEMS OF ONTOGENESIS OF ARCHITECTURE

*Our dialogue with Nature will bring fruits
only when carried from its inside.*

Ilya Prigogine

From a Cave to a House

Defining architecture as an area of human activity, and thus classifying it as belonging to the world of culture, is setting it in opposition to nature. In effect, we no longer see the continuity between works of nature and those of human invention, which was so obvious for the ancients. Although the word architect is derived from the Greek word *architéktôn*, meaning a master-builder, *arche* itself means the rule, including the principle underlying the order of the universe. The word *tectonics*, used in geology to denote the structure of rocks, derives from the Greek word *tektonikē*, meaning the art of construction. The field of architecture and geology, then, use a similar terminology even though today they seem very remote and detached from each other.

If the point of departure in considering architecture is its encyclopaedic definition, its history, therefore, only begins with the first structures built by people. In this usage, the name does not apply to the works of nature of which people avail themselves for their own needs and purposes. A tent-shelter is architecture, or at least – according to some – a constructed object, but a hole dug in the ground or the first altar of heaped-up stones is not.

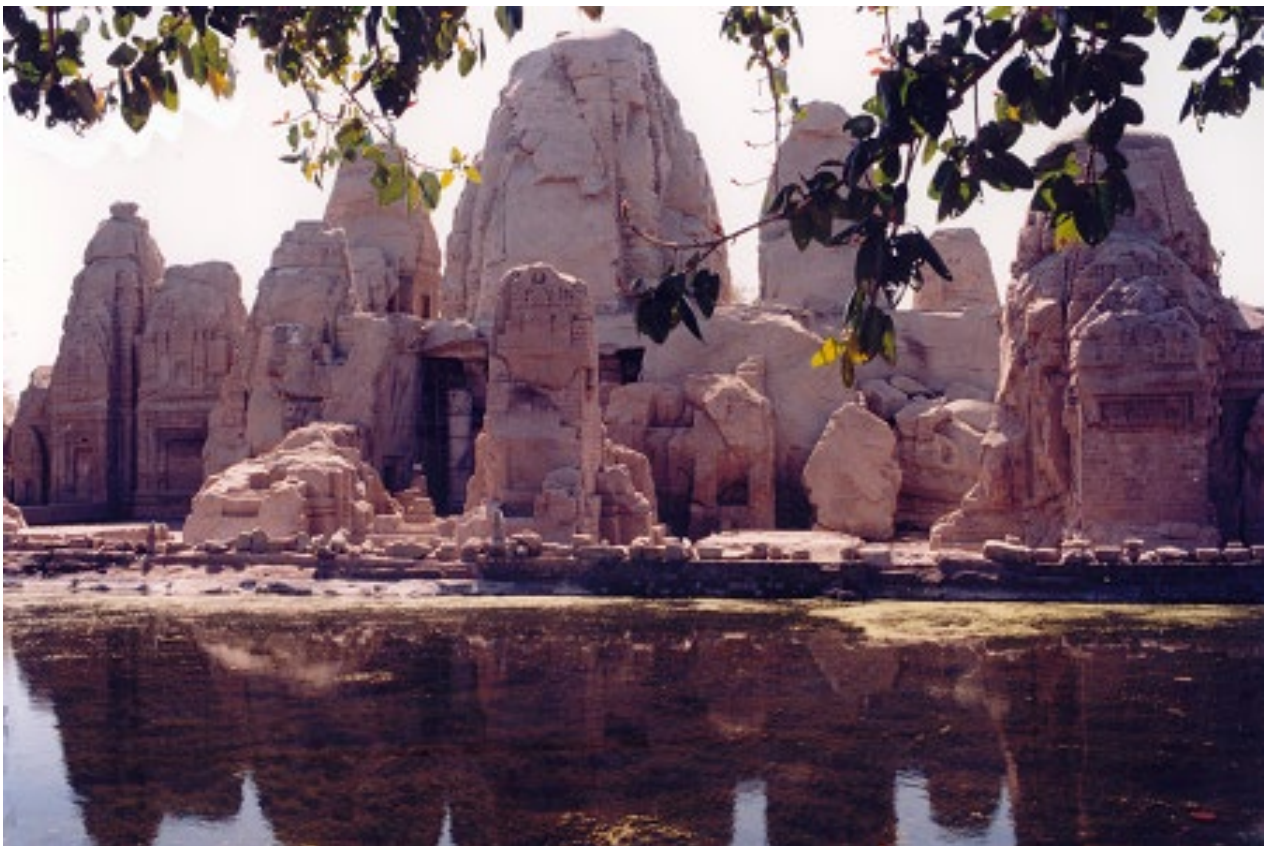


Figure 2. South India; temple hewn in the rock; erosion brings it back to nature. Photo: E. Dziuk



