

POLSKA AKADEMIA NAUK ODDZIAŁ W LUBLINIE
POLISH ACADEMY OF SCIENCES BRANCH IN LUBLIN

TEKA

KOMISJI
ARCHITEKTURY,
URBANISTYKI
I STUDIÓW
KRAJOBRAZOWYCH

COMMISSION
OF ARCHITECTURE,
URBAN PLANNING
AND LANDSCAPE
STUDIES

ISSN 1895-3980



VOLUME XVI/2

TEKA

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I STUDIÓW KRAJOBRAZOWYCH

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Lublin 2020

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I STUDIÓW KRAJOBRAZOWYCH

Tom XVI/2

Lublin 2020

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Kamila Boguszewska

Fotografia na okładce tomu XVI/2 oraz na s. 5

dr inż. arch. Bartłomiej Kwiatkowski, Ruiny zamku w Korcu, Ukraina 2018 r.

Rysunek na s. 1

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Publikacja finansowana ze środków Polskiej Akademii Nauk

ISSN 1895–3980

www.pan-ol.lublin.pl

Wydawca: Politechnika Lubelska, ul. Nadbystrzycka 38D, 20–618 Lublin

Skład komputerowy

INFO STUDIO Agencja Reklamowo-Wydawnicza s.c., www.isar.pl

Realizacja

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Perception and functionality of space in view of potential and dysfunction of senses

Sense-sensitive Architectural Design

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Abstract: This article is of an illustrative nature. It is intended to juxtapose the possible options of architectural perception and the potential capabilities and dysfunctions of senses. It is, further, aimed at highlighting the co-dependence of the perception of architecture on mental and physical abilities of man (its observer and user).

The way space is perceived is dictated by the perceptual capabilities of our senses. Understanding the physiology and the role of the senses can sensitise the designers to the fact that the users' responses to his/her works might diverge from the perceptual processes in the brain of the creator him/herself. More importantly, architecture itself can generate sensory feedback and exert a therapeutic effect in view of sensory dysfunctions.

Key words: senses, perception, dysfunctions, architecture, universal design

Role of the senses in the perception of space

Many years ago, Le Corbusier, a pioneer of modern architecture, suggested that architectural forms physically affected our senses. Our know-how on the psychology of perception and the impact of sensory experience on the health, well-being and behaviour of the user (environmental psychology), if aptly used, can help us to work up high quality human-centered architectural designs. Perception of architectural space is an individual and multifaceted experience. Only human-centred designs that account for the physiology of senses, multi-levelled perception and any potential dysfunctions shall enable the designer to fully meet the postulates of universal designing.

Architectural space exerts impact on man, underlies his mental and physical condition and, thus, can be deemed an important factor in the process of human therapy. The term 'therapeutic architecture' has evolved into a recognised concept in response to senseless space, among others of the health care facilities, and in response to the absence of any human factor accounted for in the process of their designing. This concept is far from suggesting that architecture alone has any healing properties, it is, though, meant to suggest that

proper arrangement of space may foster certain natural factors like the daylight, colour perception, sound propagation, appearance or smell.

It is important to take these polysensory aspects into account in the architectural designs. Owing to the sensitivity of designs that include the integrated perception aspects, architecture can affect the well-being of man not only with the physical parameters of its form but also with the emotions evoked with its composition. Thus, conscious designing of space that transmits multi-sensory stimuli received via the synergy of all the senses can facilitate architecture and urban planning that promote social welfare and foster cognitive and emotional responses of the users.¹

Sight

“Vision reveals what the touch already knows (...) Our eyes stroke distant sur-faces, contours and edges, and the unconscious tactile sensation deter-mines the agreeableness or unpleasantness of the experience.”²

For centuries senses have been perceived to be under the hegemony of vision. In his principal work on metaphysics, Aristotle stressed the dominating role of sight in comparison to other senses.³ This approach has always prevailed. Even if roles of the other senses were eventually recognised, sight has maintained its prime ranking position. Today, this hegemony of sight is becoming more and more often criticised.

We can observe attempts to engage and activate other senses, embodied in many aspects of designing, and to sensitise the users to their stimuli. Sight is without any doubt a dominant sense, nevertheless, its role should be re-analysed in view of how its interrelation with other senses can be appropriately harnessed to our advantage.

Ancient Greek architecture was designed to be pleasing for the eye. The system of optical corrections, the golden ratio principle and contrasting colours underlay its visual perception. The privileged position of sight has not, however, suppressed the responses of other senses. We are still sensitive to the pureness of materials, weight, texture, rhythm and haptic interaction. As Pallasmaa wrote – “*the eye invites and stimulates muscular and tactile sensations*”.⁴

Sight can reinforce the sensations felt via other senses. Touching various items and surfaces, we feel their texture, yet, only if observing the process itself are we able to better feel its true nature and materiality. We can better focus on the articulated words if we are looking at our interlocutor. The visual representation of appetising foodstuffs makes our mouths water and intensifies our gustatory sensations. Guided with sight, we are not only able to tell apart shapes, colours and distances but also to identify the features of items such as softness, hardness, plasticity, roughness (haptic perception). The visual appearance of such natural materials as brick, concrete, stone and wood facilitates the recognition of their texture and assures the human brain of their authenticity. By sight, we are able to identify the age of the materials, often their origin, and to recreate the history of their useful lives. We can, thus, feel stronger bonds with the space that surrounds us, we can identify with such space or emotionally respond to it.

Our sense of sight enables the human brain to receive visual stimuli in a defined electromagnetic spectrum – the visible light – thus, transmitting to the brain the majority of data about the environment. Images projected onto the retina are focused only on a narrow area (in the centre of the field of vision). The remaining part of the space someone sees falls into the scope of peripheral vision. An eyeball is constantly moving, immobile vision does not exist,⁵ for that reason we hardly notice the focused vision effect as it affects a very narrow vision range.

1 Spence C., *Senses of place: architectural design for multisensory mind*, Cogn. Research 5, 46 (2020). <https://doi.org/10.1186/s41235-020-00243-4> [dostęp 28.10.2020].

2 Pallasmaa A., [The Eyes of the Skin] *Oczy skóry. Architektura i zmysły [Architecture and senses]*, Instytut Architektury [the Institute of Architecture], Kraków 2012, p. 53.

3 Aristotle, *Metafizyka [Metaphysics]*, Translated by K. Leśniak, Warsaw 1983, p. 3.

4 Aristotle, *Metafizyka [Metaphysics]*, Translated by K. Leśniak, Warsaw 1983, p. 3.

5 Koestler A., *The Act of Creation*, Hutchinson & Co Ltd, Londyn 1964, p. 158.

(...) richly moulded architectural space, provide ample stimuli for peripheral vision, and these settings centre us in the very space. The preconscious perceptual realm, which is experienced outside the sphere of focused vision, seems to be just as important existentially as the focused image."⁶

To a large extent, it is the peripheral vision that underlies the quality of perception of the matter inherent in the architectural forms. It, moreover, integrates the user with space and shapes his/her assessment of the surrounding space. We feel the atmosphere of a given place even before we intentionally look at its details.

"The preconscious peripheral vision transforms into focused vision and fragmentary images projected onto the retina into some vague, spatial, embodied and sensory experiences that constitute full, existential and dynamically changing experience and the sense of continuum. Ours is a changing and continuous world because we are born with a dynamic system of perception, consciousness and memory, which on on-going basis pieces fragments together into some coherent whole. Peripheral vision makes us feel integrated with the space, whereas focused vision turns us into mere passive observers.' [translator's own translation]⁷

Neurological research confirms the dynamic nature of visual perception. It has been proven that the time of transmission of such stimuli as the object's colour, form and its movement varies. Colour is perceived first, followed by shape and movement, whereas the time difference between the reception of the first and last stimulus ranges from 60 to 80 milliseconds. This means that respective systems of perception are separately developed for the performance of individual functions, pursuing this line of reasoning even further, we can separate colour from form in our perception.⁸

All the above specified features of visual perception ensure the continuous transmission and reception of full data about the surrounding space. We are capable of instantly feeling the place and its atmosphere as we are part of the surroundings. We live in the world that surrounds us and constantly interacts with us – its reality is not just limited to images projected on the retina of our eyes. The visual image of the world can be compared to a flexible structure that continuously interacts with our memories and experiences. This identifies the visual stimuli embedded in the memory and compares them with the stimuli received from the sensed reality.

Touch

Haptic interaction can be defined as the most intimate sensation of the surrounding world. The sensitivity of human skin to touching differs depending on the part of the body. Particularly sensitive areas are called the 'tactile points'. Finger tips, palms and the tongue have shown the highest tactile sensitivity,⁹ That is why, palms and fingers are used to identify the surface quality of the touched objects and enable the blind to master the ability to read the tactile writing system (Braille system).

The fact that skin is provided with tactile receptors does not preclude the ability to create the tactile impression without the involvement of the actual touching process. Stimuli other than touch can also activate the tactile receptors. Additionally, it has been observed that mobile stimuli tend to strongly interact with the tactile receptors than the immobile ones. The sense of touch responds to many various stimuli that are difficult to be unambiguously classified. The latest research has distinguished between the ability to feel pain and temperature. In general terms, however, many properties of the environment affecting our response thereto is the resultant of all the sensations triggered in several senses at the same time. Humidity is the resultant of

6 Pallasmaa J., op. cit., p. 18.

7 Kusiak J., Świątkowska B. (red.), op. cit., p. 58.

8 Kusiak J., Świątkowska B. (red.), op. cit., p. 48.

9 Wyburn G. M., Pickford R. W., *Zmysły i odbiór wrażeń przez człowieka [Senses and reception of sensual stimuli by man]*, Państwowe Wydawnictwo Naukowe, Warsaw 1970, p. 3.

the tactile and temperature (cold) sensations. Hardness or softness encompass the pressure element – certain effort must be made to identify the features of a given object. However, vibrations will be felt as a type of non-continuous pressure transmitted via the skin to extensive areas of tactile receptors. We can also note that the touch and pressure will continue to be felt even if the vibrations aren't.¹⁰

The feeling of firmness plays a significant role in any touch related therapy. It is the feature felt as a result of many different types of tactile sensations. Moreover, it is the only sensory quality that involves the integration of tactile and kinaesthetic data and the data concerning the deformation and plasticity of the material under pressure.¹¹

The ability to sense firmness and the different sensitivities to firmness of the individual space users are used in many therapies, with the account for the users' personal features, the environmental conditions or degree to which an individual can develop the sense of firmness. This testifies to its theoretical and practical significance in a variety of therapies.

The sense of touch is distinguished from any other sense due to its continuous activity, on-going reception and transmission of stimuli. The human brain is able to process the sensations it receives only selectively, thus, we can talk about seeing without recognising the visual images, or hearing without understanding the meaning of the sounds heard.¹² However, the tactile receptors in our skin are unable to ignore certain stimuli. Our bodies are constantly sensitive to them. The sense of touch is an important part of the early stages of child development, predetermining proper functioning of a human body later. It plays a significant role in sensory integration therapy, autism therapy and in the treatment of other sensory disorders. Many medical research results have confirmed the positive effect of the sense of touch. Patients who feel the positive touch of nursing personnel are better able to adapt to the specific conditions in hospital, more positively view the treatment procedures they have to undergo and recover quicker. A friendly touch positively fosters the course of therapy – it can reduce the patient's fear, promote a nice atmosphere and make the cognitive disorders of dementia patients less acute.¹³ What's more, the patients become more open and relaxed, feel safe and are willing to get into social interactions during their hospitalisation period.

The sense of touch may apparently seem to be inferior to sight in the process of sensing the architecture. Yet, it is the sense of touch that transmits to the human brain a lot of information about the surrounding space, which would not be received if we only relied on visual sensations. Rasmussen observes the importance of the sense of touch in the development of a child, who, at the early stages, learns about the world through the tactile sensations – learning to identify the textures of various materials, to understand the difference between tension and relaxation and to differentiate between the weight of objects. Learning about the material objects and their spatial relations, a child engages into such activities as e.g. throwing a ball against the wall. This way the child comprehends the plasticity of the wall, weight and texture without directly touching it.¹⁴

As the most intimate of human senses, touch helps man to feel architecture and space in the most natural way, fosters the integration of man with space and promotes an in-depth analysis of spatial properties. Haptic architecture, unlike the visually dominated architecture, engages the users into the interaction with space, creating bonds between them, turning them into active participants from otherwise passive onlookers. The sense of touch is something more than a cognitive method to learn about the environment, it is also a database of previous memories and emotions.

10 Wyburn G. M., Pickford R. W., *Zmysły i odbiór wrażeń przez człowieka [Senses and reception of sensual stimuli by man]*, Państwowe Wydawnictwo Naukowe, Warsaw 1970, p. 32.

11 Ibidem p. 131.

12 Wyburn G. M., Pickford R. W., *op. cit.*, p. 32.

13 Ibidem p. 66.

14 Rasmussen S. E., *Odczuwanie architektury [Feeling architecture]*, Wydawnictwo Murator, Warszawa 1999, s. 15.

The sense of hearing

Hearing structures and articulates the experience and understanding of space. We are not normally aware of the significance of hearing in spatial experience, although sound often provides the temporal continuum in which visual impressions are embedded. When the soundtrack is removed from a film, for instance, the scene loses its plasticity and sense of continuity and life. Silent film, indeed, had to compensate for the lack of sound by a demonstrative manner of overacting.¹⁵

Human life is, to a large extent, dominated by the visual sensations. We often feel oblivious to the surrounding cacophony of sounds. We are able to ignore the auditory stimuli, e.g. when we must focus on something else or if the sound continues for an extended period. The auditory stimuli usually go together with some elements of dynamics. Sounds can strongly interfere with our mental comfort. The hurricane hail, the sound of thunder or a car horn will be felt by the human brain more acutely than any other visual sensations.¹⁶ Hearing is a useful space orientation tool. Being in the building or in the street we can hear our own steps, the noise of the surroundings, the rustle of the objects, the chirping of birds, conversations, echoes. Once we register all these stimuli emitted from the environment we are able to identify, sometimes unconsciously, the scale of space we are in, the distance to the subsequent elements or buildings or the nature of space at a distance, even if it is still invisible to our eyes. Pallasmaa observes that *“music of shopping malls and public spaces eliminates the possibility of grasping the acoustic volume of space. Our ears have been blinded.”*¹⁷

The auditory experiences created by architecture enrich the range of our sensory perception. Proper acoustics of space affects our mood and activity. Rooms that assure intimacy and tranquillity seem to attract the users, contrary to the rooms where sounds are echoed or reverberated. Proper acoustic comfort is an important parameter in the assessment of health care facilities. It not only affects the well-being of patients and the work comfort of medical staff but, furthermore, facilitates social interactions in common areas. Sound therapy is an important part of sensory integration therapy, used not only in the treatment of patients with hearing disorders, but also the autistic or hyperexcitable patients or those suffering from depression. A common form is music therapy, when the patients calm down and relax. Auditory experiences may differ depending on their variable properties. Pitch and intensity evoke respectively different sensations of tone volume and loudness – low sounds seem to level over longer time periods than high sounds. Additionally, respectively adjusting the frequency and intensity, we may influence individual audio experiences – the feelings of hard or plusive sounds.¹⁸

Smell and taste

The chemical senses, i.e. the senses of smell (olfaction) and taste (gustation) can be analysed as functionally interrelated. Their role in the sensation of architecture may be suppressed by the senses discussed above, yet complementing the dominant senses they underlie completeness of the sensory experience of space.

We distinguish between four basic tastes: sweet, bitter, sour and salty. The human tongue is mapped into four areas that correspond to the aforementioned tastes. Similarly to basic colours that, in combinations, create secondary colours, combinations of the basic tastes form tastes which are inherent in our foods. Without any doubt, taste goes together with smell. Any gustatory experience is reinforced with the sense of smell and smell can change the human sensation of the taste.

Pallasmaa highlights the interrelation between taste and other senses. Tactile sensations related to food structure and consistency and visual impressions of appearance and colour make the meals more palatable.¹⁹ In the further part of *“The Eyes of the Skin”*, the author states that architecture can evoke gustatory sensations:

15 Pallasmaa J., op. cit., p. 18.

16 Wyburn G. M., Pickford R. W., op. cit., p. 80.

17 Pallasmaa J., op. cit., p. 18.

18 Wyburn G. M., Pickford R. W., op. cit., p. 75.

19 Pallasmaa J., op. cit., p. 71.

“A delicately coloured polished stone sur-face is subliminally sensed by the tongue. Our sensory experience of the world originates in the interior sensation of the mouth, and the world tends to return to its oral origins. The most archaic origin of architectural space is in the cavity of the mouth.”²⁰

In the context of architecture, smell seems to have a bigger role to play than taste. Smell is largely dependent on our volition – if we want to feel the smell, we must take a deeper breath and focus on the received stimuli. Volatile odorants dispersed in the air reach our olfactory receptors in the nose. The more volatile the substance is, the more intensive the smell it gives off.²¹ On the other hand, intensive smells reach our body simply during the normal breathing process, with no special effort made.

Another attribute of the sense of smell is its ability to get used to long-term and persistent odorants, then our body starts ignoring the olfactory stimuli if they fail to change on the on-going basis. Despite this, repetitive stimulation of the olfactory receptors with one and the same flavour may result in the nostrils identifying it differently.²²

Olfactory, similarly to auditory, sensations influence the emotional perception of architecture and the feeling of well-being of its users. Smell is also an important spatial orientation tool for the blind or the visually impaired. Smell is most strongly remembered. Certain places or people are immediately associated with familiar olfactory stimuli and we are able to distinguish between spaces on the basis of their different smells. Olfactory impressions and sensations may be pretty individual, however, there are certain aromas, e.g. natural flavours that positively affect the well-being of all of us.

Sensory compensation

Some people may be born with certain sensory disorders or be born with a total lack of certain sensory abilities and some may become impaired as a result of a disease or injury. Human senses seem to show compensatory properties. Should any get impaired or lost, the remaining ones are able to increase their efficiencies. The loss of vision will not translate immediately into different or better functioning of the other senses, but the senses will learn to better analyse the data received and interpret it correctly.²³

The sense of touch is the basic cognitive tool compensating for the loss of vision. Unfortunately, the operation of the two senses largely differs – sight can receive visual stimuli that are located at a distance from the observer, whereas the sense of touch requires direct physical contact. This is vital in the sensation of architectural space because most of its components remain outside of the field of perception of a blind person. Another important aspect of vision is the fact that the human brain is able to receive many different stimuli at the same time, which underlies the ability to understand the features of the objects seen and the relations between them. However, the sense of touch enables us to discover ‘layers’ of an object.²⁴

Visual perception records data involuntarily, in a sense – automatically – contrary to the sense of touch, which requires undertaking specific acts, attention focus and refraining from simultaneous engagement in any other activities. Tactile sensations, however, provide much more data about the features of an object than vision. Another sense compensating for the vision disorders is the sense of hearing. It is particularly useful in spatial orientation and moving around space. Reflexive analysis of the tone, pitch or intensity of sounds enables us to locate the position of objects in space and their interrelations. The sense of hearing largely affects the perception of the vast spatial expanse, going beyond the perceptual abilities of the sense of touch.²⁵

20 Ibidem p. 71.

21 Wyburn G. M., Pickford R. W., *op. cit.*, p. 142.

22 Ibidem p. 148.

23 Kusiak J., Świątkowska B. (red.), *op. cit.*, p. 79.

24 Ibidem p. 80.

25 Ibidem p. 80.

Also smell can, to a certain extent, compensate for incomplete visual perception of the blind, yet, it will not be of much use in spatial orientation. Smells that reach us from the environment most often complement the overall data set about the surroundings, underlying the feeling of aesthetics.

Talking about the compensatory nature of senses, it shall be underlined that none functions separately. We can observe their changeable hierarchy, depending on the actual process of perception and the type of the analysed object or space, however, we must acknowledge that all our senses work jointly, on the basis of cooperation, transmitting to our brains complementary information.

Sensory dysfunctions and designing space

Sensory dysfunctions are not tantamount with disability, but in combination with social and environmental factors, may lead to it.²⁶ We are talking about a disability, in relation to functioning in a particular way when it poses a barrier preventing the performance of certain functions easily performed by a reference group.²⁷ Proper space design can remove the barriers posed by the dysfunctional senses and, thus minimise the disability. Dysfunctions are not tantamount with disability if they can be overcome. Properly shaped social environment plays a key role in this respect. To better illustrate the issue, Buchanan refers to an example of a person with a hearing dysfunction (as compared to the reference group with no dysfunctions, this person does not hear sounds in certain frequency range). If the frequency range this person does not hear is redundant for his/her functioning in the social environment, such inability is not deemed a disability.²⁸ Subjective opinion of a given person regarding his/her condition underlies the disability definition. Public spaces and buildings adapted to special needs, e.g. of people on wheelchairs, will enable them to use the space on equal terms with other users and will facilitate positive perception of their condition, now not so much diverging from the others.

