

# The origins of "healthy architecture". Health, hygiene and the quality of life in theory and practice of pre-modern architecture – an outline of research issues



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The article presents the research issues related to the origins of healthy architecture – methodological assumptions, scope of the study, objectives, and main theses. The article briefly discusses the evolution of views on health and disease prevention and the transformation of elements of the "health-promoting" architectural program of buildings.

Over the past several decades, there has been a clear shift in research priorities in the study of old architecture. The questions of authorship, style, artistic provenance, and value of the work are being replaced by attempts to explain the historical reality that is revealed through works of architecture. Buildings are increasingly studied in a close relation to social space. The architectural "form" is seen as a language of expression, a way of communication. The analysis of its "function" enters the realm of communication of content and meaning. Elements of "the structure" are sometimes interpreted as parts of a formal, functional, and ideological program. The contexts of the architectural work gain in importance, in particular the natural, social and landscape contexts. The knowledge of the history of societies – their ideas, beliefs, culture, science and technology, and legislation and economy – allows the modern scholar to look at architecture through the eyes of people living in the previous era. This point of view helps to identify concepts, phenomena, or features which have been overlooked or marginalized in previous research, but were considered important in the past. In the area of research on European pre-modern architecture, such concepts and features include "health" and "health-promoting architectural and building program".

The term "healthy architecture" is most often associated with architectural works created in the last few decades and is usually connected with the pro-environmental (pro-ecological) movement in designing and the idea of sustainable development. The concept of "health and hygiene" is also visible in the functional, spatial and ideological program of avant-garde modernist buildings erected after 1910. On the other hand, in the study of architecture built in earlier centuries, the aspect of health is

recognized selectively, usually in the context of sanitary facilities. The attention of researchers and laymen is still on what is spectacular in the architecture of that period: the stylishness of forms, the representativeness of functions, the archaic quality or the novelty of construction. What is being ignored, is the fact that almost all authors of architectural treatises and textbooks in the 15th-19th centuries wrote about "health". From today's perspective, functional and technical solutions focusing on the health, hygiene, and comfort of users may seem trivial, but when the overarching goal of research is not architecture itself, but how it functions in society – the former importance of a building's health-promoting program should not be overlooked.

The limited length of this paper allows only to briefly mention the research issues: the methodological assumptions, the scope of research, the structure of the research question, historical sources and selected findings. First of all, the practical purpose and sense of this research topic should be emphasized. The study and popularization of this topic:

- will help to identify and interpret elements of a "health-promoting" functional and spatial program when researching the architecture of historic buildings;
- will allow historic buildings to be protected in a comprehensive manner, without omitting the historical and scientific value represented by elements of former sanitation and hygiene infrastructure, construction, and woodwork;
- will support research in the area of history of medicine, technology, and culture.

The modern era (ca. 1450 – ca. 1918) in the history of Europe is a period dominated by cultural influences from Italian countries, France, the Netherlands, and the British Isles. It was their overwhelming influence

that shaped the culture of the countries and regions to the north of the Alps and to the east of the Rhine, a territory (Central Europe) which is the focus of this study. After 1450, countries beyond the Alps started incorporating the cultural heritage of Greco-Roman antiquity, which determined European culture (and architecture) in the modern era. The second half of the 15th century also saw the beginning of architectural writing and the invention of printing, which became the primary tool for disseminating scientific information (including knowledge about architecture, medicine, and hygiene). The year 1918 (the end of World War I) is associated with radical political, social, and cultural transformations in Central Europe. These also include the popularization of modern standards of hygiene and medical prevention in architectural and urban design, which began in the fourth quarter of the 19th century and are still relevant today.

Based on the study of glossaries, medical treatises, and manuals of hygiene from the 16th-19th centuries, the historical meaning of "health" roughly corresponds to the modern understanding of this term. According to the 1948 definition by the World Health Organization, "health" is physical, mental, and social well-being, and not merely the absence of disease and infirmity, which corresponds with statements of former medics and philosophers who treated health as a state of body and soul (psyche). Therefore, research on the health-promoting architectural program should take into account both, the solutions designed to protect against disease (issues related to microclimate and hygiene), as well as aspects related to the perception of convenience, comfort and elimination of discomfort (the layout and size of rooms, heating and sanitation infrastructure, greenery in the vicinity of the house). Moreover, because of the de-