Figure 3. Megiddo in Israel; an altar (Bamah) of stacked stones in the sanctuary on levels XVIII-XVI, Early Bronze III. Such “High places” were usually built in elevated sites in an open landscape and used for worship. Photo: M. Wojciechowski

A cave used as a dwelling place or a mountain – the natural site of primitive cults – is not architecture, either. Art historians have denied the title architecture to even the first objects made by human hands. Generally, the history of architecture begins with the Egyptian pyramids and Greek temples, buildings that are very mature products of human activity, already supported by a theory. If, however, we view architecture in a different way, extending the meaning of the term to include those natural objects people made use of for their own purposes, we will arrive at a deeper explanation of the genesis of some archetypical architectural forms built by humankind.

Caves

We Westerners do not usually hold our cave-dwelling ancestry in very high regard, and yet it was exactly then, in the cavern environment, where human beings, put to the survival test in the Ice Age, achieved a significant breakthrough in adaptability. The factors stimulating the development of the human mind were the intensive use of fire and the production of tools and clothes, as well as adapting caves for the purpose of dwelling. It was in this environment that the evolution of humanity and social relationships created the deepest foundations of our civilization. We inherit most of our physiological and mental characteristics from our primitive ancestors. The experience of using and taking from nature, which formed the *Homo sapiens* species in the late Palaeolithic period over 100,000 years ago, had a great impact on the further development of humanity and on its ability to perceive and shape space.

The landscape of rocky slopes and cave interiors constituted the scenery of the natural architecture of the first settlements. Its shape and configuration affected the way people moved in the environment and utilized the interiors. We can assume that the habit of a whole clan living in one tent-shelter, testified by archaeological findings, comes, perhaps, from the cave-dwelling tradition. The formations that are most suitable for living in are those built of dissoluble rocks (limestone, dolomites) in which the karst phenomena occur. Water forms grooves of complicated channels and chambers, arranged in floors, connected by inclined and curved corridors. Often you can enter them either from above or from the side, on rocky terraces. The mountain slopes shaped intensively by karst became natural habitats.¹¹ The elevated location of such dwellings made them excellent defence posts and permitted clear observations of the animal migration routes down in the valleys.

Most of the grotto housing complexes in France, where the oldest traces of human existence originate from the lower Palaeolithic period, follow the pattern/design described above. The cave settlement dating from about 450,000

¹¹ Habitat – a term used in architecture to denote clustered housing with singular units built one above another in a form similar to a mountain. Famous habitats are those designed by Moshe Safdie in Montreal (1967) and Jerusalem (1969).

BC – Caune d'Arago by Tautavel – in the French Pyrenees, where the skull of *Homo erectus* was discovered,¹² has a unique picturesque location on a limestone slope with a beautiful view of a wide river valley covered with a grid of vineyards. However, it was not the beauty of the landscape that led our pre-ancestors to this ideal location but the easy access to water and the defensive value of a place situated at the top of a cliff. It gives the impression of a cosy and safe shelter. The valley, embraced on all sides by the "arms" of the low mountain ranges, is enclosed in its own little micro-world and is "controllable" from the cave.



Figure 4. Caune d'Arago near Tautavel in the French Pyrenees; cave inhabited from 450,000 BC, where one of the oldest European skulls of *Homo erectus* was discovered. The lodge controlled the river valley from the high point of the cliff. Photo: M. Tobolczyk



Figure 5. Caune d'Arago k. Tautavel. Excavations (1994) inside the cave. Photo: M. Tobolczyk

One can imagine that everyday life was carried out down by the banks of the stream – where the archaeologist's camp was situated – and the cave served as a refuge in case of danger and in the Ice Ages. The neighbouring mountain ranges encircling the valley are dissected by many cave mouths or openings (fig. 4, fig. 5).

The grotto complex in Soyons near Valence on the Rhone was inhabited about 150,000 years BC. This natural terraced habitat spread over an area of about 30 ha (fig. 6). One can enter these caves, which are located on several levels, from rocky platforms after climbing the gentle slope by means of the convenient path. The open view of the river valley permitted a good visual control of the surrounding area.