Because we have certain social norms and standards applicable to the majority, a disabled person that fails to meet the set criteria is often negatively perceived as a misfit. Such perception of people with sensory dysfunctions may also entail aggressive attacks on them.²⁹ We can, thus, understand that a disability is a deprivation of a certain potential or functional inability resulting from certain barriers posed by a sensory dysfunction, spatial or social barriers. These, in turn, are posed as a result of stigmatisation or discrimination of people suffering from sensory disorders.³⁰ The important thing is that the designed space should be sufficiently accommodating (universal) to be able to serve the needs of persons with various perceptual abilities, eliminating the barriers that prevent their unassisted functioning and, thus, narrowing down the physical differences between people.

The fundamental principle to adapt space to sensory dysfunctions, e.g. the dysfunction of vision, is to design its functional and clear layout. The concept of beauty, in reference to architecture, is a much more complex issue. It can go beyond the purely visual zone and be felt through non-visual perception. However, despite the fact that the pleasure man feels experiencing beautiful and aesthetic objects is a universal human need, irrespectively of perceptual abilities of an individual person, when designing public utility architecture, the designers often seem to ignore its aesthetic value. Universal design should stress the importance of aesthetics, emotional code and meaningful language of architecture equally with the functionality. This is often deemed a prerequisite for the fundamental sense of dignity, comfort and safety of the user.³¹

26 Sen A. K., *Development as freedom*, Knopf, New York, 1999.

27 Buchanan A., i in., *From Chance to Choice: Genetics & Justice*, Cambridge University Press, 2000, p. 285–286.

28 *Ibidem* p. 287.

29 Davis, L. J., *The disability studies reader*. New York: Routledge, 2013.

30 Mitra S., *The Capability Approach and Disability*, "Journal of Disability Policy Studies", 2006, volume 16, no. 4, p. 236–247.

31 Kłopotowska A. *Niewidzialna architektura – status piękna w poza wzrokowej percepcji przestrzeni architektonicznej* [Invisible architecture – status of beauty in non-visual architectural perception], *Czasopismo Techniczne. Architektura*, Wyd. Politechniki Krakowskiej, Kraków, 2007, R. 104, z. 6-A, p. 269–274.

Perception and senses

The terms 'sensory system' and 'perceptual system' are often used interchangeably. The processes within the two systems are mutually complementary and stimulating. They, however, concern different processes. The sensory system shall be understood as the process of reception of the stimuli that reach us through all the senses that we have. Perceptual system is the process of decoding, analysing and responding to the stimuli transmitted to our brains via the sensory system. Thus, we can be facing different types of disorders – our senses might not be sending some of the data (and prevent us from full perception of the environment) or the perception itself might be impaired (which does not have to mean that we have any sensory disorders). Pallasmaa argues that we so easily rely on the work of our senses that we do not fully comprehend the role perception plays in our lives. Perception refers to past memories and emotions to further process them and recognise the meaning of the stimuli sent from the environment at a given moment.³² The role of memories is discussed in the works of Kenya Hara, who points out that memory is vital in the processing of data by the human brain. He explains that memories are evoked through past experiences, that then help us comprehend and interpret a given situation we are facing at present. Therefore, what we can see at a given moment is not just the image projected on the retina, the visual stimuli are reinforced with our previous experiences recorded in the memory.³³ Perception is the resultant of volition and imagination. According to the research done, the perceptual processes occur in those parts of the brain that are responsible for imagination, which proves that they are interrelated.³⁴

The quality of architectural space is, to a large extent, predetermined by the users' feedback. For that reason, it can never be appropriately assessed exclusively based on its visual attributes. Proper assessment of the nature of a given place or an architectural facility is much more complex and shall fully account for all the sensory stimuli. According to Edward T. Hall, the way the users experience the spatial layouts depends on the visual contours of the facilities as well as on the distances maintained between them. Moreover, cultural differences between various groups of users might also involve the differences in the perception of spatial relations. Users dynamically experience space because their perception is correlated with action, thus, they account, not only for what they see, but also, for what they can do in the space.³⁵ The very topic of building relations, undertaking unusual activities with the use of objects and implementing new materials is discussed by Maciej Frąckowiak in his publication "Inne podniety. O miasto otwarte także na doznania" [Other stimuli. City also open to sensations"], where he calls these atypical relations or activities 'other stimuli' that enable the users to open up to new bodily sensations and other, more intensive sensory stimuli transmitted to the brain. He is of the opinion that it is desirable for the urban space to more extensively stimulate the users. The author refers to a very simple example of street furniture, namely armchairs installed on the pavement, along a busy road. Anyone sitting on the armchair can observe the space and other passers-by from the position of an active participant of the traffic, rather than a passive observer only, being able to receive the same stimuli, smells, vibrations and sounds. He/she stands a chance of actively participating in the scene dynamics via a direct interaction (engagement into a discourse, enforcing a route change or letting someone pass).³⁶ Time of the day may be an important motivator thereof because the atmosphere prevailing in space depends on the given moment, lighting conditions or what's temporarily going on in the street. Being in space and experiencing architecture is always of multi-sensory nature, in other words, our simultaneous perception involves the simultaneous work of all the senses together.³⁷

32 Pallasmaa J., *The Contribution of the Five Human Senses towards the Perception of Space*, p. 27.

33 Banasik-Petri K., *Architektura zmysłowa – Nowe tendencje w procesie projektowania na podstawie wybranych przykładów z twórczości Kenya Hary* [New tendencies in designing based on selected examples of Kenya Hara works], KNUV.

34 Kusiak J., Świątkowska B. (red.), *op. cit.*, p. 23.

35 Hall E. T., *Hidden Dimension*, 1996.

36 Kusiak J., Świątkowska B. (red.), *op. cit.*, p. 163

37 Kusiak J., Świątkowska B. (red.), *op. cit.*, p. 14.

Sensing space

Generally speaking, some places encourage leisure activities and social contacts and some tend to be avoided. Halls with glazed side doors offering nice views foster social relations, whereas e.g. lifts seem to discourage them. The same has been observed about the impact of shapes on human behaviour – round tables encourage the social integration, contrary to the narrow and long spaces that discourage it.³⁸ Owing to his/her peripheral perception, the space user can interpret the atmosphere of the place he/she is in, just in an instant. This multi-dimensional and peripheral vision makes the observer part of the space observed. This phenomenon has been used in impressionist, cubist and abstract expressionist paintings to recreate the 3-D reality around the observer.³⁹

Spatial perception is largely dependent on mental factors. Mental approach, emotions, associations or response to the experienced architecture correspond to the models prior created in the observer's psyche. If the experienced space contains unknown or complex elements, the observer attempts to find similarities by analogy with previous experiences, consciously developing his/her manner of perception.⁴⁰

The observer responds with uncertainty to unknown objects, forms or materials. This at the same time increases his/her attention focus and curiosity and in the end, enriches and extends the experience range. Another important aspect of perception is finding similarities between the properties of architecture and music and interdependencies between their visual and acoustic features. The two disciplines share such elements as rhythm, proportions and harmony, which often serve similar functions. As early as in the Ancient times, the scholars found a correlation between mathematical proportions used in building facilities and harmony in music. Ancient Greek classical architecture, designed with the use of the golden ratio, may well support the statement.

Palladio's works were also based on spatial dimensions and measurements. The most frequently used by Palladio proportions were: 3:4, 4:4 and 4:6 – the same as time signatures in music.⁴¹ The factual impact of such proportions on the perception of space has already been confirmed. If these proportions are observed, we feel that the building composition is harmonious, magnificent and well-integrated. This translates into our well-being therein. Feeling the rhythm of architecture fundamentally underlies the components of spatial perception. Comparison with music automatically comes into mind. We can similarly look at people dancing or listening to a concert and feel the rhythm of music as if it were originating from the inside of our own bodies, even if we are just passive observers and do not engage into any physical activity. Rasmussen notes that we similarly feel architecture if we visually sense the elements repeated at the same intervals.⁴² The rhythm of architectural forms makes us better understand and remember a place. It also eliminates any feeling of spatial chaos and disharmony. Another vital factor underlying the atmosphere of a given place and the well-being of the users is the interior design. In this respect we can well refer to the works of Peter Zumthor that may serve as the examples of conscious sensitivity to designing and almost 'poetic' use of materials. The skill of combining textures, colours and weight with the play of light makes his architecture appeal to all the senses and evokes an emotional response of the user. A specific relationship of form and sensuality of materials represents an outstanding value, enabling the users to sense the uniqueness of the creation made of familiar components.

Conclusions

Perception is a complex process that involves tools of sensory cognition and personal experience. Adherence of the user to a given cultural group might further condition his/her manner of perception. A wide range of factors affecting the perception of space by its users poses a true challenge for the designers. Architecture may appeal to man in terms of bodily, material and spiritual attraction. An architectural work, blended within the landscape, transmits unique stimuli received with all the senses. The ability of a designer to create innovative relations

38 Day C., *Places of the Soul. Architecture and Environmental Design as a Healing Art*, Routledge, London 2004, p. 21

39 Ibidem.

40 Wyburn G.M., Pickford R. W., *op. cit.*, p. 207.

41 Rasmussen S.E., *op. cit.*, p. 111.

42 Ibidem p. 134–135.

with space and its other users can positively foster the users' sensitisation via new and more intensive bodily and sensory experiences. The understanding of the processes of spatial perception, based on the knowledge of the physiology of senses, enables the designer to fully comprehend the needs of the users and to design works in compliance with the principles of the universal design. Properly designed space can enable people, suffering from sensory dysfunctions, to enjoy the widest scope of unassisted living. At the same time, it can hide their limitations from the public eye and compensate their deficiencies with multi-sensory aesthetic feelings.

Conscious designing in future shall harness the multi-sensory potential of human nature to respectively create the intended spatial relations with the users, having a wide range of special needs.

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Nineteenth-century, non-existent buildings of the Castle Hill in Lublin

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Abstract: This article presents the history of no longer existing 20th century buildings against the background of the turbulent history of the Castle Hill in Lublin. It shows the location, appearance and functions of the buildings, which were supposed to serve administrative, residential and technical purposes and some of them became a place of slaughter and executions. The analysis was based on data from archive searches as well as from geo-radar studies.

Key words: Castle Hill in Lublin, Administration House, Prison in Lublin Castle, geo-radar research

Introduction

The oldest history of settlement on the castle hill dates back to the 6th century AD. In the 8th century the first town was most likely built. These data were obtained thanks to archaeological research carried out in various periods. Despite the good historical and archaeological recognition of the castle hill, the place still hides a lot of secrets and unresolved issues, thanks to which various, sometimes even fantastic, theories are being developed. The location on the hill and the shaping of the immediate surroundings was almost ideal for the location of the defensive point. Over the years, this function has been maintained but transformed and the buildings have evolved. In the 13th century the brick tower, which still exists today, was probably built, and in the 14th century Casimir the Great greatly expanded and transformed the building into a brick, defensive royal castle. From that moment on, as the royal seat, the buildings were repeatedly transformed, changed and renovated according to their rank. In the 18th century, due to, among other things, the geopolitical situation, the castle fell into disrepair and at its end it became a source of building material for town houses or road fortification¹. The facility looked like a 'scarecrow' and there was no idea of how to develop it until the central authorities decided to build a prison on a hill that would cover almost the entire area. The concept of building the castle was carried out by J. Stomf and later supervised by J. Hempel². During this period, documentation was created to illustrate the condition designed against the background of the ruins, which is extremely useful to illustrate the location and course of the royal walls. Fortunately, the construction project assumed the preservation of the castle chapel building and the tower – the jungle.

The prison facilities were built in stages until 1824, partly using the medieval walls as foundations and as a source of building material³. Buildings during the prison period often underwent changes (especially the interiors). Until the end of the nineteenth century, the prison was housed within the structure of the walls of the quadrilateral foundation designed by Stompf, but these areas proved to be insufficient. At the beginning of the twentieth century, the expansion of small technical buildings began in the area of the hill, which was lim-

1 W. Tomicka, *Lublin Castle in the 19th century*, *Monuments Protection*, 1954, p. 190.

2 S. Wojciechowski *Renaissance Lublin Castle Monument Protection* 7/3 (26), 178–182S. 182.

3 The walls were uncovered during the renovation in 2019.

ited on the one hand by the existing prison facility and on the other hand by the slope and buildings located at the foot of the hill. Hence the only possible form of expansion was the courtyard area and small areas between the edge of the slope and the wall of the main building. Over the next few years, buildings were built in the courtyard and on the northern and eastern sides.

Due to the nature of the building, the building regulations that were in force in the city did not include the prison area. On the one hand, archives in the army have always been more "tidy", but on the other hand, they were actually unavailable. As it turned out, during the search, most of the archives of the facility were in various collections not related to the military, the problem was their fragmentation and incomplete preservation.

Administrative house building

It was not possible to establish the exact date when it was created, but it most probably took place around 1905. At that time, a massive three-storey building was constructed right in front of the prison facade, almost completely covering the western side of the facade. Admittedly, a document from 1905 was found in which the Governor's Engineer E. Sidorski presented the "Project for the construction of a police detention centre in the city of Lublin, 2nd Administrative House", may be the project of the building in question, but it differs significantly from the one known from archival photographs (Fig. 1, Fig. 2, Fig. 3). The project includes a drawing of the elevation, cross-section, basement projection, ground floor and storey⁴ but does not include a situation plan or the number of the plot on which it was to be built⁵. The projections describe in detail the individual functions, which mainly indicate that the facility was to include staff housing, laundry and cellars. The project has been dimensioned in the fathoms for unspecified reasons. At that time, it was very often the case that the designed building differed significantly from the one constructed sometimes by changing the number of windows in the facade and sometimes by adding additional storeys. In this case, the building had to be quadrupled and gained one more storey. It is very doubtful whether this project can be attributed to the building constructed on the plot in question⁶, but no other building could have been identified that could have served as an administration building under arrest in Lublin at the time. The architecture of the facade is quite characteristic for the beginning of the 20th century, except for the window in the middle axis of the first floor (Fig. 3), which seems to refer to the windows of the neo-Gothic castle. It may be a project of an unrealised building completely unrelated to the castle hill, but if we assume that it concerns the building in question, significant changes have been made during its construction. It is possible that the building was simply meant to be as large as possible and its outline was created during the construction of the foundations in such a way that it could be safely erected right at the edge of the slope.

In any case, the building was built around 1905, in place of the square in front of the main entrance. The entrance gate to the medieval castle and the royal chambers were located in this place. The location of this building forced at least partial removal of the remains of the foundations of the royal castle and if the cellars underneath were built, the older foundations were probably demolished and could have been used as a reused building material. A big problem with the execution was the difficult ground conditions. Half of the building was located on the inner side of the medieval castle (i.e. on the ground close to stable) and half on the slope (where thick layers of secondary layers were deposited for years). It is not known how the contractors approached it, but it seems highly probable that serious problems with heterogeneous settlement of the walls may have occurred during the operation of the building⁷.

4 State Archives of Lublin, Plans of the City of Lublin, no. 172.

5 It was not until 1918 that the Potocki Palace (Old Penitentiary) passed from the army to the police.

6 Based on the Tariff of Houses of the City of Lublin and its suburbs: Piaski, Czwartek and Kalinowszczyzna from 1904, the only buildings that can be linked to the function of the project were located at 9 Zamkowa Street (488) – a prison and 3 Poczętkowska Street (349) Police Board.

7 Due to the nature of the facility, the Lublin City Construction Inspectorate had no access to the site and any technical problems were only the responsibility of the prison authorities.

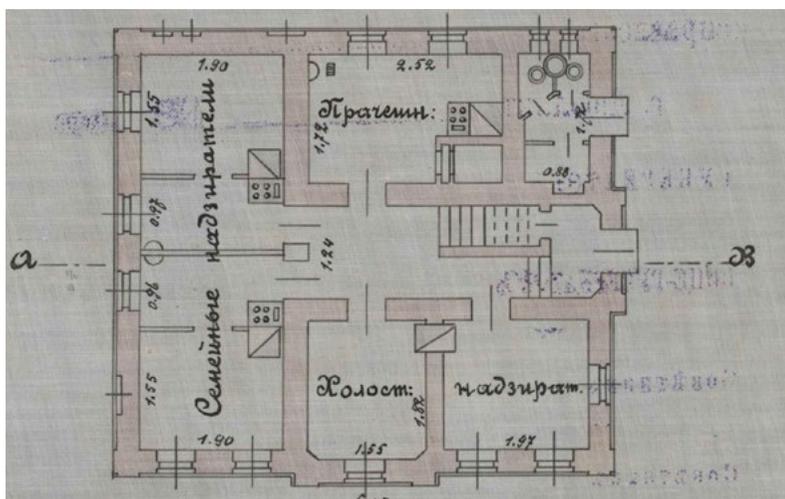


Fig. 1. Ground floor plan – Project for the construction of a police detention centre in the city of Lublin, 2. Dom Administracyjny, E. Sidorski. 1905, APL, PmL. ref. 172

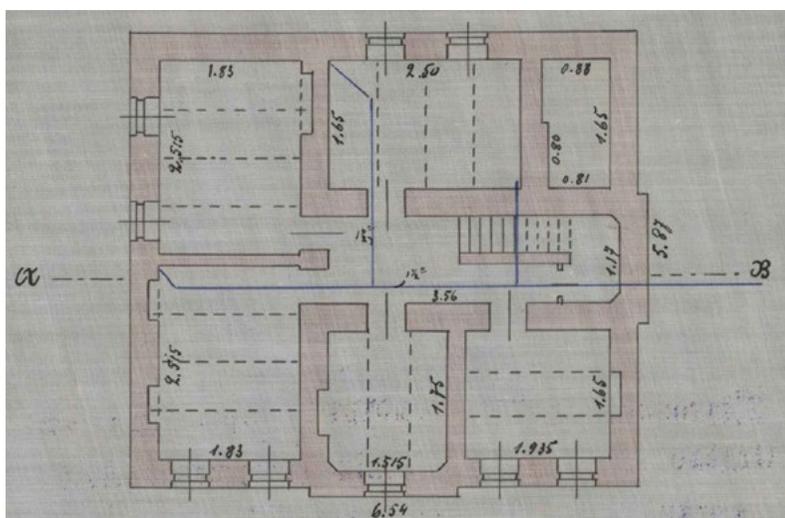


Fig. 2. Basement plan – Project for the construction of a police detention centre in the city of Lublin, 2. Administrative House, E. Sidorski. 1905, APL, PmL. ref. 172

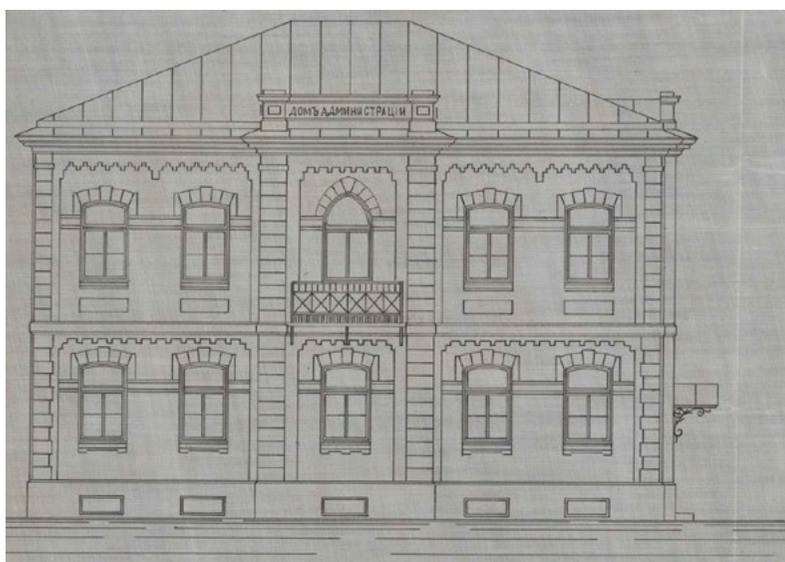


Fig. 3. Façade – Project for the construction of a police detention centre in the city of Lublin, 2. Administrative House, E. Sidorski. 1905, APL, PmL. Ref. 172.

The first technical documentation we managed to find comes from 1918 and shows the exact layout of the three floors (ground floor, first and second floor – Fig. 4, Fig. 5, Fig. 6), without cellars⁸. It was made by the Austrian military, dimensioned in metres. The drawings show exactly the layout of the rooms, equipment or dimensions, do not describe their functions. However, it can be assumed that the building contained both flats and office spaces.