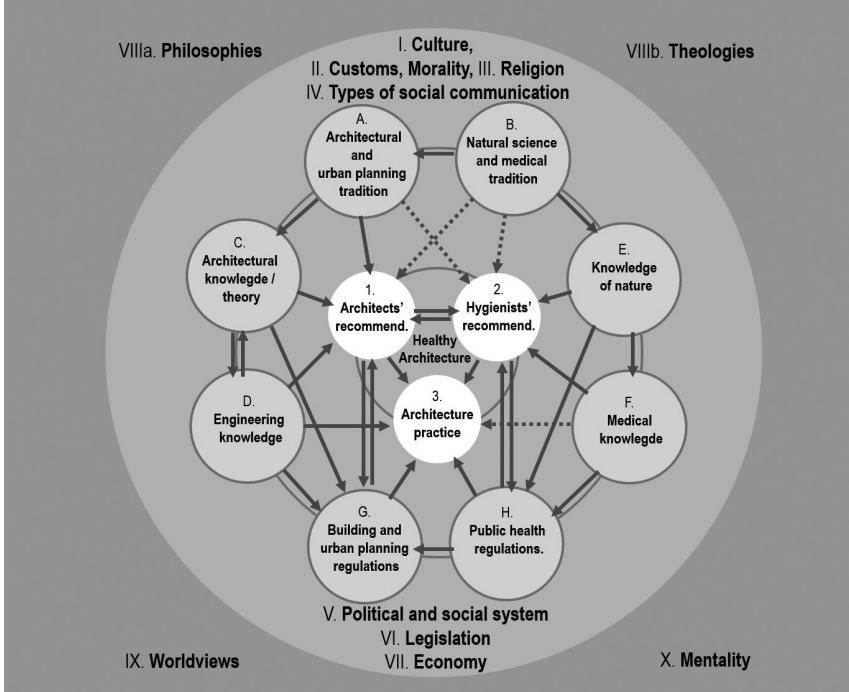


FIG. 1. The problem structure of the research on healthy architecture in the 15th-19th centuries – research areas and contexts. Written by Artur Kwaśniewski

development of natural and medical sciences in the 18th and 19th centuries, people started to see those elements in the home and its surroundings that were considered luxuries as a factor that affects physical health (e.g., bathroom, toilet equipment, trees near the house).

The historical sources relevant to this study can be divided into three groups. 1) Treatises, textbooks, articles on architecture, urban planning and construction technology, as well as books on rural farming and garden art, and glossaries quoting such studies ("architectural and engineering knowledge"); 2) Studies in the field of medicine and hygiene, which also address the home and its surroundings ("medical and hygiene knowledge"); 3) designs of buildings or their infrastructure, building inventories, built structures ("architectural and construction practice"). Because of the influence of the West and the South on Central Europe it is justified to include all European architectural and medical literature in the query. Certainly, when written sources of information must be subject to source criticism. Since the abovementioned literature is a compilation of various sources, it is important to recognize borrowings and citations (identify primary and secondary sources) as this is the only way to determine how knowledge, views, and solutions evolve. It should also be mentioned that contemporary scientific studies on this topic can be used to support the research but will never replace the author's analysis of a historical source.

In the case of this study, the historical contexts of former architecture mentioned in the introduction to this article are as follows: 1) ancient and medieval traditions that influence modern architecture, urban planning, and construction; 2) ancient and medieval traditions in modern natural science and medicine; 3) modern theory and practice of architecture and urbanism; 3) modern knowledge of engi-

neering and technology in relation to the structure and infrastructure in buildings and urban spaces; 4) knowledge in the field of natural sciences related to how the environment affects the human body; 5) medical and psychological knowledge related to the functioning of humans in the environment; 5) legislation related to construction and urban planning; 6) legislation related to public health; 7) the society and its beliefs related to philosophy, theology and world view, culture, moral and religious codes, and forms of social communication at various levels of the social ladder.