Figure 6. Soyons, close to Valence, France; a multileveled rocky habitat from 150,000 BC. General view from Rhone. Photo: M. Tobolczyk

Figure 7. Thais grotto, St. Romans by Isere, near Valence in France; cave dwelling from 15,000 BC of the Cro-Magnon people; room with a hearth. Photo: M. Tobolczyk

¹² Nowadays, the oldest remnants of a hominid, found in Sierra de Atapuerca in North Spain in the form of a jawbone, are 1.2 million years old (Nature International Weekly Journal, 23.03.2008).

The Cro-Magnon people adapted the vast, naturally sculptured Thais grottos near present St. Romans by Isere, east of Valence, in France. In the Ice Age of around 15,000 BC, the whole clan lived in this complex of multi-storey caverns located on a lake, with internal passages and an underground pond. The huge chamber with a big hearth (see fig. 7.) distinguishes itself from other smaller and mostly “passage” type rooms. Its spatial interior might have served as a community meeting place. There are also signs of smaller hearths and sleeping areas in the other chambers. As is demonstrated in one of the annexes, cave dwellers sometimes built tent-like structures covered with animal skins for protection from dripping water.¹³ Stalactites, orange-red drippings on the white limestone rock and a variety of stone forms have created unusual interior decorations in the Thais grottos.

Could the forms known in nature have influenced human beings in the creation of the first settlements?

The archetype of interior space, known by humankind at this stage of development, was a cave, an earth burrow, a space covered by a tree crown and a tangle of plants. However, it would be excessively simplistic to imagine that prehistoric peoples were able to use this experience in a continuous way. They were guided more by instinct than knowledge in their everyday survival activities.



Figure 9. Gordes in Provence, France, symbiosis of the natural and man-made architecture. Photo: M.Tobolczyk

lime mass of which formed a natural fortress, a castle was carved from the rock. It had a very good defensive position with its difficult access and an excellent view in all directions of the fertile Rhone valley all the way to the Mediterranean coast. Unusual sculptural rock forms seem to create a somewhat unearthly scenery. The buildings, formed by people in such an organic way, merge with the natural landscape so that the castle and the city fabric are unidentifiable from a distance. Whilst visiting the castle ruins, it is difficult to distinguish the man-made parts from the



Figure 8. Medieval castle in Les Baux de Provence; harmonious union of the built and hewn in rock architecture.

It was the necessity for and the physical features of materials that dictated their application. However, living in caves led to the development of some habitual behaviour in terms of dealing with the environment, and it also influenced the perception of space. In the minds of prehistoric humans, home was an oval-shaped space, not necessarily illuminated but easily accessible, which provided shelter from the cold, rain, and invaders. Various paths, requiring a strenuous climb or crawling, led to the cave complexes. Therefore, it should not come as a surprise that entrances to the first man-made houses were also formed more like manholes than doors. Entering a dwelling from above was considered as natural as from the side. Today, the meanings of the terms wall, roof, doors, window, and stairs are clear to us. However, we hardly realize that it took millennia of development for these parts of a building structure to turn into actual forms that were well-adjusted to human needs. It is surprising to find places where a continuous tradition of cave dwellings has persisted from prehistoric times until now.

There are stone-carved cities where man-made architecture was created in harmony with nature and became its supplement and enhancement. Just such an unusual place is Les Beaux de Provence (fig. 8) in southern France, where the oldest evidence of human existence stretches as far back as 5000 BC; the later evidence came from the Gallo Roman period, and the climax of the settlement’s development took place in the Middle Ages (950 to 1426 AD). At the top of the hill, the

¹³ Man-made structures that improved the habitation were found in many cave dwellings. For instance, remnants of a wall and post holes were discovered in the Oryniac deposits in the Morin Cave in Spain.

natural ones because the ruins, as a whole, have been heavily eroded. As in Les Beaux, the defensive character of the place and easily manipulated limestone attracted people to the Göreme valley in Cappadocia around 2000 BC.

The digging of the two underground cities Kaymakli and Derinkuyu commenced (fig. 12–13) probably in the time of the proto-Hittite rule. Today, both are a labyrinth of tunnels and cells cut from the volcanic rock and comprise four and eight levels, respectively. The inhabitants of these cities could live underground in the long term without the need to go outside. Derinkuyu could accommodate 20,000 inhabitants. The cities would later give shelter to thousands of people fleeing Arabian invaders.