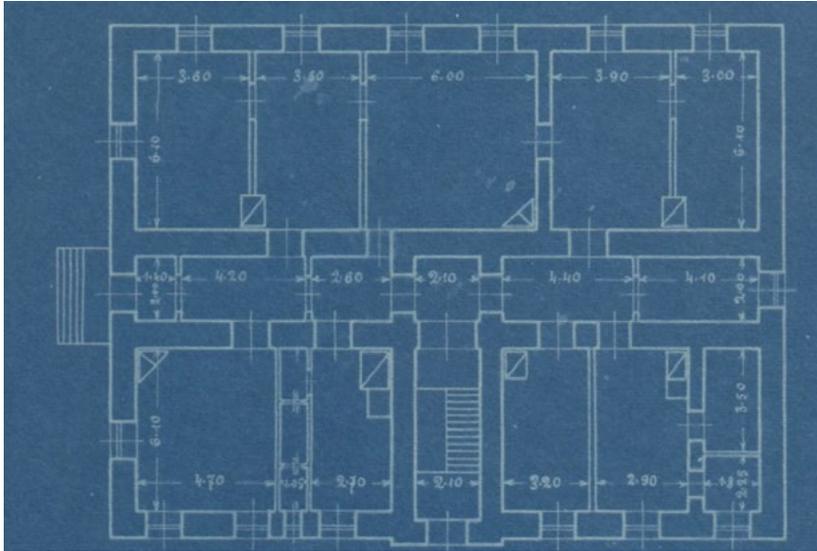


Fig. 4. Ground floor plan of the administrative building, 1918, APL, C. and K. District Headquarters in Lublin. sign. 411, p. 8

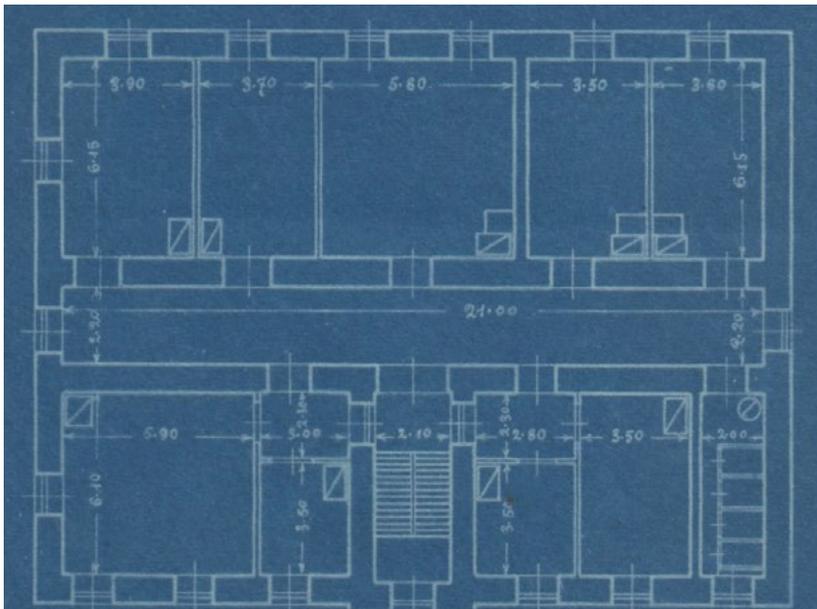


Fig. 5. 1st floor plan of the administrative building, 1918, APL, C. and K. District Headquarters in Lublin. sign. 411, p. 8

⁸ During this period it is common practice not to include floors below ground level in the documentation.

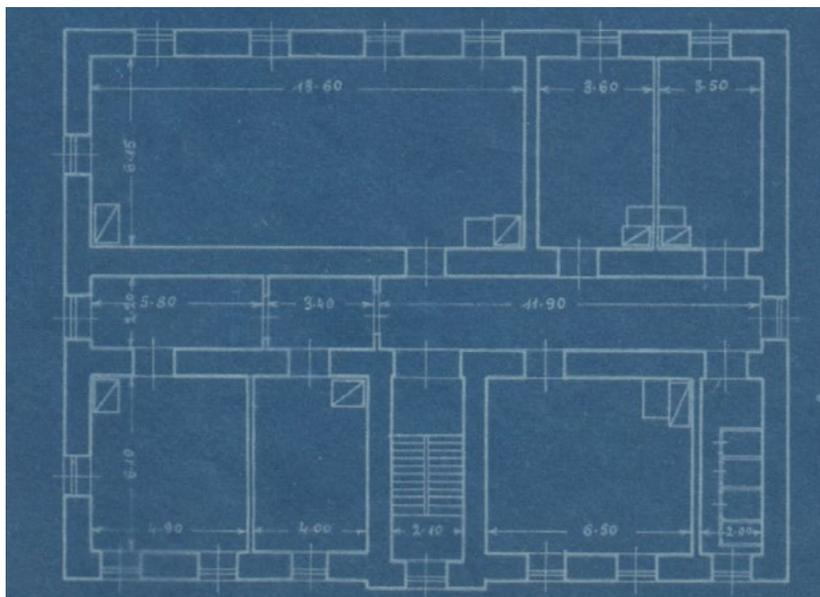


Fig. 6. 2nd floor plan of the administrative building, 1918, APL, C. and K. District Headquarters in Lublin. sign. 411, p. 8

The further fate of the facility is not known except that it was used by the Germans during the German occupation, and in 1944 – 54 prisoners were executed in the cellars. The administrative building was probably demolished⁹ around 1954, when the square in front of the castle and the current layout of the slope for the 10th anniversary of the PKWN (Polish National Liberation Association) were formed. At that time, the prison was liquidated and the buildings were handed over to the Voivodeship House of Culture. Since then, apart from repairs to the surface and current repairs, no major changes have taken place in the area.

The determination of the location of the administrative building itself was quite simple due to the available maps and archival photographs. Although there is uncertainty about the accuracy of the archives, it should not be more than one metre. Archival documents do not specify the location of basements or their size, but we do know that they existed. During the period of the building's construction, it was common in Lublin to make cellar ceilings and staircases in sectional form on steel beams (cement mortar was used quite often). There is a certain probability (although very low) that during the demolition of the building the basement ceilings were not removed¹⁰, which was not confirmed by geo-radar surveys. It could be that during the demolition process the ceilings were preserved but the cellars were buried, which was also not confirmed by the geo-radar. This leads to the conclusion that the only reliable source for confirming the location of the building and its degree of preservation is archaeological excavation.

The geo-radar research defined quite precisely the outline of the administrative building, but only in the scope of the east wing (additionally, most of it was located in the inaccessible space of the flower bed). Anomaly A3 (Fig. 13) probably marks the partially buried (but not precisely) basements of the east wing, while it does not show any other unbasement parts¹¹. From here it can be assumed that the stairs from the east led to the basement. In the central part there was a corridor throughout the whole length of the building and the rooms were located on the eastern side. The remaining part did not have cellars or the cellars were completely demolished. An attempt to reconstruct the storey is shown in Fig. 15.

9 It is said that during the demolition work there was a construction disaster which resulted in several deaths.

10 If the cellars are left empty after 70 years, there would certainly be a bump or landslide.

11 The situation here is relatively unusual in the part that was on the inner side of the medieval castle walls and on the outer side, where the foundations should have been deeper, the cellars were not built.

Other buildings – currently nonexistent

The bathhouse building was located in the courtyard. In fact, apart from the drawing and photographs of the roof, nothing is known about it.

On the northern side, there were still a few small farm buildings, which show maps from the interwar period.

Historical photographs show that the greenery in the prison area seemed to be taken in an orderly form (on the slope there were terraces, at the entrance of the flower beds and the layout of alleys). The order and maintenance was probably done by the prisoners.

All these facilities and the fence were probably dismantled (like the administrative building) around 1954 after the end of the prison and the introduction of cultural functions on the hill.

Conclusions

Over the years of its existence, the castle hill has undergone many changes in its form and function. Since the oldest history, there have been defensive points, a castle, a royal seat, a defensive castle, a prison, a place of execution and a cultural unit. These periods were intertwined with stormy events connected with the fall and destruction, whether caused by war turmoil or lack of repairs.

The administrative building, against the background of the history of the castle hill, has functioned here for a relatively short time, only 50 years. However, due to the site of the massacre that lasted for 10 years in its cellars, it has become part of a shameful history that should be remembered and documented.

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Fig. 7. Administration building, museumlubelskie.pl, access 2019.



Fig. 8. aerial photography – red arrow marks administration building, green arrow marks bathhouse building



Fig. 9. Aerial photography 1938. – Red arrow marks the administration building, green arrow marks the bathhouse, https://fotopolska.eu/Lublin/b58146,Panoramy_Lublina,24,48.html?f=633676-foto accessed 20.10.2020 r.

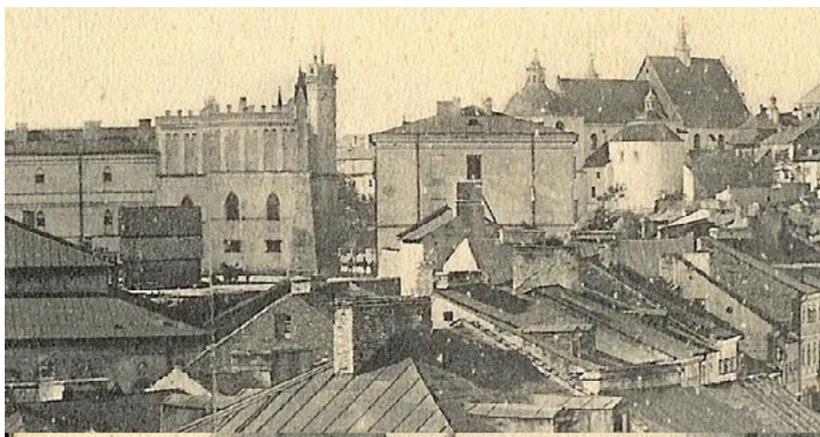


Fig. 10. Fragment of a postcard depicting the discussed object from the north – in the author's possession



Fig. 11. A fragment of the postcard "Lublin – Castle" – with a red arrow marks the administrative building, owned by the author



Fig. 12. Postcard depicting the castle hill – the red arrow marks the administrative building, owned by the author

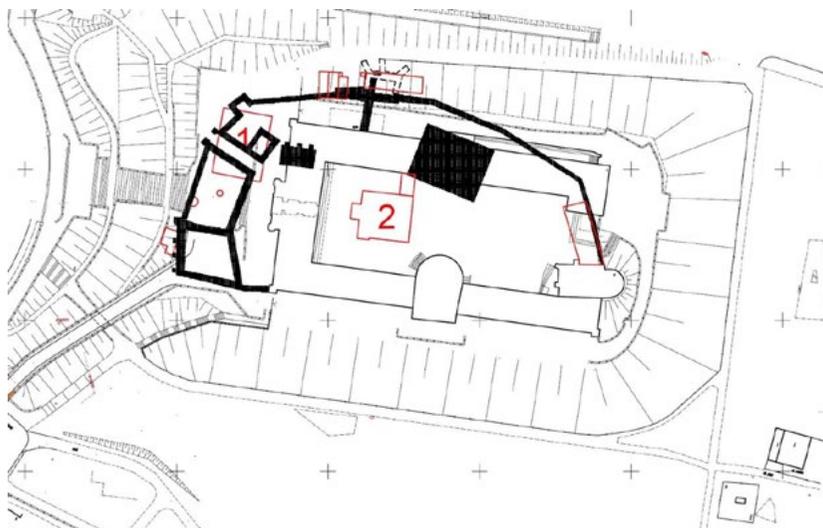


Fig. 13. Location of non-existing buildings on the castle hill (red buildings of the 20th century, black defensive walls and buildings of the royal castle), Fig. K. Janus

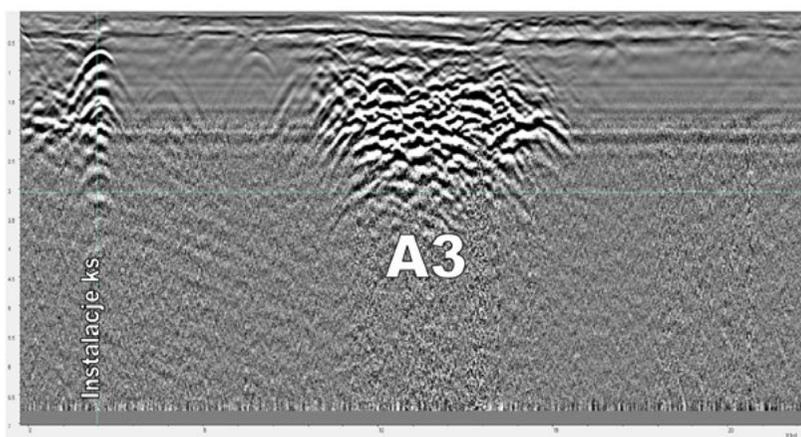


Fig. 14. section W.53 showing a fragment of the inaccurately buried basement of the eastern wing of the administration building – Geo-radar research “Plot of land 41, in front of the Lublin Castle building”, K. Janus, W. Kocki, N. Przesmycka, Lublin 2018, p. 107.

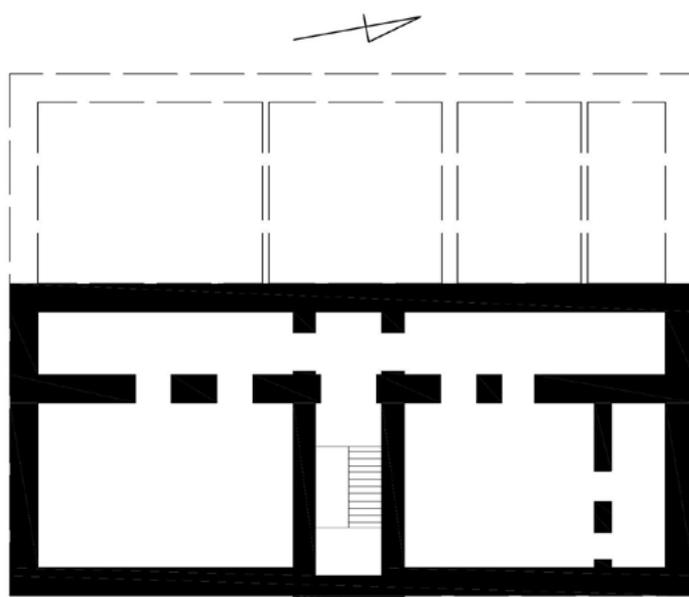


Fig. 15. Attempted reconstruction of the basement plan of an administrative building from 1918, Fig. K. Janus

Freehand drawing as a basic means of artistic expression in the process of educating future architects versus modern computer technology

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Abstract: Freehand drawing is one of the earliest and most important human skills. It is one of the simplest forms of recording thoughts and information from an early childhood, which allows to communicate without using words. It is the first verbal form of contact with the outside world by means of which feelings, emotions and desires are illustrated. It is something that allows one to see the surrounding beauty, see the details, learn about the structure and structure of matter and keep the image in memory for a long time. The article discusses issues related to the process of education in freehand drawing at the Faculty of , Faculty of Civil Engineering and Architecture of Lublin University of Technology. In this paper, the drawing is presented as a basic tool for presenting one's own design concept to future investors, which teaches perception, analysis, as well as develops creative and spatial imagination. Assuming that learning freehand drawing is the basis of all artistic activities, the article attempts to examine the essence of freehand drawing in the process of educating future architects at the Lublin University of Technology. The literature on the subject raises the issue of values conveyed through freehand drawing and compares it with contemporary, advanced computer programs.

Key words: freehand drawing, modern computer technology, means of artistic expression

The ability to draw is the source and essence of painting, sculpture and architecture itself, as well as of any presentation that falls under the senses (...). The drawer, who will become master of this skill, has in his/her hands a treasure underestimated.¹

Introduction

The use of freehand drawing is a basic skill necessary for future candidates wishing to study architecture at both the Technical University and the Academy of Fine Arts. Every year, hundreds of high school graduates try to get into their dream studies in order to become an architect in the future. As you know, drawing is one of the most important skills required from the candidates for the degree in architecture, as it is the basis for any design and artistic activity. It is based on the search and the resulting errors, which makes it close to man. Nowadays, in the era of omnipresent informatization and computerization, the role of freehand drawing has significantly changed. More and more often we can come across an opinion that it is unnecessary for contemporary designers and is being replaced by advanced computer programs that quickly and easily allow for the

1 F. de Hollanda, *Dialogi rzymskie* (1548), fragment in: *Disegno – rysunek u źródeł sztuki nowożytnej*. p.125. Available: <https://www.szkoelnictwo.pl/szukaj.Rysunek> [Accessed: 20 November 2015]

representation of three-dimensional reality without any manual skills. Nowadays it is increasingly difficult to explain to students how important is a solid drawing technique, which is a trademark of a good designer and architect. The highly developed skill of using drawing allows to illustrate, in a quick and easy way, every thought, idea and idea, leading to its execution. It so happens that modern design programs are not able to replace the basic means of communication, which is freehand drawing. The key role it plays is the need to communicate and present one's artistic vision to others.²

Every creative process has always started with an initial sketch or a note from nature. To this day, nothing has changed. What is new, however, is that more and more often preliminary drawn projects are subjected to computerized graphic processing to better visualize the idea. Nowadays, freehand drawing seems to be a much more complex and multi-aspect phenomenon available for a few. It is a kind of language with which the designer-artist presents his/her vision and idea and communicates in this way with the rest of the world. It is the first tool for communication expressed through a quick sketch, diagram or concept. It allows analyzing and synthesizing the surrounding world and developing one's individual creative style. It is becoming common for freehand drawing to be replaced by a computer, however, architecture students in the first years of their studies largely use freehand drawing, as it is the only one that enables them to develop creative design abilities.

This article refers to drawing as one of those timeless human skills that contribute to the development of civilization and are the basis for building material culture. It is an essential and irreplaceable element of education, upbringing and training, which teaches independent thinking. The article brings the reader closer to the essence and meaning of freehand drawing, as a process of perception, study of reality and as a primary means of presenting architectural thought, which is an important element in the process of educating architects.

Drawing as an independent creative statement

Since the beginning of the history of art, there have been excellent drawers who left behind valuable creative works. Already in prehistoric times drawing was one of the main forms of communication between people, fulfilling at the same time decorative, religious and ritual functions. Already Pliny appreciated the drawing skills of the Greek masters, who for the first time introduced the contour which proves the perfection of the painting. He believed that anyone can paint, but drawing the contours of the body and surrounding elements is one of the most remarkable skills.³

Byzantine artists gradually developed the art of drawing, which had been forgotten for a certain period of time, which in consequence contributed to the popularity of this technique, especially in miniature art. During the Renaissance, on the other hand, it was mainly used to specify the artist's idea, where painting, sculpture and architecture were defined by a common term *arti del disegno*, i.e. the drawing arts.⁴

The Gothic era caused an intensive development of freehand drawing, called the modern architectural sketch, which contributed to the identification of the architect. Such creators ensured themselves an important position in the society by deepening their technical knowledge and necessary skills. Their creative predispositions played an important role, which they could present only thanks to their ability to transfer the idea to the paper by means of sketch. Particularly important for freehand drawing was the turn of the fourteenth and fifteenth century, in which the interest in art and drawing grew, which led to an increase in the realization of architectural concepts.⁵

The turn of the 19th and 20th centuries saw a great development of different styles in drawing in Europe, which led to a deeper understanding of the characteristics of materials used at the design stage. During this period there was a diversity of styles and architects began to create bolder drawings. Drawing became a major

2 H. Mełges, "Freehand drawing as an important skill for an architect and students of architecture", [in:] M.J. Żychowska (ed.), *Challenges of 21st century. To draw, to paint or to use a computer*, Vol. 2, Wydawnictwo PK, Cracow 2015, 85–98; B. Makowska, "The significance of sketches in the education of architects and in the development of their professional skills", *Czasopismo Techniczne. Architektura* 2015, R. 112, z. 4-A, 17–24; Gomółka J., "Architectural drawing as a means of communication", *Czasopismo Techniczne. Architektura* 2015, R. 112, z. 4-A, 191–194.

3 Pliniusz, *Historia Naturalna*, translated by I. T. Zawadzki, fragment in: *Disegno – rysunek u źródeł sztuki nowożytnej*, Wrocław-Cracow 1961, s. 125.