By studying the contexts it is possible to understand the evolution of knowledge and views on environmental factors that affect the health of humans, which took place for antiquity to the beginning of the modern era. In ancient times, this influence was associated with the effect of each of the four elements that make up all of the matter in the world. This is reflected, for example, in Vitruvius's architectural treatise (c. 20 B.C.), which addresses the effects of winds, the harmfulness of swamp gases and moisture, the issue of water and soil quality at the place of residence, and the advantages and disadvantages of exposure to sunlight. In early modern medicine, the belief that poisonous moist vapors (miasmata) spreading in the air were harmful was supported by the view that water had a dangerous effect on the human body. It was believed that when in contact with the human body, water opens the pores in the skin making it easier for miasmata to penetrate it. This view, formulated in the 16th century, was held by Europeans at least until the second half of the 18th century. Bathing was thought to pose health risks. After taking certain safety precautions, it was practiced as part of balneotherapy or for pleasure and was considered a luxury of aristocrats, but baths were not taken for hygienic reasons.

Maintaining the body's cleanliness – which was rather a symbol of social status, culture, and courtly etiquette – consisted in frequently changing undergarments, wiping the skin, and washing the face and hands. The gradual adoption of bathing in the second half of the 18th century was also not related to hygiene – bathing in groundwater was considered a method of strengthening the muscles and activating the entire body which offered more benefits than harm while at the same time helping to shape one's personality. It was not until the beginning of the 19th century that the effects of water and warm baths were recognized as beneficial and, in the mid-19th century, as essential for hygiene.

People had already written about the health benefits of fresh air and the need to clean the air of fumes in the 16th century. The development of natural sciences in the 18th century played a significant role in changing the views about the effects of air on the body. Research conducted in the 1770s by J. Priestley and A. Lavoisier on the chemical composition of air and by J. Ingenhousz on photosynthesis provided the scientific basis for these beliefs.

During the 19th century there was a giant leap forward in knowledge of how the environment influences human health and hygiene became an independent field of science. The experience of physicians struggling with epidemics of Asian cholera in Europe (between 1831 and 1892) and with the consequences of rapid urbanization and industrialization, as well as scientific research, in particular the discoveries made by Louis Pasteur and Richard Koch in the fields of bacteriology and virology in the 1870s-1880s, led to a fundamental change in people's views about personal cleanliness and hygiene. The state of knowledge of hygiene that was formed at the end of the century serves as the basis of contemporary views and practices regarding this issue.

Based on the statements of architects and hygienists regarding the health impact of buildings, this issue can be analyzed using two approaches: 1) the evolution of criteria for a healthy home/apartment, 2) the transformation of the architectural and building program and its components that promote the health and comfort of users. The first approach leads to the conclusion that the housing requirements in the 1870s-1980s were not much different than today: a healthy dwelling was to be well-aired, adequately spacious, light, dry, ventilated, heated, and with access to quick waste disposal. In the second approach, the autonomous development of each component can be analyzed with respect to the differences depending on the social environment, type and location of the building.

– Location adjusted to environmental conditions. Since the end of the Middle Ages, authors of almost all architectural treatises and textbooks – by quoting Vitruvius or develop-



ing his recommendations – have emphasized that the location of settlements and buildings needs to take into account the wind and sun (building orientation in relation to the cardinal directions), the quality of soil and water, and the proximity of wetlands. In an urban environment, the basic criteria for a comfortable and healthy location of a house included the ventilation of streets and land plots, the elimination of sources of offensive smell and access to sunlight.

– Dimensions and arrangement of rooms. The influence of room sizes and layout on health was mentioned already in the second half of the 18th century whereas the standards for minimum room size, room height, etc. were not stated until the 19th century.

– Window openings. The role of windows in illuminating, insulating, and ventilating rooms was addressed in literature on architecture and hygiene throughout the studied period, particularly in the 18th century.

– Ventilation equipment. In their treatises and manuals on residential architecture L. B. Alberti (ca 1450) and almost all his successors wrote about the necessity of air exchange. Until the mid-18th century, ventilation was provided through window and door openings as well as fireplaces and their smoke ducts; in the fourth quarter of the 18th century, as a result of Priestley's research, propositions appeared to introduce permanent ventilation in rooms and bedrooms, for instance by making holes in walls (Zuglöcher). In the 19th century, the most common means of ventilation were window hatches and heating devices.