Figure 10. Uçhisar in Cappadocia, Turkey; habitable mountain; some dwellings are still in use. Photo: M. Tobolczyk

Figure 11. Ürgüp; hotels hewn in rock, well-harmonized with the natural site. Photo: M. Tobolczyk

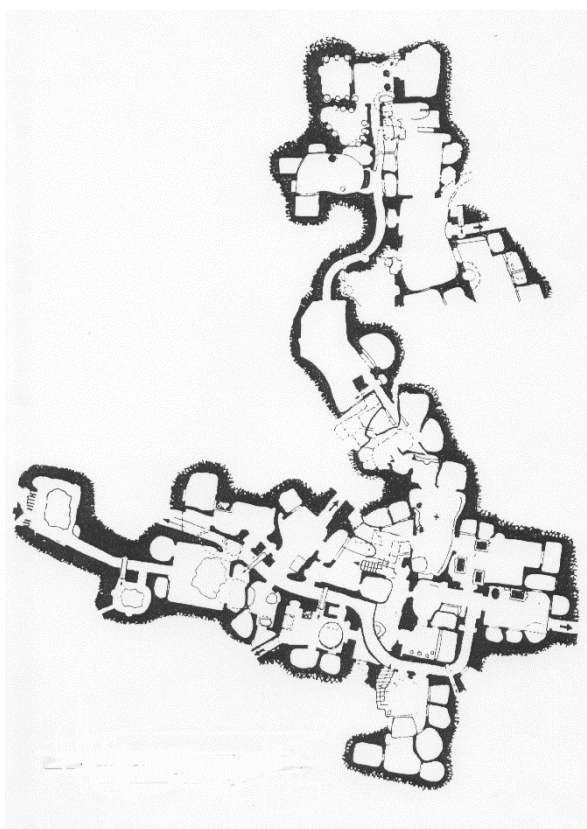


Figure 12. Derinkuyu in Cappadocia; plan of the “under-ground city”

Figure 13. Derinkuyu in Cappadocia; interior of the “underground city” at the lowest eighth level. Photo: M. Tobolczyk



Figure 14. Zelve in Cappadocia; dwellings and monasteries hewn in volcanic cones by early Christians. Photo: S. Tobolczyk

In the times of early Christianity, a group of monks and hermits came to the Göreme region looking for solitude for meditation and asceticism. Rocky cliffs formed by erosion, especially the volcanic cones resembling buildings, towers and chimneys, lent themselves to being utilized as dwellings (fig. 10, 14). Cells, and even groups of rooms and corridors, were carved out of the rock.

About 350 churches and chapels were created, most of which were built in the 10th and 11th centuries. In some of them, Byzantine frescoes have survived until the present time. The rock cities of Cappadocia are an example of a place where people lived in harmony with nature, wisely trying to adapt it to their needs. A special kind of continuation of the cave dwelling tradition is represented today by the new hotels that have been carved in the rock; hotels in which the cost of a room is much higher than in a normal guesthouse (fig. 11).

The stone dwelling complex of the Anasazi Indian tribe, carved into the canyon sides in Mesa Verde in Colorado, is an eminent example of natural organic harmony, unity and integration with what is man-made (fig. 15, 16). At the end of the 12th century, several dwellings were created on a difficult-to-access rock ledge under the canyon cliff. One of the most beautiful is the Cliff Palace. The hill slope formed a natural half-circle enclosure, above which there is a huge rock overhang. The dwelling, which was set in the crevice below, forms a picturesque group of rectangular and oval forms built from stone and brick. Tribespeople created over 200 rectangular rooms and 23 so-called kivas – round caves – for ritual male dancing. There is a beautiful view of the opposite side of the canyon where other, smaller settlements can be found.

The Mesa Verde canyon is in fact one huge habitat of human cave shelters, hidden in cliffs and populated by about 5000 people, which go almost unnoticed because they merge so well with the natural landscape. The rock dwellings of Mesa Verde are evidence of unity between human and nature; harmony between what was built and what was natural. The cave age greatly affected the way people perceived reality. Thus, shaped by nature, they entered the era of permanent settlement. Their aesthetic feeling was different from ours. As will be demonstrated in the following chapters, their buildings were soft, they rounded the corners and ends of walls not only because of poor technology but also because they considered these organic forms more beautiful. At the same time, however, prehistoric people were inclined to order things in a geometric way. From the moment they drew the first magic abstract signs on the cave wall, they traced out the path of building development – between the order of nature and order based on geometry. The latter applied more often as humankind’s ability to think in an abstract way increased.