4 G. Noble, *Rysowanie. Klasa mistrzowska. 100 technik wybranych artystów.*, Arkady, Warsaw wyd. 2019, s. 9–10.

5 A. Białkiewicz, „O rysunku architektonicznym”, *Teka Kom. Architektura i Urbanistyka Studia Krajobrazu – OL PAN*, 2006, p. 53–60.

tool in the architect's work until the emergence of advanced graphical programs to assist in the creation of shapes that were difficult to reproduce manually.⁶

In the 1970s drawing was distinguished as a fully sovereign field of visual arts, where practically every work of art, architectural design or drawing, was made using perspective. Among the artists creating in the last five hundred years, considered to be masters of drawing, one can mention: Michelangelo, Leonard, Rafeal, Titian or Hieronim Boch. In works of all the above mentioned artists, the drawing was the absolute basis of everything. It allowed not only to experiment, but also to create much more painterly works. Other great artists, like Rubens, used drawing to develop their complex compositions, and Claudi Lorrain used it to create visual catalogues of his own drawing compositions. All these less and more famous artists used it as an integral medium in their work, where each of them used it according to their needs and individual style. Without a doubt, Vicent van Gogh's work provides most examples of how artists often used drawing to satisfy their needs and desires.⁷

The 20th century saw the charismatic work of Pablo Picasso, whose experimentation led to the discovery of new possibilities of drawing, painting or graphics. Other artists could not match him. His main rival, however, was Henri Matisse, also considered a giant artist. Both of them made thousands of drawings and although not all of them were great, the excellence of the best ones overshadows all their competition.⁸

In 1915, teaching drawing from nature was nothing new in public schools. It was considered to be one of the most important subjects that significantly influenced the development of young people's imagination. Drawing was treated as a form of recording simple visual insights, complex ideas and imaginations. It included both the material and visible world, as well as the world of thoughts, ideas and views, essential features of structure, construction, function and proportion.⁹ It was often regarded as a method of thinking and not just a mechanical action, as it allowed the views and ideas to be combined while maintaining a specific form of expression.

Since the beginning of history, drawing and architecture have been closely linked. It is enough to mention the drawings of Mies van der Rohe or Antonio Sant'elia, in which architecture dominates in the form of drawing, exploding with the canon of colors and spatial forms. The turn of the 1970s for many artists, such as Mies van der Rohe and Antonio Sant'elija, were the years of greatness in which they reached the apogee of their creativity using a simple tool such as a pencil.¹⁰ Multiplicity, multiformity and multifunctionality of drawing have been recognized, as it is used not only by architecture designers but also by constructors, mathematicians and physicists. Flexible and fragile drawing has become a carrier of stimuli for the imagination, a rotation of thought-provoking concepts and a cipher with ambiguous message content. Thanks to its unpretentiousness and modesty, drawing gained a new position and value and gained autonomy, thus expanding its functions, space and form.¹¹

It is worth noting that the drawing was created out of a need and its teaching for many years was purely practical. The first architectural schools were connected with the Academy of Fine Arts, complementing each other. The twentieth century saw to its appearance also at the Polytechnics, where drawing, however, had a lower rank than at art schools.¹²

The art of using freehand drawing is a personal act of creative human activity, where it is often sketchy and schematic. It maps a perspective, draws points and, above all, sets a given space on paper. The act of drawing often becomes the beginning of a great work. It allows discovering the true, inner idea of a given creator. Drawing, sketching or painting allows to get to know and look closer at the works of great artists, who often become a valuable source of inspiration. Thanks to the simplicity of the technique, there are no intermediate stages between the concept of the drawer and the materialization of his vision. The hand holding the tool can

6 N. Benkari, M. Boudidah, Architectural education and cultural context in the use: challenges and opportunities, *Alma Cipta* vol 7 (2), December 2014, 51–62.

7 G. Noble, *Rysowanie. Klasa mistrzowska...* p. 12–15.

8 Ilab, p. 16.

9 R. Balcerzka, M. Ozrechowski, J. Pętkowska-Henlek, M. Suffczyński, A. Sufiński, T. Trzupiek, *Rysunek architektoniczny w praktyce, czyli jak patrzeć ze zrozumieniem*, PWN, Warsaw 2019, p. 73.

10 Danish studio BIG and its publication *Yes is More*, Herzog & de Meuron or Jean Nouvel: „Architektura i komiks”, *Architektura-Murator* 11, Murator, Warsaw 2010, p. 1.

11 B. Narolska, „Sztuka”, Available: <https://www.profesor.pl/publikacja,10846,Artykuly,Rysunek-jako-samodzielnny-pelnowartosciowy-obszartworczy> [Accessed: 27 February 2015].

12 Ilab, 74.

respond directly to any vibration of emotions, change of mood or course of thoughts. The close relationship between the activity of drawing and biological mechanisms makes it only personal, where drawing becomes a unique work, created only in one copy.

The concept of drawing is most often analyzed in terms of the psychology of seeing, because it consists in reproducing real and imagined objects on any plane. It also includes aspects of graphic imaging and has the characteristics of a structural drawing. Structural drawing is defined mainly by graphic aspects, understanding and analysis. It is a record of geometric forms, which allows a comprehensive understanding of the subject and a graphic presentation of the internal structure of an object. The ability to draw is especially connected with thinking from the moment of birth through growing up, cognition leading to independence and maturity.¹³

Nowadays, drawing has become an independent and full-value creative image, which can be found everywhere and its scope becomes immeasurable. It is no longer just a mimetic process revealing the artist's emotions, but an understanding of aesthetic values in every most unexpected form of drawing. The boundaries between artistic and non-artistic drawing are also blurred and they are no longer clear. The formulation of an intellectual and emotional problem, consisting in the visual organization of all components of a work of art, became decisive in this respect. The use of different tools, types of lines, relations of form, character or size, plays a strictly defined role in the drawing, where the mutual relations among these components determine whether the work contains this kind of internal tension. It may seem, therefore, that the way in which all the components of the work are organized is individual and reveals itself at the level of the drawing, influencing the value of the project.¹⁴

The role of drawing has changed radically over the recent years. Its range has expanded considerably and it has been elevated to the rank of an independent and full-fledged medium. Drawing has ceased to be treated as a side activity and has become more comprehensible to a wide audience. It was considered to be an attitude of almost every visual expression on which one builds, nowadays using different technologies and tools, completely different structures.

In some cases, the drawing has not changed significantly, as it still operates with a line, stroke, valor or stain and is an independent and complete creative image. The canons of proportions of the characters in the old days, where they are still a rich source of knowledge about man and his surroundings, have not changed either. It is an instinctive and deeply inborn medium. It is a universal and versatile art, highly practical as it allows anyone with a pencil and a piece of paper to express themselves creatively in a fairly quick and easy way. It is counted among the earliest records of exchange of thoughts, ideas and ideas known to us. Despite the emergence of modern computer technologies and new methods of artistic expression, drawing still retains its unique place as a means of individual creative expression. It is a universal, universal and practical form of art. It is thanks to it that the spatial imagination is shaped, which influences the ability to note and create ideas. It is one of the quickest and most direct forms of expression at the stage of the presentation of an idea still after it will be reproduced in detail using a computer.

Convention – vision – purpose of freehand drawing

The education and development of artistic skills of past architects is mainly based on learning to observe phenomena, where reality is analyzed. Learning to draw starts with observation and turns into the creation of a work of art, for which language is necessary to express form, color, space or light. These are the values that characterize an architectural work, which is based on drawing and the related methods of visualization. Learning to draw is a very important part of the course of study of architecture, because it is necessary not only at the stage of design, but also to document reality.

The main aim of the classes in drawing and painting in the faculty of architecture is to exercise spatial imagination, artistic sensitivity and sense of proportion on the paper surface. These classes are designed to teach sensitivity to value and color as a decorative element of the architectural form. They enable free and creative expression, which significantly influences the shaping of personality of future architects.

13 M. Orzechowski, *Rysunek, metoda edukacji kreatywnej*, Blue Bird, Warsaw 2015, p. 15–18.

14 B. Narolska, „Sztuka”... [Accessed: 27 February 2015].

One of the basic exercises during drawing and painting classes at the Faculty of Architecture at the Lublin University of Technology is the study of still life, which allows an in-depth knowledge of a given object's structure, matter, shape or color. At the same time, it is an excellent way to practice the drawing workshop necessary to solve more and more complex artistic issues in the architect's further work. Drawing from nature consists of detailed observation and analysis, leading to the realization of the task set. It teaches us a completely different approach, when we can really look at a given building, alley or situation, we are able to remember many more details as our head remembers through the hand. Each such drawing is also associated with a lot of emotions that accompany a given place at the time of drawing, smells from nearby cafes, the climate of the area or the sounds of the city.

The first topics for students consist mainly of simple geometric arrangements of solids, which over time turn into multi-element and dynamic still life compositions. (Fig. 1, 2) During the classes, there are also exercises in the imagination, which aim to stimulate creativity, the ability to express a specific topic and search for their own solutions only with the help of imagination. (Fig. 3, 4) Students use a variety of drawing, painting and graphic techniques during the class. They learn to correctly grasp proportions, structure, scale or detail and to correctly place a given form in space. The classes also include exercises related to the acquisition of the ability to correctly draw the proportions of the human body. Painting classes allow conscious and creative use of color. Students gain knowledge of the theory of color phenomena, the theory of composition of its types and understanding the impact of individual colors and their application in architecture. In turn, the outdoor classes, where the students carry out landscape painting exercises, allow an impression of architecture, used at a later stage of design. (Fig. 5, 6, 7, 8)

Before the appearance of advanced computer programs, the drawing served as an element of communication between the designer and the investor. It was based on observation, drawing from nature by independent analysis of the observed phenomenon. Sketching was not only a transfer of the building on a sheet of paper, but also a conscious analysis and learning about the object, its shape, function or structure. It is working with the client, who sees the certainty of thoughts and no hesitation of the architect.

Nowadays we live in the times when every designer-architect must develop his/her own visual language. Freehand drawing allows to use one's own separate drawing style and not to succumb to the conventional scheme. The task of a drawing project is not, therefore, to map a given reality, but to create a completely new reality or to show a surprising transformation. It allows to quickly express the form, color, space or light, which is sometimes difficult to visualize with modern computer equipment. Nowadays, more and more often a project is treated as a product and not a work of art, and all this by a widely developed commercialization. A drawing project appears more and more often as an aesthetic protomaz created using a computer, instead of a synthetic impression sketch. More and more rarely young designers use pencil and card, which are an inseparable part of place, time and above all humanity.

Nowadays, the process of education of future architecture students is still changing, new subjects are added, which encourage them to look for independent and creative design solutions. However, freehand drawing remains an irreplaceable and unchanging basis for future architects. Many classes are still conducted in the manual form, because it allows to develop manual and design skills, and allows to learn about the form and styles of architecture, which influence the formation of cultural awareness. On the other hand, the first drawing sketches often serve as a basis for a dialogue between the artist and his own work, which leads to a deeper and deeper search for new forms of individual creative expression.

Teaching freehand drawing is an important part of the architecture education at both the Academy of Fine Arts and the Technical University. It plays a very important role not only in the design process, but also in documenting nature and history. It is considered to be one of the oldest languages of creative expression. It is one of the most popular artistic techniques, thanks to which, with the use of specific creative tools, visual compositions on a given plane are created. Drawing is an irreplaceable tool for presenting one's own design concept to future investors, it allows communicating with the environment through one's own artistic vision.¹⁵

15 H. Mełges, "Freehand drawing as an important skill for an architect and students of architecture", [in:] M.J. Żychowska [ed.], *Challenges of 21st century. To draw, to paint or to use a computer*, Vol. 2, Publisher: PK, Cracow 2015, 85-98; Makowska B., "The significance of sketches in the education of architects and in the development of their professional skills", *Czasopismo Techniczne. Architektura* 2015, R. 112, z. 4-A, 17-24; Gomółka J., "Architectural drawing as a means of communication", *Czasopismo Techniczne. Architektura* 2015, R. 112, z. 4-A, 191-194.

Using artistic skills at the design stage

The perspective, of all the rules of freehand drawing, is one of the best known, desirable and useful skills required from future architects. Leone Battista Alberti, in his treatise *Della Pittura (About Painting)*, proved that perspective is one of the most effective methods of presenting three dimensions on a two-dimensional plane, while drawing is meant to show the viewer what he/she has not yet seen in the most original and surprising way possible.¹⁶

The second important issue is the knowledge of chiaroscuro, which allows the drawer to describe the gradation between black and white. It consists in capturing the light of the paper by adding darker characters with one tool. Drawing from nature is an in-depth observation of the subject and an attempt to recreate it on the flat surface of the paper, where the real space is the one around us, which we refer to while drawing.¹⁷

Skillful application of contour or edges allows making the drawing look flat or three-dimensional. Paul Klee emphasized that drawing is like *taking a line for a walk*, where the line often serves as a contour that wraps a silhouette or an object.¹⁸ The structure of a contoured drawing refers to a specific skeleton architecture that connects certain parts of the area.

On the other hand, knowledge of the rules of composition allows for proper organization of the space using simple geometric shapes and proper layout of these elements on the paper surface.¹⁹

Eyesight is the most developed and at the same time the most complicated human sense used in freehand drawing, as it subjects the seen and processed image to in-depth analysis. The ability of students to use the sense of sight while drawing is closely related to the process of perceiving, processing and interpreting reality. They make an in-depth analysis of their own creative work, which consists of both what they see with the naked eye and what they know about the presented (drawn) object. Skilful and insightful observation allows showing the real space on the basis of one's own experience and acquired knowledge in the most correct and interesting, sometimes even surprising, way.²⁰

A very important element at the stage of learning to draw is sketching, because it allows to quickly create creative solutions, where in the multitude of lines, something yet unknown may emerge. Sketch very often functions as an independent artwork and has unlimited possibilities. It allows creating original realizations that come out for a typical understanding of drawing. It is often full of the content related to the experiences of an individual and not only a reflection of the image. It filters the existing reality, taking into account only important elements. A sketch is often used in the open air, because it allows to save the seen moment (image) in a fast and simple way. It belongs to the most beautiful, as it is the most personal, forms of graphic expression, It most accurately shows a certain fragment of reality far from realism. A sketch in a subjective way shows an object in space being an end in itself in an intuitive and random way.²¹

A freehand drawing can be considered as a certain state of mind, which does not have to be referred to in the sketch, as it is a brief description of the phenomenon of the project being developed. In a schematic way it presents an outline, concept or composition elements used in a later realization. Sketching is the ability to create mental shortcuts and translate them into plastic language, which often turns out to be even better than the final work.

Learning the skill of studio drawing is also important for architecture students, It consists of careful study of spatial relations and surface analysis of the subject. Freehand drawing allows an individual observation and analysis of the perceived object and then drawing the form, proportions, texture, chiaroscuro, construction or texture. A studio drawing is a thorough structural and surface analysis of the object, which provides important

16 L.B. Alberti. *Renansowa teoria piękna*, cz. 1 Available: <https://niezlasztuka.net/o-sztuce/leon-battista-alberti-renansowa-teoria-piekna-cz1/> [5 April 2017].

17 G. Noble, *Rysowanie. Klasa mistrzowska. 100 technik wybranych artystów*, Arkady, Warsaw, published: 2019, p. 16–28.

18 Ilab. 30–34.

19 Ilab p 35–38.

20 Ilab p. 125–130.

21 R. Balcerzka, M. Ozreowski, J. Pętkowska-Henlek, M. Suffczyński, A. Sufiński, T. Trzupke, *Rysunek architektoniczny w praktyce, czyli jak patrzeć ze zrozumieniem*, PWN, Warsaw 2019, p. 180–190.

information about the object, which is a reflection of reality. It is, in a way, only a means to achieve an assumed goal, which is mainly based on working out one's drawing skills.²²

Freehand drawing is characterized by a lack of precision and artistic freedom, which significantly distinguishes it from the effects of computer work, and thus will bring specific and timeless value. Freedom and flexibility often translates into freedom of thought and allows one to quickly save fleeting ideas. It teaches students to see, be attentive and translate the real view into a flat sheet of paper. It is a universal skill that is used in the same way when drawing a character, car, tree or architecture. It allows students to perceive independently, express their own thoughts and emotions coming from outside. It allows one to find their own individuality and creativity, as well as helps to understand oneself and the surrounding reality. It is a simple form of communication between the participants of the design process, constituting a starting point for a more complex and elaborate project. It is a graphic record of complex information about space.

What is important in the drawing is what the author wants to express using the available means and techniques. It consists in examining spaces and shapes between objects, which allow to change the way of perceiving and discovering a given object anew. Drawing based on his own previous sketches is a very practical tool, because it allows to transfer an object from a small format to a large one, changing the technique or form. It is not only a learned set of graphic skills, but an overall process of perceiving and learning about reality through the senses. It directly influences the shaping of the personality of the future architect by individual recording in the graphic form of the observed environment using long lines, short lines or spots.

A freehand drawing is a description, analysis and interpretation of the environment. It starts with a study of the object through realistic interpretation where it turns into graphic abstraction over time. *God invented paper so that the architect could draw* stated Alvar Aalito. Drawing is a process of technical skills of the creator, a state of mind subordinated to the relationship between man and nature. It is the crossing of borders between the known and the unknown, visible and invisible. Often it is not an end in itself, but an analytical record of everyday life stopping the passing by, thanks to which we see shapes, colors or forms, and can analyze the reality around us.²³

Drawing is used by the architect not only to impress emotions or to reconstruct the reality seen, it is a deuce of spatial imagination, the science of sensitivity to shapes and colors is the science of artistic culture. It allows to *penetrate* the object, where the physical and mental analysis of the features of the observed space takes place under the account of mood, proportions, character or color. It also has an important cognitive function, teaches the space of a given project and contributes to the constant learning of oneself, human abilities and limitations. It influences the harmonious development of a human being throughout his or her entire life.

Learning freehand drawing during the architecture studies allows to improve the artistic skills of future architects. It allows them to acquire basic skills of presenting architectural space and its surroundings using their hand. It teaches to understand the spatial dependencies of the surrounding environment, the construction of the geometric form, not forgetting about the simultaneous artistic and creative development. It allows to acquire the ability to present design ideas, own ideas in the form of intentional sketches – simplified, as well as legible imitations of the concept in an appropriate scale and form. It allows a skilful use of perspective, creating details or wall views. It is a specific work of art, which can become a decorative element or a hallmark of a given place.

Freehand drawing versus modern computer technology. (Pencil versus computer)

When we talk about freehand drawing we mean the whole process in which there is a close relationship among the brain, the eye and the hand. Freehand drawing is the oldest way to formulate human expression, it is a very practical and useful medium. It is the most independent element of art, characterized by unlimited inventiveness and resistance to the dangers of scheme and conventionality. Computers, television, photography or advertising graphics, which surround the man from all sides, constantly attack the eyes, impose consciousness and subconscious with great force, dulling our sensitivity. On the one hand, the highly developed technology

²² Ilab p. 164.

²³ Ilab p. 17–19.



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Fig. 1, 2, 3, 4, 5, 6, 7, 8. Sample topics of work carried out during the first year of the Architecture course at the Lublin University of Technology during drawing and painting classes and outdoor exercises.

allows drawing thoughts using a graphical tablet or computer mouse, but it is also a hand stimulated recording. In this process, there is no material cause-and-effect relationship between work, brain, muscles, eyes and tools and the substrate. Modern computer technology allows undoing the activity, erasing or easily transforming it, which, however, does not provoke a deeper cognitive analysis, but only a mechanical action. The advanced programs to design at an early stage of education often prevent the process of learning the world by studying the form, texture or material of a given surface. Moving only within the space of a three-dimensional computer simulation disturbs the process of learning about the structure of external world elements. Freehand drawing is a complex intellectual, spiritual and technical process that cannot be fully replaced by a computer. It is also not important what kind of tool we choose, but it is essential that it is an accurate record of essential features of structure, construction, functions and proportions of a given space.

The first half of the 21st century was the ubiquitous computerization and digitization of design processes, which led to the spread of the architectural profession. This profession has become accessible to an ever-wider group of people for whom freehand drawing has been an insurmountable barrier so far. A computer does not have human qualities such as creativity, sensitivity or aesthetics, without which it is impossible to become a good architect. Such features as spatial imagination, the ability to observe and transfer objects to the plane can only be done by a human being. It turns out that no modern technology can fully replace man, his personality and creative creativity. Freehand drawing is closely related to the ability of abstract thinking. One cannot express himself/herself graphically if one does not acquire good drawing skills before. It is thanks to it that various skills and abilities are stimulated already in early childhood, which are the basic function of understanding the world around us.