– Heating appliances and installations – were indispensable in households in the Alpine countries; since the 17th century, the construction of cooking hearths, stoves and fireplaces has been an independent branch of technical knowledge (Furnologia) The late medieval standard of an apartment in a feudal family seat – which comprised a chamber (Stube) heated by a stove and an unheated chamber-bedroom (Kammer) – evolved in modern times to include fireplaces (which were believed to purify the air) in chambers and rooms. In the 19th century, the stove became a standard fixture in every living quarters. The problem of smoke in the rooms was eliminated in the late Middle Ages by making the stove hearth accessible from the passageway.

– Plumbing. The supply of water to the interior of the house did not become a housing standard until the mid-19th century; earlier, such installations had been proposed and built infrequently.

– The bathroom with fixtures and infrastructure – was perceived throughout the modern era in terms of luxury rather than hygiene; it was not until the 19th century that bathrooms were built for hygienic reasons; it became a standard in residential construction between the sec-

ond half of the 19th century (among the wealthy bourgeoisie) and the middle of the 20th century.

– The toilet and its infrastructure. A solution that was proposed between the 16th and 19th century consisted of a lavatory with a shaft to discharge human waste into a pit or sewer, located in a separate room. To eliminate the smell, airtight toilet covers were used and ventilation holes. The flush toilet was still contested in the third quarter of the 19th century (human waste from sewers was commonly used to fertilize fields and gardens).

– Greenery around the house. The discoveries made in 1779 by J. Ingenhousz about photosynthesis and the effect of plants on the composition of air provided purely medical arguments for the presence of trees near homes.

Finally, it is worth noting that by studying the history of healthy architecture and its historical contexts one can see a timeless rule that governs innovation in architecture. New qualities emerge as a result of scientific progress (in natural and technical sciences), take root in the people's consciousness based on ideas, worldviews and beliefs, are popularized by social elites and opinion-forming media, and finally are sanctioned by law or become the accepted standard.

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**Abstract:** The article presents the research issues related to the origins of healthy architecture – methodological assumptions, scope of the study, objectives, and main theses. The subject of study is the issue of human health, hygiene, and psychophysical well-being from the perspective of theory of pre-modern architecture, as well as the philosophical and medical basis of solutions proposed by architects and hygienists in the modern period (16th-19th centuries). The research is based on a critical analysis of source texts – such as architectural treatises, manuals of hygiene, and written statements concerning the rules of designing and using buildings. The author identifies the most relevant contexts, including the ancient and medieval traditions in architecture and medicine, the philosophy, culture, and customs of social elites, the level of knowledge about architecture, engineering, natural sciences, and medicine, building and urban code, and public health regulations. The article briefly discusses the evolution of views on health and disease prevention and the transformation of elements of the "health-promoting" architectural program of buildings.

**Keywords:** healthy architecture, early modern period, architectural treatises, architectural theory

**Streszczenie:** U ŹRÓDEŁ „ZDROWEJ ARCHITEKTURY”. ZDROWIE, HIGIENA I JAKOŚĆ ŻYCIA W TEORII ORAZ PRAKTYCE ARCHITEKTURY PRZEDNOWOCZESNEJ – ZARYS PROBLEMATYKI BADAWCZEJ. Artykuł przedstawia problematykę badań nad początkami zdrowej architektury – założenia metodologiczne, zakres, cele, główne tezy. Przedmiotem badań jest kwestia zdrowia, higieny i psychofizycznego dobrostanu człowieka w ujęciu teorii architektury przednowoczesnej, jak również filozoficzno-medyczne podłoże rozwiązań postulowanych przez architektów i higienistów w okresie nowożytnym (XVI–XIX w.). Badania zostały oparte na krytycznej analizie tekstów źródłowych – takich jak traktaty architektoniczne, podręczniki higieny, wypowiedzi dotyczące reguł projektowania, a także użytkowania budynków. Autor wskazuje najistotniejsze konteksty: antyczną oraz średniowieczną tradycję w architekturze i medycynie, filozofię, kulturę, obyczajowość elit społecznych, poziom wiedzy architektonicznej, inżynierskiej, przyrodniczej, medycznej, prawo budowlane, urbanistyczne oraz prawo o zdrowiu publicznym. Artykuł krótko omawia ewolucję poglądów na temat zdrowia, a także zapobiegania chorobom oraz przemiany elementów „prozdrowotnego” programu architektonicznego budowl.

**Słowa kluczowe:** zdrowa architektura, nowożytność, traktaty architektoniczne, teoria architektury