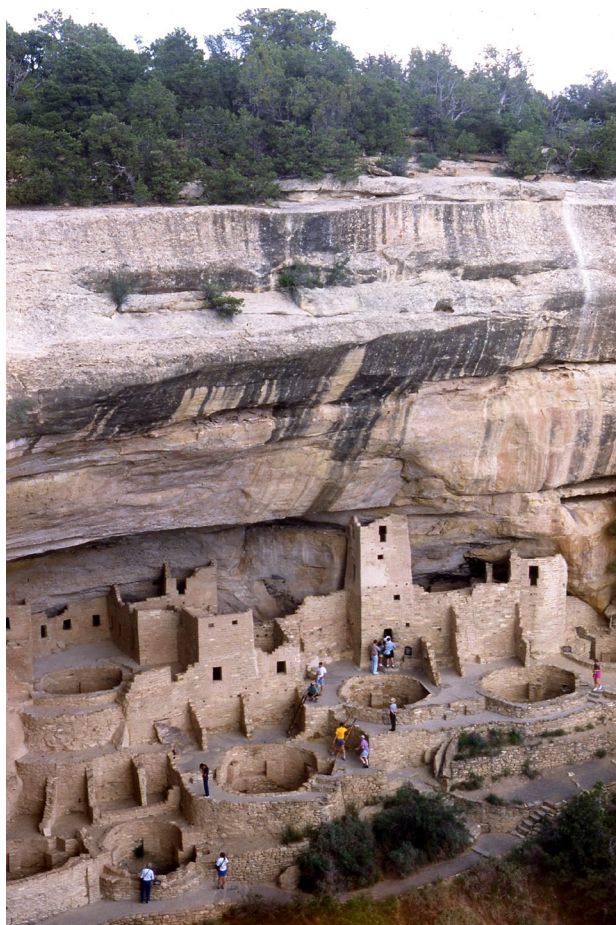
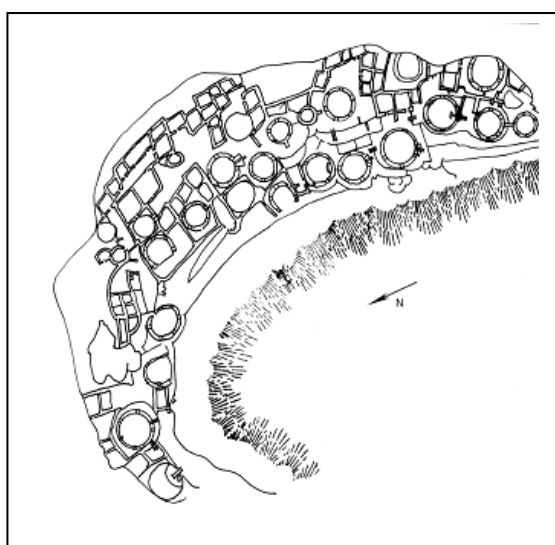


Figure 15. Mesa Verde, Colorado; plan of the Anasazi village built on the rocky ledge in the 12th. century. Rectangular dwellings sit next to subterranean, round *kivas* –surviving form of pit houses – which served as places for ritual dances of men.

Figure 16. Mesa Verde, Colorado; “Cliff Palace”, beautifully integrated with the natural landscape of the canyon. Photo: M. Tobolczyk

A Tent

A tent is the most primary human structure. It can be considered the earliest laboratory, in the field of experimentation, where different materials and their interactions were tested. Many portable tents built today, like those of the Mongols, are very good examples of the great wisdom of using simple materials available in the environment. Until the last decades, their economical application sometimes achieved a level of perfection not attainable by the manufacturers of tourist tents.

The tent, as the most organic man-made structure, has attracted the attention of contemporary architects who identify themselves with so-called organic architecture. Imre Makovecz, the famous leader of this architectural trend in Hungary, used to organize special workshops in the countryside where students had to build structures with reference to the first yurts of the Hungarian nomads. There is no doubt that such a direct experience is the best living study of architecture.

It is difficult to establish the exact moment in prehistory when the early humanoids started to build their first shelters. We can assume that they always used either caves or pit-dwellings, as well as primitive patch-up tents. The oldest traces of human shelter, or rather a kind of screen or enclosure giving protection against the wind, are those from Olduvai Gorge in Tanzania, dating from about 1.8 million years BC. They were constructed from basalt stones, which were placed in a circle of 4.8 m in diameter. Tools and the scraps of food found in this area also belonged to that early period of time (Kmicieński 1997:63).

In the periods of unfavourable climate, for example, during the Ice Age era, caves were not the only type of human dwelling. Groups of mammoth hunters, following the animals’ routes south of the glacier, built temporary camps in the