Freehand drawing is for most architects the beginning of their visions, it turned out to be an excellent medium for documentation, but above all it became a method of intellectual concentration. It allows for reflection and creative action, which is difficult to achieve using only a computer. Man, by direct contact with an object or nature is able to deeply learn the structure, function, texture or smell. These are valuable and personal experiences, which cannot be felt through a computer screen. Advanced computer technology takes away creativity and often slows down thinking processes because it suggests ready-made solutions and thus destroys creative thinking. The consequences of such actions can lead to the creation of projects that do not meet the relevant architectural, construction and social standards.²⁴

Learning to draw by hand has a huge impact on shaping the spatial imagination of future architects. Reproducing objects from nature allows one to acquire the ability to graphically record ideas from one's imagination in the form of sketches on paper. Freehand drawing is one of the fastest and most direct tools necessary at the creative design stage. It consists in creating the form of the project from a point, through lines, surface, to the creation of three-dimensional image space. This type of practice is used by older architects, while younger ones often consider freehand drawing an unnecessary skill. This is due to the fact that from a very young age they use electronic media, flat screens, which makes them difficult to imagine the space. Frequent use of laptops, smartphones or tablets interferes with the process of three-dimensional vision, which results in problems with drawing from nature, correct alignment of line directions or perspective, which blocks the ability to see and process images. Drawing is an area of activity, a place where thoughts are formulated at the level of its physical structure, which is responsible for all its components, including color, which seems to lose its expressive value here in favour of information.

Many years have passed since the technological revolution in drawing and a computer should not be treated as a threat to freehand drawing. Nowadays, it is an excellent tool to assist in design. Although it may seem that freehand drawing has become a utilitarian tool with very sophisticated tasks, yet it is not. It still has an important communication function, as a simple graphic message, which allows saving a lot of easy-to-read information (e.g.: pictograms) in a relatively fast way. At the design stage, it allows a quick and easy way of expression, where a few lines can effectively replace many sentences. It allows an in-depth analysis of the physical and mental characteristics of space and a deep (detailed) understanding of the object. It allows materializing in the form of a drawing, an idea born in the imagination and pour it on paper.

24 D. Hansen, "Architecture and pencil," [in:] M.J. Żychowska (ed.), *Challenges of 21st century. To draw, to paint or to use a computer*, vol. 1, Publisher: PK, Cracow 2015, 48–49.

Nowadays, more and more often students, wishing to present their idea, choose advanced computer programs, which are yet not able to replace a creative handcrafted concept. Additionally, these programs significantly limit imagination and free creation, often offering ready-made solutions. The consequence of this is a lack of ability to present one's own creative idea in a drawing form.

Nowadays, in such computerized times it is rare that hand-made visualizations can compete with advanced computer programs. Today's world is focused on image, reproduction and transformation and not on creating with the use of individual features of creative activity. Without a doubt, a computer is a very useful tool to support the creative work of an architect, but only freehand drawing allows one to truly look into the past and create an unforgettable future. All this is possible at the stage of design, creation and creative activity using freehand drawing. It allows to present the most important features of the project, creates a three-dimensional impression on a flat surface, shows the beauty, harmony and spatial order of the designed area. Freehand drawing represents a longing for uniqueness, which combines originality with the need for intimacy and privacy. It liberates freedom of gesture, individual expression leading to the most personal expression, not adhering to any conventions.

The specificity of the design is based on a special sensitivity to the environment, which is possible with direct contact. And although modern technologies give us great opportunities to present our ideas, still many designers choose freehand drawing, perhaps this is due to the fact that it is an irreplaceable method to convey the essence of their ideas.

Freehand drawing is the oldest way of formulating human expression, it is a very practical and useful medium. It is the most independent element of art, which is characterized by unlimited inventiveness and resistance to the dangers of scheme and conventionality. Computer, television, press photography or advertising graphics, which surrounds the man from all sides constantly attack the eyes, impose themselves on the consciousness and subconscious, and with great force dull human sensitivity.

Summary

Learning to draw is a continuous process of learning to observe, explore and discover the environment. Freehand drawing is not only a tool for presenting the final version of a project, but also a basic means for its realization. Over the last years, its form and its earthy character has been greatly affected, as often a pencil is replaced by more modern electronic tools, but this does not mean that it is no longer needed. Its role has changed, but not its importance as a basic means of communication, which significantly affects the development of the imagination, so important in the design process. Teaching freehand drawing to architecture students plays a key role in the development of aesthetic sensitivity, composition, spatial imagination, and technical skills necessary for future professional work.

Drawing from nature develops the sense of observation, teaches to see the rules that determine the principles of drawing. Only by drawing from nature is it possible to find confirmation of all the theories and rules in practice, which allows to understand them. Freehand drawing is about lights, shadows, solids, space, colors, perspective and countless forms and topics to draw. It is an infinite number of issues, waiting only to be confronted with. It is an infinite path of artistic development. One will not find all this in any photo.

The learning process of a human being consists of constant repetition of certain behaviors, activities in a practical way until a given skill is acquired. The same is true of drawing, only the numerous hours spent in the studio, where students personally, using various techniques, make drawings, are able to teach future architects how to create valuable and demanding projects. It should be remembered that the use of digital technologies must go hand in hand with the ability to present a design idea. The basis of the skill of a good architect is drawing, which is accompanied by pure pleasure, which is an excellent basis for creative activity and creation.

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Rysunek odręczny podstawowym środkiem wyrazu plastycznego w procesie edukacji przyszłych architektów a współczesna technologia komputerowa

Streszczenie: Rysunek odręczny należy do jednych z najwcześniejszych i zarazem najważniejszych umiejętności człowieka. Zaliczany jest do najprostszych form zapisu myśli oraz informacji już od wczesnego dzieciństwa, który pozwala komunikować się bez użycia słów. Jest on pierwszą, werbalną formą kontaktu ze światem zewnętrznym za pomocą, którego ilustrowane są uczucia, emocje i pragnienia. Jest czymś, co pozwala zobaczyć otaczające piękno, dostrzec szczegóły, poznać budowę i strukturę materii i na długo zachować obraz w pamięci. W artykule poruszono zagadnienia związane z procesem kształcenia w zakresie rysunku odręcznego na kierunku architektura na Wydziale Budownictwa i Architektury Politechniki Lubelskiej. W niniejszej pracy rysunek został przedstawiony, jako podstawowe narzędzie umożliwiające zaprezentowanie własnej koncepcji projektowej przyszłym inwestorom, który uczy spostrzegania, analizowania oraz rozwija wyobraźnię twórczą i przestrzenną. Przyjmując, że nauka rysunku odręcznego stanowi podstawę wszelkich działań artystycznych, w artykule podjęto próbę zbadania istoty rysunku odręcznego w procesie kształcenia przyszłych architektów na Politechnice Lubelskiej. W literaturze przedmiotu poruszona została kwestia wartości przekazywanych za pośrednictwem rysunku odręcznego oraz dokonano porównania go ze współczesnymi, zaawansowanymi programami komputerowymi.

Słowa kluczowe: rysunek odręczny, współczesna technologia komputerowa, środek wyrazu plastycznego

The image of the spa town of Szczawno-Zdrój in light of the transformation of the city of Wałbrzych at the turn of the 20th and 21st centuries

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Abstract: The focus of the article is to determine the impact of the industrial transformation of the city of Wałbrzych, which took place at the turn of the 20th and 21st centuries, on the image of the spa town of Szczawno-Zdrój. The paper discusses the growth of the city of Wałbrzych and its impact on the landscape and spa conditions of Szczawno-Zdrój. The article presents the main activities which change the nature, structure of industry and landscape of Wałbrzych and which affect the neighboring spa town and its cultural landscape. The article looks at how the transformations that took place in Wałbrzych at the turn of the 20th and 21st centuries affected the spa activity of Szczawno-Zdrój.

Keywords: Wałbrzych, transformation, landscape

Introduction

The spa town of Szczawno-Zdrój and the adjacent city of Wałbrzych were developing alongside each other for many centuries. When Szczawno-Zdrój was in its prime in the late nineteenth and early twentieth century, it was one of the most renowned spas in this part of Europe. Wałbrzych, which like Szczawno has a rich history, in the 17th century was a center of weaving, and, later, of the rapidly developing textile, glass, ceramics, coal mining, and coke industries. The dynamic development of black coal mining started in the mid-nineteenth century and lasted practically until the end of the 1980s. In 1896, due to an increase in the economic potential of Wałbrzych, its area started growing and this process of territorial development accelerated after World War I and continued in the second half of the 20th century. After 1950, adjacent housing estates were incorporated into the city and new housing estates were later developed so that the spa town of Szczawno became surrounded on three sides by the industrial city of Wałbrzych with over 100,000 inhabitants. Such a neighborhood had an increasing influence on the image and development of the Szczawno-Zdrój spa town.

Since the early 1990s, as a result of political and economic transformations, the image and landscape of the city of Wałbrzych have changed.

The aim of this study is to determine the effect of the transformation of the industrial city of Wałbrzych on the landscape of Szczawno-Zdrój, and on how it is perceived and judged. The research method consists in the analysis of the trend in changes in the landscape of Wałbrzych at the turn of the 20th and 21st centuries and their impact on the image of Szczawno-Zdrój.

The Szczawno-Zdrój spa town

The year 1815 is considered as the beginning of organized spa activities. The investments, organizational changes and the appointment of a spa therapist allowed Szczawno-Zdroj (German: Bad Salzbrunn) to officially become a spa town [1, s. 352]. The dynamic development of this resort began in the mid-nineteenth century. It started to flourish after the nearby more popular spa town of Stary-Zdrój (currently a district of Wałbrzych) shut down its services in 1873 due to the disappearance of mineral springs caused by intensive mining operations at the neighboring Chwalibóg black coal mine. The town was not destroyed during the war and its spa buildings survived, including a wooden walking hall, wooden and brick pump room, a social house, a spa theater, a natural medicine center, and other spa facilities. After the war, they were used for therapeutic activities. What also remained were hotels and guesthouses, including the characteristic Grand Hotel.

Owing to the high standard of facilities and their good condition, it was possible for the spa town to quickly resume operation. In 1946, Szczawno (then Solice-Zdrój¹) admitted its first civilian patients [2, s. 99]. On July 1, 1945, Szczawno-Zdrój (then Solice-Zdrój) received municipal rights.



Fig. 1. Szczawno-Zdrój (photo by author).

Wałbrzych

The industrial city of Wałbrzych, Szczawno-Zdroj's neighbor, started developing dynamically at the beginning of the 19th century, i.e. at the same time when Szczawno reached its peak of development. With the development of industry, starting from 1896, the city grew by developing the surrounding areas and spreading into the neighboring housing estates². This spatial development also continued after World War II. The city limits were expanded to include, among others, the nearby towns of Sobiecin and Biały Kamień to the west, Poniatów and Rusinowa to the east, as well as the Lubiechów and Książ estates located to the north of Szczawno-Zdrój. In these new areas located to the north of Szczawno, new housing estates of Piaskowa Góra and Podzamcze were built in the 1960s and the late 1970s respectively. As a result of this long-term process, the spa town of Szczawno-Zdroj and, above all, its therapeutic facilities, became surrounded on the south, east and north by

1 The first name of the town, used to the end of 1946.

2 cf. Ludwig B., 2017, *Czy małe miasto może zmienić się w duże? Analiza przypadku Wałbrzycha w drugiej połowie XIX i na początku XX wieku*. Space-Society-Economy, vol. 52, no 4, pp. 5–24.

the buildings of Wałbrzych. In 1991, Wałbrzych reached its peak population of over 141 000 residents. Since then, the number of inhabitants has been systematically decreasing.

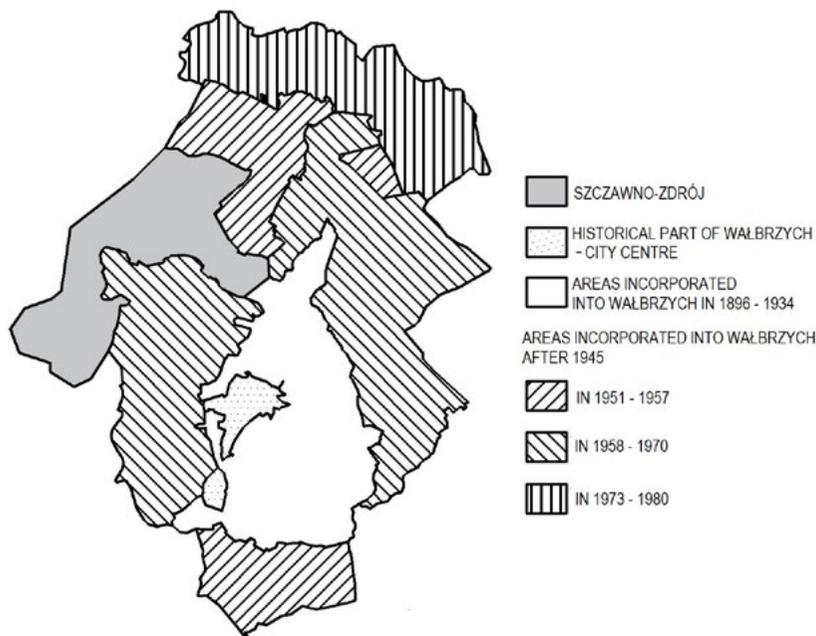


Fig. 2. Urban growth of Wałbrzych after 1945 (author's study based on a map by Ilona Jaworska based on the cartographic collections of the Museum in Wałbrzych and archival materials of the Spatial Planning Office in Wałbrzych.

The cultural landscape of Szczawno-Zdrój in contrast to the landscape of Wałbrzych

The spatial development of Wałbrzych and Szczawno is largely determined by the terrain. Wałbrzych is located in a valley with numerous hills, surrounded by the Wałbrzyskie mountains. This is similar to the spa town of Szczawno-Zdrój which is located at the foot of the Chelmiec mountain (851 m a.s.l.) in the Szczawnik stream valley and surrounded by hills.

Both places are separated by the forested Parkowa Mountain, also known as Gediminas' Hill. This type of terrain combined with a favorable direction of prevailing winds blowing over Szczawno-Zdrój (from the west and north), to some extent, protected the spa for years against air pollution produced by industrial plants located mainly in the southern, industrial part of Wałbrzych [3, s.352]. However, given the proximity of the two cities, all these favorable circumstances did not completely protect Szczawno-Zdrój from the effects of Wałbrzych's plants.

The main result of the city's economic growth and its developing burdensome industry was higher environmental pollution, caused not only by fumes from factories and coke batteries but also from waste heaps and landfills. This pollution affected both the area of the city and of the nearby region.

In the second half of the 20th century, two large housing estates were built in Wałbrzych, in the area to the north and northeast of Szczawno. As a result, one of the main communication routes that ran from north to south through the center of Szczawno started functioning as an alternative road connecting these housing estates with the districts of Biały Kamień and running further towards the city center. Heavy traffic started to produce noise, pollute the air with engine exhaust and bring about other undesirable phenomena.



Fig. 3. Grunwaldzki Square in the 1980s – the center of Wałbrzych. (photo by author)

Over the many years of their parallel development, Wałbrzych and Szczawno became mutually connected in several ways, which was especially apparent in the second half of the 20th century. Wałbrzych became a commercial, economic and administrative base for the spa. Szczawno-Zdrój became more than a weekend recreation area for the residents of Wałbrzych.

As the built development in these two locations spreads in many directions, it becomes interconnected and overlaps, sometimes making it difficult to notice the boundaries between Wałbrzych and Szczawno.

Despite this close relationship, Szczawno has retained its uniqueness in terms of the scale and character of its buildings.



Fig. 4. The landscape of Szczawno-Zdrój. Wałbrzych's Biały Kamień housing estate is visible in the background. (photo by author)

However, one of the consequences of Wałbrzych's growth was the surrounding of the area of Szczawno-Zdrój, which in turn caused the traditional cultural landscape of the spa town to become "overshadowed" by the landscape of Wałbrzych and all the effects resulting from the activities of this prominent industrial center.

When viewing Szczawno from the surrounding hills, one can see a spa landscape set against the background of apartment blocks and housing estates of Wałbrzych districts, which upsets the traditional landscape of the town. [4, s. 37–44].



Fig. 5. The landscape of Szczawno-Zdrój. Wałbrzych's Podzamcze housing estate is visible in the background. (photo by author)

The image of the town, which had been largely shaped by its historic spa buildings and landscape values, started to be seen through the prism of the polluted, smoky, and troublesome city of Wałbrzych. Such was the image that was recorded in the memory of tourists, particularly in the last decades of the late 20th century, which diminished the popularity of this spa town.



Fig. 6. View of downtown Wałbrzych. The turn of the 1960s and 1970s. (source: fotopolska.eu/Walbrzych/b8244,Dzielnica_Srodmiestcie.html, accessed on 01.10.19)

The “new” image of Wałbrzych in the landscape of Szczawno-Zdrój

Wałbrzych started to change at the beginning of the 1990s. The character of the city and its landscape changed. The political and economic transformations led to the closing of mines, coking plants and most of the onerous industrial plants. The city's industry structure changed. The quality of air over Wałbrzych and the region changed. Already in the 1990s (largely as a result of the restructuring of Wałbrzych's industry) dust pollution in Szczawno was significantly reduced to a level that was acceptable by the spa town. Since the beginning of the 21st century, Wałbrzych has undertaken many projects aimed at rebuilding and organizing subsequent parts of its built development. The projects also include the modernization of road infrastructure. For Szczawno-Zdrój, the most promising investment is the recently started construction of Wałbrzych western bypass which will connect the northern residential districts with the city center, bypassing Szczawno-Zdrój.



Fig. 7. “Stara Kopalnia” (Old Mine) in the landscape of Wałbrzych. (photo by author).



Fig. 8. The center of Wałbrzych. (photo by author)

Wałbrzych is changing its image from an industrial, polluted and troublesome neighbor, to a modern, industrial agglomeration that is just as committed to protecting the environment as to industrial production. Wałbrzych is focusing on tourism development. New landscape values related to the city's location and surroundings are being discovered.

In 2014, the city of Wałbrzych completed the revitalization of its largest mine "Julia" (formerly "Thorez") and in its place opened the Stara Kopalnia (Old Mine) Science and Art Center, which has become one of the most popular tourist attractions in Poland related to postindustrial facilities.

Although Wałbrzych is still a large industrial city, all these activities and processes that have taken place since the turn of the 20th and 21st centuries have made its landscape more "friendly" for the spa town of Szczawno. The favorable trend in changes to the landscape and the character of the city offers the opportunity to restore the objectively high value of Szczawno's cultural image, without negative references to the "former" landscape of Wałbrzych.

Summary

With its hundreds of years of history, Szczawno-Zdrój is a spa town that still remembers its former splendor. In many respects, it is an exceptional spa town with impressive spa facilities, beautiful parks, and green areas. The landscape of this spa has been preserved over the years and does not change much. The single – and multi-family houses that were built after the war in areas located at a distance from the spa facilities, have little impact on the traditional cultural landscape of this spa town. However, the neighboring industrial city of Wałbrzych, especially during the last decades of the 20th century, affected the conditions in the spa town, which made people see and judge this beautiful spa through the prism of this close neighbor. The richness of the spa town's architecture and its great landscape values were obscured by these often-repeated opinions.

Wałbrzych started to change in the early 1990s. Since then the city has been going through transformations. As a result of economic changes, mines, coking plants and businesses related to the coal industry were closed. The coal industry has been replaced by the ceramics, mineral resource and automotive industries. An important trend in the city's development is tourism, which is stimulated by the city's location near the Książ Landscape Park, the Wałbrzyskie Mountains with the peak Chelmiec (851 m a.s.l.), the Stone Mountains and the Owl Mountains. The "Old Mine" Science and Art Center located in the former "Julia" ("Thorez") mine has become one of the biggest attractions of post-industrial tourism in Poland.

In terms of culture and tourism, the industrial Wałbrzych with its surroundings is becoming an attractive city for the patients of Szczawno-Zdrój.

As a result of the urban restructuring of Wałbrzych, there was a large drop in atmospheric particulate matter throughout the region. The period of economic changes has had a beneficial effect on air sanitation, which is evidenced by the amount of particulates in the air in Sudeten spas which has remained within limits for many years [5, s. 114–124].

This changing image of Wałbrzych offers the opportunity to look at the landscape of Szczawno-Zdrój in a broad context, not only of the city itself but also of its immediate surroundings. This, one of the oldest Sudeten spas, has a chance to increase its popularity, restore its former splendor and break free from the long-lasting opinion about the spa's landscape as seen through the prism of its troublesome neighbor.

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Contemporary architectural interventions in the historical tissue of Cádiz – contextual minimalism in the service of genius loci

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Abstract: Discussions devoted to the contemporary approach to the historical heritage usually evoke strong emotions, re-siding somewhere between the conceptual poles of mimetic reproduction and ruthless anastylosis of forms and materials. Against this background, the four projects implemented in Cádiz, Spain, described in this paper appear to be very successful in their somewhat subdued formal character, the emphasis put on functionalism and space revitalisation, and the application of the concept of transparent architecture not conflicting with the historical one, non-aggressive, and at the same time thoroughly modern.

Keywords: Cádiz, Between Cathedrals, Alberto Campo Baeza, Genoves Park, José Luis Bezos Alonso, Mercado Central, Carlos de Riaño Lozano, Teatrum Balbi, Tomás Carranza Macías, Francisco Javier Montero Roncero, Castle of Matrera, Carlos Quevedo Rojas

Introduction

Cádiz is regarded as the oldest city in Spain and one of Europe's oldest still inhabited towns. Situated in the south of Andalusia on a narrow peninsula separating a branch of the Gulf of Cádiz from the Atlantic Ocean, over centuries of its turbulent history the city was subjected to different influences and impacts, which has found its reflection in the heterogenous stylistic character of the local architecture. The town of *Gadir* was founded in ca. 1100 BC by Phoenicians, whereupon it came under the rule of Carthage and Rome (since 206 BC). In the 5th century it was destroyed by Visigoths, from the 8th century for over 500 years it was under the Moorish rule, and starting from 1262 it was in the hands of Castile. The majority of ancient and medieval architecture of Cádiz was destroyed in 1596, when the city was plundered by English troops under the command of the Earl of Essex, after a previous defeat of the Spanish fleet by Francis Drake¹. From the perspective of conservation, the architectural heritage of Cádiz reveals many interesting elements, both due to the presence of relics reaching back to deep Antiquity and taking into account the scarcity of preserved buildings from before the 16th century, which makes it particularly valuable in the context of protection and exposition. Finally, the unique character of the city is also determined by the stylistic diversity of its architecture, from antiquity, through Moorish influences,

¹ See: <https://www.britannica.com/place/Cadiz-Spain>; E. Nash, 'Europe's oldest city' is found, 2007, <https://www.independent.co.uk/news/world/europe/europes-oldest-city-is-found-5328361.html>; <https://encyklopedia.pwn.pl/haslo/Kadyks;3918943.html>; H. Radziszewski, *Mityczne początki Kadyksu: wybór źródeł*, "Studia i Materiały Archeologiczne" vol. 12, 2005, pp. 163–168; <http://www.cadizturismo.com/destinos/provincias/cadiz/municipios/cadiz/historia>; P.E.J. Hammer, *Myth-Making: Politics, Propaganda and the Capture of Cadiz in 1596*, 1997, <https://www.cambridge.org/core/journals/historical-journal/article/mythmaking-politics-propaganda-and-the-capture-of-cadiz-in-1596>; A. Morgado García, A. Horozco, *Historia de Cádiz*, Cádiz 2001.

Gothic and Renaissance, through a rich representation of the Baroque architecture from the 17th and 18th century². In this respect what appears to be particularly interesting are contemporary architectural interventions, implemented in the direct vicinity of historical sites and adapting them to the purposes and functions of a modern city, respecting their historical character. In this regard several very successful as well as controversial projects can be observed in Cádiz, constituting an interesting comparative material. This paper focuses on five sites, different in terms of their functions, as well as the character of the historic structures they refer to. These are: the architecture of *Entre Catedrales*, *Genoves Park*, *Mercado Central*, the adaptation of *Theatrum Balbum*, and the reconstruction of the Castle of Matrera.

Between cathedrals (*entre catedrales*)

In 2009 in the historical city centre modern development, designed 3 years before by Alberto Campo Baeza, came into being, completing and developing the space between the “old” and “new” cathedrals³. The so-called Old Cathedral devoted to the Holy Cross (today *Iglesia de Santa Cruz*) was completed in 1263 and destroyed in 1596. Its reconstruction in a style manifesting the influences of the Renaissance architecture was undertaken in the early 17th century; soon, however, it turned out that this prosperous and quickly developing city needed a bigger cathedral church. Hence in 1722 in the distance of only a bit more than 40 metres to the west from the existing edifice the construction of a new temple was commenced, supervised by Vicente Acero, a designer of the cathedral in Granada. A long construction process, lasting over a hundred years (completed in 1838), resulted in Rococo elements appearing in the initially Baroque “New” Cathedral (*Catedral de la Santa Cruz sobre el Mar*) and in the overall Neo-Classical style of the temple. The space between the “old” and “new” cathedral on one side and the seashore on the other is the so-called *Campo del Sur*, and along the line linking the two temples there is the Episcopal Palace (*Casa del Obispo*), which today houses an incredibly valuable for the city archaeological exposition with exhibits documenting the turbulent history of Cádiz, from Phoenician anthropomorphic sarcophagi from the 6th century BC, through Roman cisterns, a fountain, and a peristyle with a mural, as well as a cryptoporticus from the time of glory of the empire, to a fragment of a medieval wall⁴. Already at the beginning of this century it was discovered that the archaeological remains under the episcopal palace go beyond the outline of the today’s edifice and are located under a considerable part of the surface of *Campo del Sur*. In 2006 the City Council announced a competition for the development of space between the cathedrals, in which the basic criterion was to secure the archaeological findings in situ, simultaneously allowing for further exploration under the surface of the piazza.

The main functional objective of Baeza’s project was, therefore, to expose and protect the archaeological site in *Campo del Sur*, and a secondary one was to create a public space with an open view of the sea, undisturbed by the perspective of the traffic. On the surface area of a thousand square metres Baeza designed a trapezoid platform, elevated 2.5 metres above the excavation site, parallel to the southern façade of *Casa del Obispo*. The entrance to the platform is through a ramp, which brings associations with a gangway leading to a ship. The metal frame of the structures and the pillars that support it are painted white, which adds lightness as well as neutrality to the form, making it seem non-aggressive. The space of the excavations under the surface is closed with glass panels, protecting the archaeological site and at the same time making it visible to passers-by from the street level. The surface of the platform constitutes a public space, a vantage point open towards the waterfront. It is surrounded with a simple metal barrier, also painted white, with the exception of the southern edge facing the sea, where instead of the fence the designer proposed a rectangular recess, a gutter, on the edge of which you can sit and enjoy the view. The platform and the ramp are covered with a mosaic of 10-cm

2 Possible examples in this respect could be the so-called Admiral’s House (*Casa del Almirante*) in Plaza de San Martín, the church of Nuestra Señora de La Palma, the church of St. Anthony of Padua, Women’s Hospital (*Hospital de las Mujeres*), or the church of St. Philip Neri at Calle Santa Inés, an excellent example of Andalusian Baroque.

3 According to the architect: “The project Between Cathedrals seeks to create an intervention worthy of the most significant location in the history of Cadiz, the oldest city of the West: the empty space facing the sea located between the Old and New Cathedrals”. See: *Between Cathedrals / Alberto Campo Baeza*, <https://www.archdaily.com/55969/between-cathedrals-alberto-campo-baeza/>; N. Schmidt, ‘Between Cathedrals’ by Estudio Arquitectura Campo Baeza, 2010, <https://www.dailytonic.com/between-cathedrals-by-estudio-arquitectura-campo-baeza-es/>.

4 See: D. Bravo Bordas, *Gazebo next to the cathedral*, <https://www.publicspace.org/works/-/project/f155-gazebo-next-to-the-cathedral>.

cubes of white Macael marble. Eight metal pillars stem to the height of six metres above the plate, creating a canopy-like structure protecting against the rain and the scorching Andalusian sun. In functional terms, there is no doubt that Baeza's work fulfils its task perfectly well, not only protecting the excavation site and exposing it, but also reclaiming the urban significance of the piazza. The structure of the platform, elevated above the traffic, opens up an undisturbed view of the sea and symbolically bonds the space of history with the space of nature. The form is undoubtedly minimalist, extremely economical, unobtrusive, which is fostered by the white colour dominant. At the same time, it is strongly founded in the context of this place, evoking associations with a ship turned towards the sea. The canopy, on the other hand, was intended by the architect to make reference to the tradition of religious processions. An element that is equally important in Baeza's work is the combination of materials – the modern and at the same time neutral steel and glass with white marble, strongly corresponding to the history of Cádiz, as this is the material that the Phoenician sarcophagi found here are made of. For the sake of fuller material integration of the entire project, the southern façade of *Casa del Obispo* is covered with limestone *pedra lumaquela*, which with its shade and structure corresponds with *pedra ostionera*, used as the building material of the walls of both temples. Extreme simplicity, purity, lightness, and brightness of the form designed by Baeza evoke its quasi-religious character, which also symbolically fits in the context of this place⁵. As the architect said himself, his fundamental objective was to create "beautiful architecture" capable of taking advantage of the potential of the place and of preserving its historical memory⁶.



Fig. 1, 2. The platform "Between the Cathedrals", Cádiz, 2018. Photo: Author.



Fig. 3, 4. The platform "Between the Cathedrals", Cádiz, 2018. Photo: Author.

5 See: *Transcending Architecture. Contemporary Views on Sacred Space*, ed. J. Bermudez, CUA Press 2015.

6 "The entirety is built with light elements, perhaps metal, as if in shipbuilding, all painted white to accentuate its lightness. (...) The construction of the base recalls ships. The awning above, as if a canopy on poles, recalls a religious procession. We wish to make a beautiful piece of architecture, capable of revealing this marvelous place to its best advantage, capable of remaining in the memory of Cádiz". See: N. Schmidt, op. cit.

View promenade and structures of *Genoves Park*

Another interesting modern solution of a public space in Cádiz are structures protecting *Genoves Park* from the side of the sea, a botanical garden whose history reaches back to the 18th century and which in its current form was arranged in 1892 by a gardener from Valencia, Gerónimo Genovés y Puiga. The garden owes its special character to the presence of numerous rare species of plants brought by Spanish conquerors from the New World. *Genoves Park* is situated at the eastern end of the city, on the ocean shore. In order to protect fragile plants and trees against changeable weather conditions and the sea breeze, the garden was furnished with a 130-metre-long stone fence facing the waterfront, erected along St. Barbara esplanade, used predominantly as a car park. In the first years of this century an underground car park was put into use under the esplanade, which allowed to reduce the number of cars occupying the wharf. Despite a single door, most often locked and not used, the wall of the esplanade separated the eastern part of the wharf from the rest of the city and made this cut-off space completely forgotten in terms of urban planning. For the purposes of its revitalisation, in 2011 an international competition was announced upon the initiative of the City Hall and the Society of Architects, won by a design by José Luisa Bezos Alonso⁷, which was implemented in 2013–2015⁸. The basic function of the new structures of the esplanade – protection of the botanic garden – was to remain a priority, and an additional goal was an urban revival of the part of the wharf adjacent to the park, which was perfectly implemented in the awarded design. Instead of the stone wall, a multi-use building came into being with the floor area of nearly two thousand square metres and the height of two storeys, with a zigzag shape based on the structure of the underground car park, so that entrances to the car park are within its perimeter. At the ground floor level there are 5 portico passages, linking *Genoves Park* with St. Barbara esplanade. Functionally, the structure houses utility rooms of the park, storages, locker rooms of garden employees, and public toilets. The upper floor houses offices and open spaces to be used for cultural purposes. The first floor façade is finished with panels of transparent polycarbonate, illuminated after dark, which visually dematerialises the entire structure. The roof of the building, accessible via ramps leading from the level of the basement, has become an open promenade with the view of the sea on one side and of the garden on the other. The dynamic form of the structure combined with the sense of its visual lightness obtained thanks to the materials used, as well as its multifaceted functional programme, constitute a radical contrast to the previous solution of a uniform, inaccessible wall. The project by José Bezos Alonso is difficult to classify typologically. One can conclude it is an urban solution combining multiple functions inside the building, as well as resulting from its orientation, shape, and interaction with the adjacent areas. *Genoves* and St. Barbara esplanade are linked by this solution, providing city residents and tourists with an opportunity to move between the garden and the waterfront freely, and creating a beautiful panorama view of the bay. The architect himself declares that what inspired him was a mural by Banksy, who redid the inscription “PARKING” on the wall by painting over the “ing” ending and adding a little girl on a swing suspended on the letter “A”⁹. Therefore, the idea was to extend the space of the park by combining it with something it used to be separated from, that is the waterfront, and at the same time to revive the waterfront by liquidating the car park and creating a recreational space instead. One could say that what we deal here with is architecture which undertakes a dialogue with the conditions of the place, as well as with the needs of all the people who occupy it, the ones who look for respite, tourists, and park employees alike. Certainly we can talk about revitalisation understood in the best possible way. The wall, a uniform, separating, closing structure, practically as well as symbolically, marked with connotations of separation and cutting off, has been replaced with a dynamic structure, modern in form, but at the same time not aggressive visually despite its dimensions, and interactive with the urban space, satisfying multiple urban needs¹⁰. The concept of the specific dematerialisation of the structure by using modern materials, such as glass, polycarbonate, and

7 *Genoves Park's Lookout and Protection Building* / José Luis Bezos Alonso, <http://www.archdaily.com>; M. Corradi, *Genoves Park*, <http://www.floornature.com/panoramic-viewpoint-and-defence-structure-in-park-genoves-cadiz>; <http://joseluisbezos.com/wordpress/urbanizacion-del-nuevo-paseo-de-santa-barbara/>

8 See: *Protection Building of the Genoves Park Cádiz (Spain)*, 2015, <http://www.publicspace.org>.

9 “El proyecto, como si se inspirara en el conocido graffiti de Baksy, la convierte ahora en una extensión del parque y un espacio libre con franjas de zonas ajardinadas, deportivas y para juego de niños. Los niños juegan ahora donde antes sólo había coches.” Zob. <http://joseluisbezos.com/wordpress/urbanizacion-del-nuevo-paseo-de-santa-barbara/>

10 “(...) the protective structure is not seen as a limit or barrier any more but more as a point of contact due to the connection created by the transparent boundary between the sea and the nature in the botanical park with its exotic American plants.” See: M. Corradi, *op. cit.*

steel, link the character of this building with the previously discussed project *Entre Catedrales*. Although they have been conceived by different authors, both solutions are connected by the concept of a transparent, modern architectural form, which does not impose itself, which is not imitative, and at the same time which is not in conflict with the existing historical architecture and is functional in terms of urban planning. Both projects share an emphasis on the making use of the existing view perspectives and creating new ones, taking full advantage of the picturesque location of the city and the fact it faces the bay.



Fig. 5, 6. View promenade and structures of Genoves Park, Cádiz, 2018. Photo: Author.

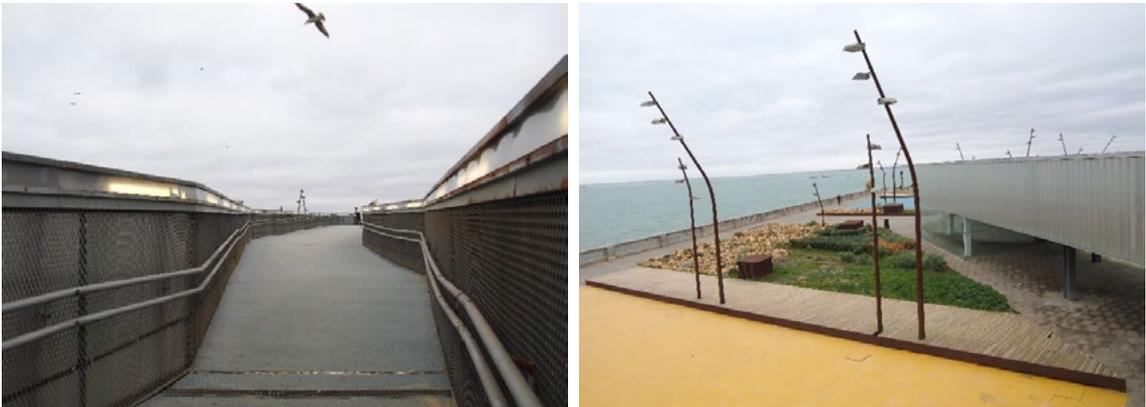


Fig. 7, 8. View promenade and structures of Genoves Park, Cádiz, 2018. Photo: Author.

Mercado Central de Abastos

Mercado Central in Cádiz is one of the first historical buildings of the type in Spain, erected at the same time as the buildings of Plaza de la Encarnación in Seville and the market square in Puerto Real¹¹, earlier than the squares in Madrid and Barcelona, which came into being in the mid-19th century. In functional terms it was an interim form between a completely open market square and what later on could be called a market hall. The first building of *Mercado Central de Abastos* in Cádiz, built in the Neo-Classical style, was completed in 1838 according to a design by Torcuato Benjumeda, continued after his death by another architect, Juan Daura. It was erected at Plaza de la Libertad, in the place of the former convent *Los Desclazos*. Four wings of 2-floor buildings surrounded the rectangular market square in the middle. The façades of the internal peristyle were designed as

11 See: *Mercado Central de Cadiz, Rehabilitación y Ampliación / Carlos de Riaño Lozano*, <https://www.archdaily.com>; *Central Market*, <http://turismo.cadiz.es>; *Mercado Central*, <http://www.destinationcadiz.com>

Neo-Doric porticos supported by impressive 4-metre-tall columns, bringing associations with ancient temples in Paestum and Agrigento. In the middle of each wing there was an arched passage, ornamented with decorative tympana. In its first Neo-Classical shape *Mercado Central* survived one century, until 1929, when it was rebuilt according to a concept of an architect Juan Talaver y Heredia. A roofed pavilion in the centre of the square was built at the time. The main problem of this building was the lack of appropriate ventilation, necessary in a place frequented by many people trading in food products, as well as the lack of access of natural daylight. The need to revitalise the square in a form addressing contemporary requirements was pursued in the first decade of this century. The decisive reconstruction took place in 2006–2009, according to the concept developed by Carlos de Riaño Lozano, selected in a closed competition organised by the department of architecture and urban planning of the Ministry of Public Works, to which only ten architects had been invited. The goal of the new project was the demolition of the inner part and simultaneous exposition of the old 19th-century buildings, as well as creation of space which – satisfying all functional requirements for such structures – would at the same time return, if only partially, to the original idea of an open piazza. The Neo-Classical building was subjected to a careful renovation, exposing the original brick details of its façade, and the new structures in the middle were built in a minimalist style, which provides the contemporary architecture with transparency, like it is the case in the solutions of *Entre Catedrales* and *Genoves* park discussed above, thanks to which it can neighbour on historical buildings without conflicting them, but instead emphasising them and enhancing the functionality of the public utility space.

Mercado Central occupies the area of nearly seven thousand square metres on Libertad square, between the streets Libertad and Alcalá Galiano. It has a shape of a rectangle with the longer side of 106 metres and the shorter one of 56 metres. An idea that guided the architect after the demolition of the central part was – besides setting the Neo-Classical buildings free – to re-integrate visually the market space with the urban tissue that surrounds it. Thanks to the new building erected in the middle of the square, but with a proper margin and a "spatial breath", creating a new view and a perspective of the 19th-century colonnades, the effect – intended already by Benjumeda – of intermingling of the market square with the street was achieved, where the street enters the perimeter of the square, and the square reaches out to the street. What we deal here with is a dialogue of the urban space and two generations of architecture, with the contemporary one serving functional purposes, as well as fostering the protection and exposition of the historical tissue. By comparing plans and sections of the structures from 1929 and the contemporary ones, one can easily notice that the structures from the early 20th century were not only closely connected with the 19th-century development, but they competed with it visually, altering the perspective of the initial buildings and disturbing its proportions. The modern building is clearly moved away from Benjumeda's colonnades, and thanks to the applied forms and materials it is not their competition, but a stylish background. It is a deliberate shift of emphasis and giving the contemporary minimalist architecture the role characteristic for all of the sites in Cádiz discussed above. In the plan of the new *Mercado Central* we can see 3 rows of double stalls arranged along the longer sides of the rectangular piazza. In total there are 169 such stalls, 57 of which sell fruit and vegetables, 54 – seafood, 44 – meat, 7 – general food products, in 4 stalls you can buy breadstuff; furthermore, one stall offers olives, one – paper bags, and one – fishing products. Along the shorter sides the architect designed covered staircases leading to glazed rooms above the level of the stalls, housing offices, a coffee shop, and archives. In the two extreme rows the stalls are separated by 3.30-metre-tall simple white concrete screens, supporting a protruding roof that provides shelter for customers from the outside. From its level there stem 30x60 cm rectangular pillars, which – combined on both sides with 130-metre-long girders – support the roof above the central part of the market space. Between the pillars the architect proposed blinds made of screen-printed glass strips for the effect of a shadow, positioned at the angle of 45 degree, fixed on a stainless steel frame. The application of glass provides the architecture of the new *Mercado Central* with the value of transparency, referred to herein many times, thanks to which the contemporary architecture becomes completely non-aggressive visually and may serve the purposes of exposition of historical buildings. At the same time, this openwork structure allows for proper ventilation of the hall, so much desired. White concrete and glass blend in well with 19th-century materials and constitute a neutral background for them. This modern building satisfies all functional requirements and can be recognised as a very successful intervention into a historical site.

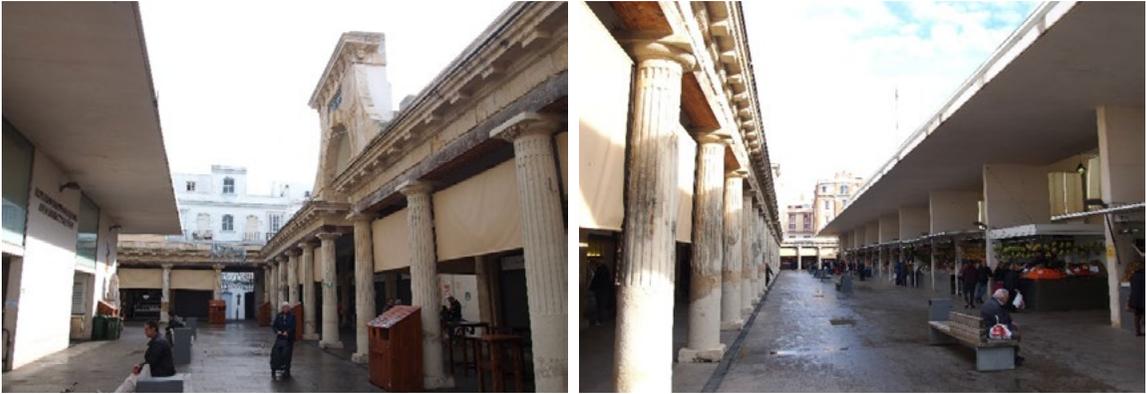


Fig. 9, 10. Mercado Central de Abastos, Cádiz, 2018. Photo: Author.

Theatrum Balbi

Theatrum Balbi in Cádiz is one of the two oldest Roman theatres in the world, next to the theatre in Pompeii, and at the same time it is Spain's second largest Roman theatre, after Córdoba¹². Erected in the second half of the 1st century¹³ by politician Lucius Cornelius Balbus Minor, this structure with the diameter of nearly 120 metres could accommodate as many as ten thousand viewers. It was made of stone combined with mortar (*opus caementicium*), with decorative elements made from marble and bronze¹⁴. The theatre was in use until the 3rd century AD, it was destroyed during the invasions of Vandals and Visigoths, for centuries its remains were forgotten under subsequent developments. Probably already in the 8th century a Muslim fortress was built on the ruins of the theatre, thoroughly reconstructed in the 13th century after the recovery of Cádiz by King Alfonso X. The history of the castle of Alfonso X of Castile was equally turbulent. At the end of the 16th century it was rebuilt after the city had been plundered by the Earl of Essex; in the 18th century it housed a naval academy and an astronomical observatory. Eventually, it was destroyed completely in the 19th century, probably at the same time as the city walls and gates. In the early 20th century *Vigorito* warehouses were built within the perimeter of the former fortress, which burnt down in 1979. One year later, in 1980, the ruins of the Roman theatre were discovered. The main problem that accompanied the uncovering of the remains of the ancient structure was the dense development of the today's district of *El Pópulo* and the vicinity of valuable historical buildings, such as the Old Cathedral, the remains of the city walls, or the palace of *Posada del Mesón*¹⁵. Archaeological works were carried out for over thirty years, with the application of the most advanced methods. Underneath the development of *El Pópulo* special vaults were built, protecting the excavations like umbrellas, and at the same time supporting the buildings above. Eventually, the ruins of the theatre were opened to the public in 2015. The uncovered left side of the auditorium (ca. a half of the initial volume), consisted of *cavea ima*, *cavea media*, and *proedria*, as well as *vomitoria*, *orchestra*, and a perfectly preserved 180-metre-long ring-like vaulted

12 See: P. Pachon, E. Rodríguez-Mayorga, J. F. Jimenez, V. Compan, A. Saez, E. Yanes, *Application of the operational modal analysis method for the control of the intervention in the Roman Theatre (Cádiz, Spain)*, [in:] *Structures and Architecture: Concepts, Applications and Challenges*, ed. P. J. Cruz, London 2013, pp. 904–911; *El Theatrum Balbi de Gades*: Actas del Seminario «El Teatro Romano de Gades. Una Mirada al futuro» (Cádiz, 18–19 noviembre de 2009), ed. D. Bernal Casasola, A. Arévalo González; <https://cometocadiz.com/theatrum-balbi-in-gades-roman-cadiz>; *Teatro romano de Cádiz*, <http://www.juntadeandalucia.es/cultura/enclaves/enclave-arqueologico-teatro-romano-de-cadiz>; R. Corzo Sánchez, *El teatro romano de Cádiz*, "Teatros romanos de Hispania" 1992, pp. 133–140; J. M. Esteban González, A. Muñoz Vicente, F. J. Blanco Jiménez, *Breve historia y criterios de intervención en el teatro romano de Cádiz*, "Teatros romanos de Hispania" 1992, pp. 141–156.

13 According to such authors as Cicero and Strabo, the construction of the theatre dates back to the years 46–43 BC; the uncovered remains indicate it was rebuilt in the times of Emperor Augustus, between 29 BC and 14 AD. See: A. Alvarez-Corbacho, P. Bustamante, T. Zamarreño, M. Gallindo, *Acoustic Reconstruction of the Roman Theatre of Cadiz*, <http://www.sea-acustica.es>

14 See: V. Perondi, *El Teatro Romano que se resistió a morir*, 22.07.2017, <https://www.lavozdelsur.es/el-teatro-romano-que-se-resistio-a-morir/>; *El Teatro Romano de Cádiz como referente económico y cultural*, <https://turismoandaluz.eldesmarque.com/cultura/243-el-teatro-romano-de-cadiz-como-referente-economico-y-cultural>

15 See: P. Pachon, E. Rodríguez-Mayorga, J. F. Jimenez, V. Compan, A. Saez, E. Yanes, op. cit., pp. 905–907; V. Perondi, op. cit.

gallery, leading to the auditorium¹⁶. The Interpretation Centre (*Centro de Recepción e Interpretación del Teatro Romano de Cádiz*) organised in the 17th-century building of *Posada del Mesón* under the supervision of architects Tomás Carranza Macías and Francisco Javier Montero Roncero, constitutes a specific complement and extension of the archaeological exposition¹⁷. The arrangement centre, modern in form and making use of the latest museum solutions, blends with the ancient ruins into an excellently harmonised whole, at the same time taking advantage of the modern buildings erected above the remains of the theatre. This way a unique contextual historical continuum is created, demonstrating the rich history of the city, from its ancient roots, through its turbulent history, to the modern times, with technological achievements allowing to exhibit ancient ruins without any harm to the existing development. What initially seemed to be an obstacle – the location of the excavations under valuable modern buildings, in the very heart of *El Pópulo* – was used as an advantage, thanks to which a very original exposition came into being, compiling several generations of architecture into a coherent whole. It is yet another current solution in Cádiz where the contemporary minimalist architecture constitutes a perfect neutral background for the historical tissue, serving both functional goals at the same time. The leitmotif that bonds this architectural whole is an arch, deriving from the vault of the theatre gallery and reiterated in the vaults cutting into the buildings above the ruins covering the excavations, as well as referred to many times in the arrangement of the exposition itself.

In *Centro de Interpretación*, via advanced interactive audio-visual solutions, viewers take a trip in time, from the views of *El Pópulo* in Room A, through modern views and plans of Cádiz in Room B, Room C devoted to *Teatrum Balbi* itself and its architecture, to Room D, which undertakes the topic of the meaning of theatre in the Roman society¹⁸. Visitors can see a model of the original building, and four round glazed openings in the floor allow to admire fragments of uncovered sections of the excavations. In the vestibule – Room A – you can see a fragment of *scaenae frons*, in Room B – *proedria* and a part of the section *cavea*, and in Room D – *orchestra*. Room C presents also the found fragments of decorative stonework, for instance a stone which is a part of one of the seats, with an inscription "*Latro Balbo*" (Balbo the thief), which was most probably the work of one of dissatisfied builders of the theatre¹⁹. The exhibition is arranged in a minimalist, modern form, dominated by wood and whites, enhanced with skilfully designed lighting arranged in slots in the ceiling and LED backlights illuminating the exposition itself, e.g. large-format photographs. The Interpretation Centre demonstrates the ancient remains not as something separate, but in the context – the social one, the context of architecture history, and most of all in the context of the history of the city to the present day.



Fig. 11, 12. Teatrum Balbi, Cádiz, 2018. Photo: Author.

16 See: A. Alvarez-Corbacho, P. Bustamante, T. Zamarreño, M. Gallindo, op. cit.

17 See: D. Bernal Casasola, A. Arévalo González, M. Bustamante Álvarez, V. Sánchez Loaiza, *De Teatro Balbi Restituendo. Un plan de Investigación para el principal testimonio de la romanidad de Gades (2009–2012)*, [in:] *El Theatrum Balbi de Gades: Actas del Seminario «El Teatro Romano de Gades. Una Mirada al futuro»* (Cádiz, 18–19 noviembre de 2009), pp. 257–306; A. Arévalo González, D. Bernal Casasola, F. J. Montero Roncero, T. Carranza Macías, *Del Pópulo al Teatro de Balbo. Un Centro de Interpretación para el Doce*, [in:] *El Theatrum Balbi de Gades: Actas del Seminario «El Teatro Romano de Gades. Una Mirada al futuro»* (Cádiz, 18–19 noviembre de 2009), pp. 123–139.

18 A. Arévalo González, D. Bernal Casasola, F. J. Montero Roncero, T. Carranza Macías, *Del Pópulo al Teatro de Balbo. Un Centro de Interpretación para el Doce...*, pp. 134–139.

19 See: <https://aprende.liceus.com/theatrum-balbi-teatro-romano-cadiz/>



Fig. 13. Vaults of the gallery of Teatrum Balbi, Cádiz, 2018. Photo: Author.



Fig. 14. Teatrum Balbi, Cádiz, 2018. Photo: Author.

Castle of Matrera

In the context of the four projects discussed above, in which the contemporary interventions should be clearly recognised as very successful, it is worth mentioning a strongly controversial project, evoking extreme emotions, which is the restoration of the tower of the Castle of Matrera. The Castle of Matrera (*Castillo de Matrera*) is located in Villamartín near Cádiz and it was erected in the 9th century by Omar ibn Hafsún, conquered by Alphonso X in 1256, rebuilt and donated to the knightly order *Calatrava*. In the early 14th century it returned to the hands of Muslims and was eventually taken over by Alfonso XI in 1341²⁰. Only parts of the fortress survived to the modern times, and in 2013 they were partly damaged by torrential rains that affected this region. Three floors of the tower along with the vaults, the entire northern wall, and a part of the western wall collapsed then. This is when the city authorities decided to renovate the partially preserved tower, and this task was entrusted to architects from the *Carquero Arquitectura* studio under the supervision of Carlos Quevedo Rojas. The controversial project was completed in 2016²¹. The preserved fragments of the Moorish walls were included in the austere rectangular form of the added white concrete tower. Fragments of the limestone from the collapsed parts of the fortress were used in the construction of the buttresses supporting the degraded walls from the inside²². The irregularity and texture of the ruins constitutes an exceptionally interesting contrast to the extreme formal frugality of the contemporary addition. According to the architect himself, the project had three fundamental goals: structural consolidation of the preserved parts of the building, clear separation of the contemporary intervention consistent with the Andalusian law on reconstructions of historical architecture,²³ and quoting the original size, texture, and tone of the tower²⁴. This project, in terms of its programme based on the principles of anastylosis, aroused widespread controversy in Spain itself, as well as beyond its borders, becoming a contribution to a heated discussion on the contemporary approach to historical heritage.

20 D. McManus, *Matrera Castle Restoration, Cádiz*, 21.05.2019, <https://www.e-architect.co.uk/spain/matrera-castle-restoration-cadiz>

21 See: *Project of the Week: Matrera Castle, Cadiz, Spain, Carquero Arquitectura*, 31.03.2017, <http://www.worldbuild365.com>

22 *Matrera Castle Intervention Heritage by Carlos Quevedo Rojas*, <https://competition.adesignaward.com/>

23 The design refers to the Act 13/2007 on the Andalusian historical heritage. Article 20 provides that in historical architecture mimetic reconstruction and use of identical materials as the original ones is forbidden. See: *¿Es el Castillo de Matrera una nueva chapuza en restauración?*, <https://www.elmundo.es/andalucia/2016/03/11/>

24 See: *Cádiz Castle Restoration: Interesting Interpretation or Harmful to Heritage*, <http://www.archdaily.com/>

The design by Carlos Quevedo was hailed the most extreme example of contemporary façadectomy²⁵; the architect was accused of reducing the priceless fragments of Moorish architecture to a thin historical 'skin' embracing the massive block of smooth white concrete²⁶. Conservative institutions involved in the protection of historical heritage, such as *Hispania Nostra*, did not spare harsh words of criticism to this bold project, and a wave of polemic texts went through the majority of European opinion-making periodicals²⁷. Irrespective of the stylistic evaluation of the reconstruction itself, it is worth pointing out that the previously insignificant ruined castle has become a popular tourist destination due to these events and gained international fame.

The project by the Spanish architect is based on the concept of reconstructing the dimension and form of the castle tower, making use, however, of a raw material, deprived of any details and decorations. In this understanding the smooth bright concrete in the ruins of the Castle of Matrera becomes as brutalist in its ostentatiously contemporary character as it is extremely neutral, like a modern in situ model, a shadow of the original building emerging from behind the preserved fragments of the wall. The spirit of a Moorish fortress has been quoted here in its original grandeur, simultaneously emphasising how little of it is left. According to the architect himself, the essence of the project was not to look into the future, but "to reflect on the past"²⁸. Anastylis is perceived here as highlighting the authenticity of the preserved fragments, whereas their mimetic reconstruction would be – according to the architects from the Carquero studio – only a fake²⁹. The objective here is not to obliterate the effects of the passage of time and of the turbulent history, but to emphasise them³⁰. At the same time, the smooth surface and the sharp geometrical silhouette of the added part constitute a formal opposition and a background for the irregular structure of the ruins, like a white wall in a museum, against which the preserved remains of the fortress have been presented³¹. The question whether what we deal here with is a violation of the historical structure of the walls, or perhaps a symbolic marriage of the heritage of the past with modernity, seems to remain a question of our own individual reception. It is worth pointing out that apart from critical opinions mentioning "a massacre committed on the national heritage", the restoration of the Castle of Matrera has also received positive reviews, predominantly among architects. It was honoured with the *Architizer 2016 A+* award in the category "Architecture and Protection"³². Among all controversies, the fact that this is an extremely interesting and noteworthy example of combining historical and modern architecture remains undoubted.

25 See e.g.: A. Weiss, *Facadectomy is Preservationists' Biggest Mistake*, 03.02.2004, <https://www.planetizen.com/>; O. Wainwright, *Some front: the bad developments making a joke of historical buildings*, 25.08.2014, <https://www.theguardian.com/artanddesign/architecture-design-blog/>

26 See: O. Wainwright, *Spain's concrete castle: a case of accidental genius?*, 10.03.2016, <https://www.theguardian.com/artanddesign/architecture-design-blog/>

27 See: S. Jones, *'What the hell have they done?' Spanish castle restoration mocked*, 09.03.2016, <https://www.theguardian.com/world/2016/mar/09/matrera-castle-cadiz-spain-restoration-mocked>; *'Botched' Cádiz castle restoration goes global*, 16.03.2016, <https://www.thinkspain.com/news-spain/27242/botched-cadiz-castle-restoration-goes-global>; *Controversy erupts over castle restoration in Cádiz*, 11.03.2016, https://elpais.com/elpais/2016/03/11/inenglish/1457696211_872057.html; R. Sobot, *Is this the world's worst restoration project? Historians furious after Ninth Century Spanish castle is 'repaired' by local builders*, 09.03.2016, <https://www.dailymail.co.uk/news/article-3484505/Historians-furious-Spanish-castle-repaired-builders.html>

28 "The essence of this project is not intended to be an image of the future (...) Rather, it is a reflection of its own past, its own origin", see: *Project of the Week: Matrera Castle, Cadiz, Spain, Carquero Arquitectura...*

29 "The proposal aims to avoid the aesthetic mimicry that involves falsification or loss of value of authenticity and, in parallel with the practice in intervention of movable heritage, its historical value is enhanced", see: *Carquero Arquitectura restores ancient Matrera Castle with contemporary elements*, <https://www.dezeen.com/2016/10/03/carquero-arquitectura-matrera-castle-contemporary-restoration-cadiz-spain-architizer-awards/>

30 "(...) this project aims to look at a unifying potential restoration, without undertaking the task of building a false historical monument or cancelling every trace of the passage of time. It tries to approach the work in recognition of the monumentum or memory in its physical consistency and its dual polarity, aesthetic and historical, in order to transmit those two aspects to the future", see: *Matrera Castle Intervention Heritage by Carlos Quevedo Rojas*, <https://competition.adesignaward.com/>

31 "The modern additions offer a contrast, yes, but also do not take away from what was a decaying ruin in any real, meaningful way", see: *Project of the Week: Matrera Castle, Cadiz, Spain, Carquero Arquitectura...*

32 See: *Project of the Week: Matrera Castle, Cadiz, Spain, Carquero Arquitectura...*; K. Megson, *Spanish architects win international prize for controversial restoration of medieval castle*, 14.04.2016, <http://www.cladglobal.com/CLADnews/architecture-design/Architezter-A-awards-architecture-design-competition-restoration-Matrera-Castle-Spain-Carquero-Arquitectura/323328>



Fig. 15. Photo 15. Consolidation of the tower of the Castle of Matrera, Villamartin, Spain, source: <https://competition.adesignaward.com/design.php?ID=48588>

Summary

The common denominator for all of the projects implemented in the urban tissue of Cádiz described above: *Entre Catedrales*, *Genoves park*, *Mercado Central*, and *Teatrum Balbi*, is the concept of combining historical and modern architecture. The latest architecture uses here most of all the formal language of minimalism: geometric forms and frugality of colours and textures. It is easy to notice that the authors of these designs did not aim to reconstruct or complement the historical structure in an imitative way, but to achieve two fundamental goals: its exposition and functional extension, so that it could find a new place in the urban organism and serve the widest possible group of recipients as extensively as possible. The concept and character of these four projects are inseparably linked with the contemporary city and its needs. The application of modern materials and functional solutions in combination with the formal frugality of minimalism allows to give historical architecture a second life and to include it in the functional programme of the city, highlighting its values at the same time. In the Cádiz-based projects described herein the architects focused on the concept of combining not only history with modernity, but also combining epochs and historical layering, as well as different zones and areas, culture and nature, with the simultaneous creation of a useful space in urban terms on the plane of combination. What we deal here with is a contextual approach to architecture, through the exposition of traces of history and the simultaneous creation of a completely new quality. Each of the described projects experienced a certain redefinition of the existing development, and the latest architecture acts as a bond and clamp connecting different epochs and spaces, at the same time becoming an area of exposition and social utility. Besides minimalism, transparency is the dominating formal concept – modernity is not in conflict with historic architecture, but it creates a transparent background for it – hence the observed frequent use of glass and transparent plastics, the use of light, and the dominating whites. The projects described herein differ from each other not only in terms of scale and functional programme, but also the character of their historical structures: from ruins of an ancient theatre, through modern religious, residential, and commercial buildings, to a colonial botanic garden. In all this diversity, they are connected by the architectural concepts they share: functionality, transparency, contextualism, and symbolic foundation on the idea of a connection plane. Against this background the Castle of Matrera, whose concrete additions evoked strong controversy even beyond the

borders of Spain, is an exceptionally interesting case. And yet, the design by Carlos Quevedo also satisfies the functional requirement: it protects the ruins facing the risk of collapse. The question whether a smooth geometrical plane constitutes a neutral background for medieval fragments, or rather an aggressive intervention, remains disputable. The location of this project in landscape is probably not without significance. While in an urban landscape sharp edges and geometrical forms are something commonly found, in the case of a castle located on a hill they actually give the impression of a structure completely foreign in the surrounding nature.

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The Community House (Dom Ludowy) in Nałęczów as an example of social architecture of the early 20th century

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Abstract: One of the most interesting facilities which were supposed to improve the quality of education of the poorest social strata were community houses. The popularity of this kind of institutions, dating back to the end of the 19th century and the first half of the 20th century, resulted in the construction of the Community House in Nałęczów, which, based on best practices, was to be a model of the realisation of a new, progressive society. The article presents the principles and "rules" for establishing such facilities by local communities in the context of activities undertaken in the difficult social and political situation of the areas under Russian rule. The history, operating principles, and architecture of the Community House in Nałęczów, which is an example of an out-of-the-box facility maintained in the national style, were herein analysed.

Keywords: Community House, Nałęczów, the national style

Introduction

The architecture of the public institution buildings in Nałęczów is unique in the whole area of the Lublin Governorate. One can risk a statement that in a sense, it is an undiscovered architecture, which only in the overall comparison illustrates the architectonic idea of the designers.

Public buildings in Nałęczów were erected with respect to the history and traditions of the health resort and its surroundings. Despite the prevailing fashions, architects and builders managed to achieve a unique style and character by transferring the patterns of national architecture to the area of Nałęczów without losing its regional features. The buildings erected in Nałęczów stand out from the historical villa and industrial architecture not only in terms of materials, but also in terms of architectural form rarely found in other parts of the country. It is noteworthy that the context of the place is respected and that it is very well connected with the surroundings and the undulating topography of the town. The architectural form and the functional solutions applied were connected with the activity of outstanding designers led by the architect Jan Witkiewicz Koszczyc, as well as the awareness of their patrons and founders. Being a health resort, Nałęczów became a recreation place for remarkable people from the world of science and literature who were close to the socialist stamina¹.

The common denominator of the public buildings erected in Nałęczów between 1905 and 1914 was the fact that all of them were financed by the community of residents, various types of contributions, publishers, donations from societies and associations², and the intelligentsia represented by the landowners, among others: Stanisław Śliwiński, Maria Kleniewska, the financiers: Karol Gottlieb Bloch, the doctors: Karol Benni, Wacław

1 Nałęczów zdrojowisko i letnisko sezon 1928/1929, Wydawnictwo Komisji Zdrojowej w Nałęczowie, p. 46.

2 Nałęczowskie Towarzystwo Kredytowe, Lubelskie Towarzystwo Zjednoczonych Ziemianek, Towarzystwo Popierania Przemysłu Ludowego, Centralne towarzystwo Rolnicze, Nałęczowskie Koło Rolnicze, Towarzystwo Oświatowe – Światło, Macierz Szkolna.

Lasocki, E. Kuńczyński, Bronisław Malewski, Kazimierz Chełchowski, the writers: Stefan Żeromski, Bolesław Prus. For these people, the positivist work at the grass roots was not unknown, they saw the future of resurgent Poland in the education of the lowest social strata. Often projects, prepared and supervised by outstanding architects, were made *pro publico bono*. The best example of this was the building of Ochronka (an orphanage) designed by Jan Witkiewicz Koszczyk or the School of the Association for the Support of Folk Industry (Szkola Towarzystwa Popierania Przemysłu Ludowego) of the same architect.

One of the particularly interesting facilities which were intended to improve the quality of education of the poorest social strata was a community house. They were particularly popular at the end of the 19th century and the first half of the 20th century and were reflected in the construction of the Community House (Dom Ludowy) in Nałęczów, which, based on best practices, was to be a model of realisation of a new – progressive society.

The state of research

Currently, there is no monograph on the subject of architecture of community houses built in the Lublin Voivodeship in the early 20th century. However, the popularity of these buildings in the Lublin Governorate has resulted in the publication of numerous books providing instructions on how to establish, finance and operate such public buildings. Noteworthy are the publications of Kazimiera Bujwidowa (1903)³, Stanisław Posner (1907)⁴, Wacław Budzyński (1918)⁵, Wanda Kosmowska (1918)⁶, Ignacy Gliksman (1923)⁷, Wojciech Sosiński (1925)⁸, Alex Kurcyjusz (1927)⁹, as well as model statutes of Society of Community Houses (Towarzystwo Domów Ludowych) describing the principles of organising this type of facilities and examples of good practice. In addition, due to the growing popularity of the Community Houses, in the 1930s, actions of building workers' houses were organised, an example of which was the realisations in the oil basin. The effects of these works were published in numerous books and brochures. [Fig. 1]

The functioning of “the model community house”

At the beginning of the 20th century, the development of “*social life and cultural work of a village, settlement or town*” was closely linked to the institution of a Community House, which was the seat of local societies, machinery rings, and savings and loan associations. This building, financed by the inhabitants, was an important place of cultural and educational life of a village¹⁰.

Their architecture was diverse. Initially, it derived from the style of national architecture (manor house), later, with the development of the workers' movement, it was maintained in the modernist style and in its initial phase – functionalism. [Fig. 3A, B, C, Fig. 2]

The fashion for building *Community Houses* has covered the entire territory of the former *Congress Poland*. In the Lublin region, there were many such objects, most of which date back to the first half of the 20th century. The particular popularity of this function is evidenced by the number of projects commissioned by different local governments, e.g. in Lubartów (1928, 1936), Łuków (1923), Golice (1936–1937), Czółno (1929), Sitaniec (1922), Józefów (1925), Warszawice (1925), Kryłów (1939), Drelów (1939), Olszanka (1927), Dziarkowice (1939), Korczew Podlaski (1924), Ksawerówka (1928), Kraśnik (1938), Urzędów (1938), Teptiuków (1939), Tłuść (1936), in the village of Dąbie (1927), in Krężnica Jara (1927), Konstantynów 1927, Milanów 1927, Krasnystaw

3 K. Bujwidowa, *Domy ludowe*, Wydawnictwo Krytyka, Kraków 1903.

4 S. Posner, *Domy Ludowe w Belgii*, Wydawnictwo Krytyka, Kraków, 1907.

5 W. Budzyński, *Pogadanki wzorowe znaczenie domów ludowych*, Wydawnictwo Szkółek Rolniczych C.T.R. w Królestwie Polskim, 1918.

6 W. Kosmowska, *Towarzystwo szkoły ludowej w Galicji z cyklu drogi do oświaty*, Wydawnictwo M. Arcta w Warszawie, 1918.

7 I. Gliksman, *Domy ludowe ich organizacja i znaczenie dla rozwoju kultury narodowej*, Warszawa 1923.

8 W. Sosiński, *Jak zakładać dom ludowy i prowadzić towarzystwo domu ludowego wskazówki organizacyjne*, Centralny Związek Kółek Rolniczych, Komisja Domów Ludowych, Warszawa 1925.

9 A. Kurcyjusz, *Znaczenie Domów Ludowych w Polsce w dobie obecnej*, Warszawa 1927.

10 W. Sosiński, *Jak zakładać dom ludowy i prowadzić Towarzystwo Domu Ludowego, wskazówki organizacyjne*, warszawa 1925, (Warszawa: Druk. Art. K. Kopytowski), p. 6.

1938–1939, Łopienniki Dolne 1927, Tomaszów Lubelski 1924, Wola Rawska 1938, Baranów n/ Wieprzem 1939, Tomaszów Lubelski 1931, in the village of Kulno 1923, in Groszki Stare 1933, in the village of Chojeczno 1934, Janów Lubelski (1924 – reconstruction), in Biała Podlaska 1937¹¹.

“Principles” for establishing a Community House

According to the general postulations, a *Community House* was to fulfil a number of functions, among the others: it was to be “*the most active centre of the improved economic life of the area*”, especially “*in the field of agriculture, rural industry, trade, all associations and unions*”¹².

An important function performed by such buildings was also the educational function: “*Community houses organise readings and lectures everywhere (...) which are the basis of education*”¹³. What is more, they were also a place for integrating the community – “*intelligence comes closer to the people*” and were centres of cultural and social life¹⁴.



Fig. 1. Covers of publications concerning the principles of establishing and functioning of Community Houses



Fig. 2. Modernist Community Houses of the Oil Basin.

The location of this type of facility was strictly defined. According to a number of guidelines promoted in the press and literature for the establishment of the model Community Houses, a building fulfilling this function should meet the “*educational, social and cultural*” needs of a local community. Its location should allow for the possibility of expanding and providing space for sports equipment – in the form of sport fields and fitness facilities. The plot should be located in the centre of the village and give an opportunity to expand the building in the future.

¹¹ Data from the State Archives in Lublin.

¹² Waclaw Budzyński, *Znaczenie domów ludowych*, op.cit., p. 10–12.

¹³ Ibid., p. 10–12.

¹⁴ Ibid., p. 10–12.

beautiful in the village, a testimony of the power of collaboration and a model of construction". It was recommended to entrust these designs to architects – "those who are specially dedicated to this type of construction (preferably with the Community Houses Commission)".

The design, together with the cost estimate of the Community House building, was subject to approval by the state office – the district architect or the District Directorate of the Public Works. The local community having the design and cost estimate could apply for a state loan¹⁶.

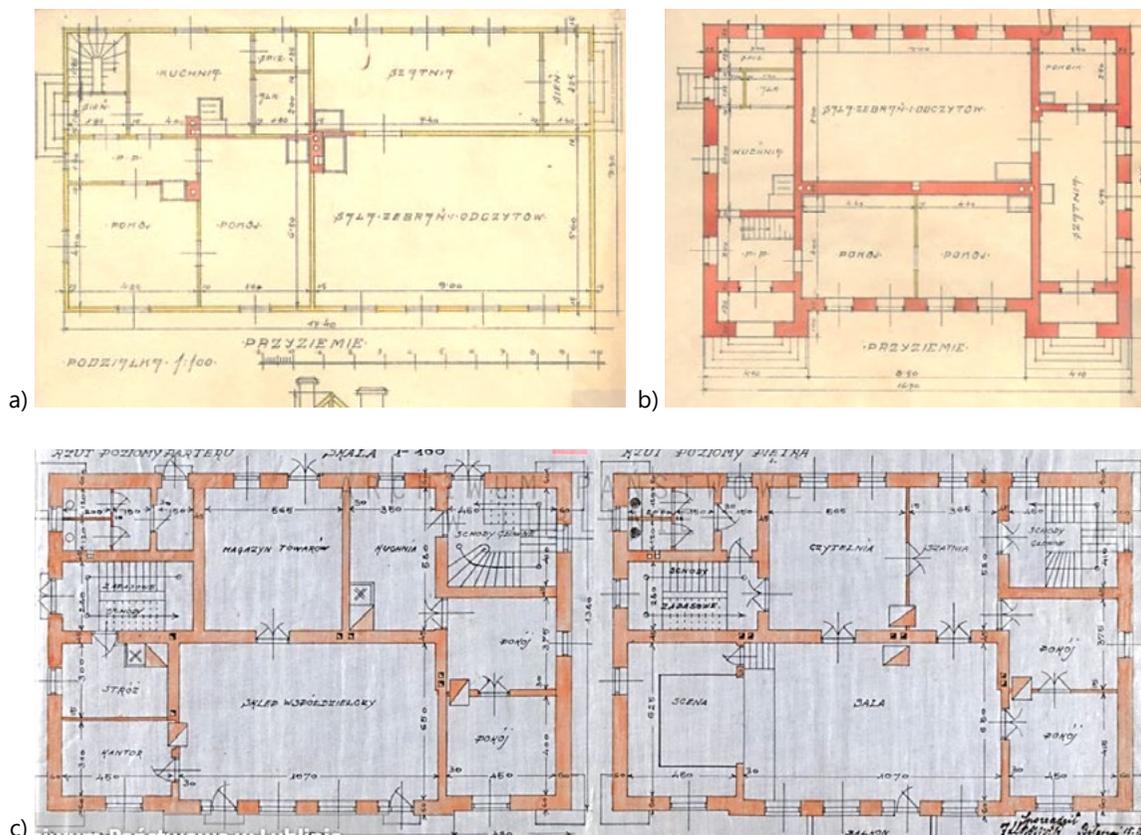


Fig. 5. A – The design of the community house in the village of Dąbie (1927), p. 1251 APL, B – in the village of Olszanka (1927), p. 1294, APL, C – in Józefów, p. 487 (1925) APL

The Community House in Nałęczów

The construction of the Community House building in Nałęczów is connected with the activity of Stanisław Śliwiński, a landowner and patriot, bringing together a group of local landowners who he was teaching "(...) not only to improve the farming, but also to feel and understand the civic mission in the national spirit"¹⁷.

The beginning of the 20th century, and especially the year 1905, brought an intensification of cultural, educational and social activities in the Lublin Governorate. The willingness to oppose the Russification through professional education (elementary schools, educational and cultural institutions) was reflected in numerous emerging machinery rings and associations. These activities undertaken due to "positivist" ideas became possible in Nałęczów thanks to a group of enlightened people¹⁸ who belonged to the Nałęczów Credit Society

¹⁶ Ibid., p. 15–17.

¹⁷ A. Przegaliński, *W kręgu Stanisława...*, p. 140.

¹⁸ Stanisław Śliwiński, Fortunat Nowicki, Konrad Chmielewski.

(Nałęczowskie Towarzystwo Kredytowe) (1903) and who were also residents of the resort. In 1906, a machinery ring was established in Nałęczów, which was a superior body to the existing agricultural enterprise "Zgoda" and the Nałęczów Credit Society. The person who was mainly responsible for the management of the ring and its *spiritus movens* was Stanisław Śliwiński – the initiator of the construction of the community house in the Nałęczów health resort¹⁹.

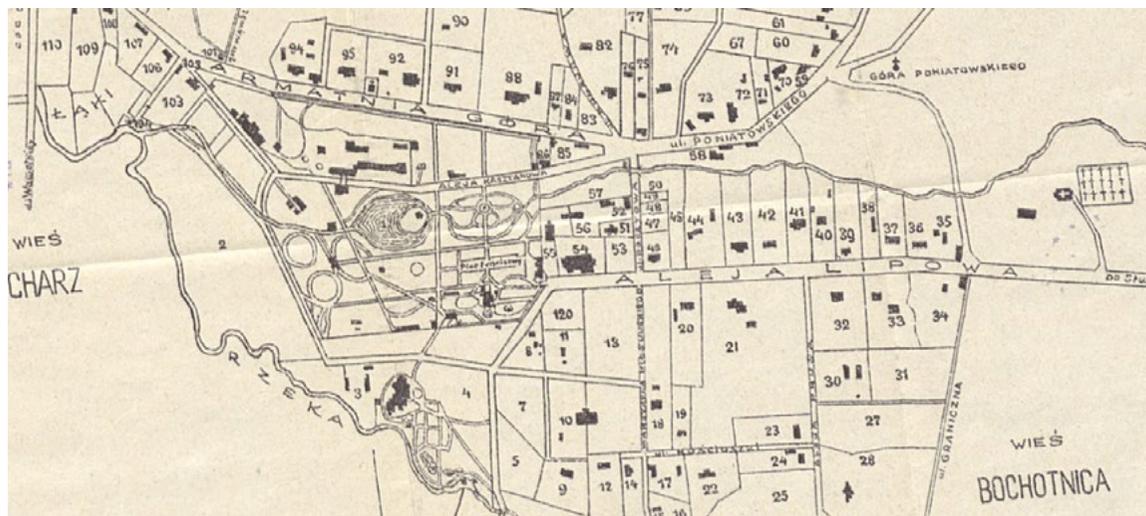


Fig. 6. A part of Nałęczów Situation Plan from 1934, the location of The Community House

The Community House „Ludowiec” in Nałęczów was fulfilling the above-mentioned functions. From the very beginning, it was the seat of a school, with classes taking place in two lecture halls on the first floor,²⁰. Apart from that, the building also hosted numerous associations. In the basement there was a guardian’s flat and a tea room^{21 22}, on the ground floor there was so-called “cash register” – Nałęczów Credit Society and on the first floor there was a Machinery Ring (transformed in 1909 into the District Agricultural Society of Nałęczów²³). [Fig. 6]

Two years later, the collections of the Lublin Land Museum (Muzeum Ziemi Lubelskiej founded in 1904 by Dr. Lasocki, Malewski and Puławski) were moved to the Community House²⁴.

The Lublin Land Museum was later called the Nałęczów Museum (Muzeum Nałęczowskie). The collections included folk costumes from the Lublin Governorate, models of cottages and manor houses, as well as various species of birds, engravings and drawings collected by Dr W. Lasocki²⁵. Apart from that, on the ground floor of the Community House, there was a shop which was opened on 1 February 1908. The Community House was the seat of the Cooperative “Oszczędność”²⁶.

19 A. Przegaliński, *W kręgu Stanisława Śliwińskiego i nałęczowskiej oświaty rolniczej na przełomie XIX i XX wieku*, Rocznik Lubelski 35, 2009, p. 140–143.

20 A. Elaszuk, *Czego nas uczono i jak żyliśmy w Szkole Rolniczej w Nałęczowie, Odczyt sprawozdawczy na ogólnym zebraniu Włodawskiego towarzystwa Rolniczego w Sosnowicy*, Warszawa p. 7.

21 The community teahouse was located in a basement with beautiful arched vaults and walls of unplastered red brick. It functioned for a year and a half. Later, in 1909, it was replaced by a café run by Ms. Wisłockas. During the First World War it was reopened by Aleksander Gustaw Maławski, then Mrs. Neyman. In 1916 a reading room was opened in the tearoom. Eventually the reading room together with the tearoom was closed in 1918. After: J. Babinicz Witucka, *Krótką historią nałęczowskiej herbaciarni*, Głos Nałęczowa, Towarzystwo Przyjaciół Nałęczowa, p. 18–19.

22 Throughout the entire period of World War I, the Community House was housing a tearoom run by Aleksander Gustaw Malewski, who was president of the Citizens’ Committee. During the war, it was called “czajnia”. Due to financial problems connected with its maintenance, it was closed on 15th May 1918. After: J. Babinicz Witucka, *Nałęczów w czasie I wojny światowej wybrane wydarzenia*, in: *Pamięć wielkiej wojny*, p. 9.

23 A. Przegaliński, *W kręgu Stanisława Śliwińskiego i nałęczowskiej oświaty rolniczej na przełomie XIX i XX wieku*, Rocznik Lubelski 35, 2009, p. 143.

24 Originally, they were stored in the Małachowski Palace under the care of Dr. B. Maławski, and later W. Lasocki.

25 I. Iskrzycka, *Z dziejów Towarzystwa pod nazwą „Muzeum Lubelskie”*, studia i Materiały Lubelskie, 1968, vol. 8, p. 24, after: Lublinianin of 16.09.1907, no. 58.

26 A. Przegaliński, *W kręgu Stanisława...*, op. Cit., p. 143–149.

During World War I, a camp office was established in the dormitory²⁷ of an agricultural school in the Community House. Its role was to find accommodation for the population²⁸. In the interwar period this building was not used much²⁹. The guides from the 1920s say: *The Community House was built on the initiative of Wacław Lasocki. It housed the ethnographic and natural history museum of the Lublin Land founded by him and later donated to the Lublin Land Museum. Currently, the Community House houses the men's agricultural school. The Community House does not meet its purpose here, as it does not have a theatre hall or a place to play or to meet, and yet Nałęczów misses it much*³⁰. After the war, the Community House was home to shops and warehouses. On the ground floor for nearly twenty years there was a photographic studio of Małachowski and on the first floor the seat of the Catholic Action which was adapted by the Roman-Catholic parish. There is also a café here to this day. The rest of the rooms are not used.



Fig. 7. "Dom Ludowy" in Nałęczów, 1912, Archive Teatr NN

Six-month winter courses for landowners in Nałęczów

One of the main functions for which the Community House was built were winter courses for landowners intended for men under 16 years of age and able to read, with priority given to men from the Lublin Governorate. The schooling initially lasted six months and was later reduced to five months. Its cost was between 40 and

27 Most of the students lived in private accommodation paid for by the course management, but there were six small rooms available. After: A. Przegaliński, *W kręgu Stanisława...*, op. cit., p. 150.

28 J. Babinicz Witucka, *Nałęczów w czasie I wojny światowej wybrane wydarzenia*, in: *Pamięć wielkiej wojny*, p. 9.

29 *The Community House in Nałęczów is completely different in its character. It stands alone and deaf most of the year. Although there are 6-month agricultural courses held there, but then no one gives general lectures, people do not gather there for meetings and hearings, they do not take possession of it. This is a great pity, not only because the facility, which is so rare in our region, is not sufficiently exploited, but also because of its exceptional supply of scientific aids, which should be made as widely available as possible. after: W. Kosmowska, *Domy ludowe u ...*, op. cit., p. 85–86.*

30 *Nałęczów, Zdrojowisko i letnisko sezon 1928–1929, jednodniówka pod redakcją Feliksa Petrucznika*, Wydawnictwo Komisji Zdrojowej w Nałęczowie, p. 48.

50 rubles. The course was managed by a committee appointed every year from the Lublin Agricultural Society and approved by the Lublin governor. The lectures, similarly to the nearby School of Women Landowners, were given in Polish. The programme included subjects such as botany, zoology, agricultural science, horticulture, breeding, gardening, beekeeping, dairy, veterinary, hygiene, land measurement, arithmetic and physics³¹. A former student of the school A. Elaszuk wrote extensively about the curriculum. The theoretical classes were accompanied by practical classes conducted already from March, among others "practical work in the garden and nurseries in Antopol" and excursions to nearby estates, the aim of which was to consolidate the acquired knowledge, among others in the estates in Rumblów, Czesławice or Antopol. The schooling ended with an exam and a certificate of completion of agricultural courses³².

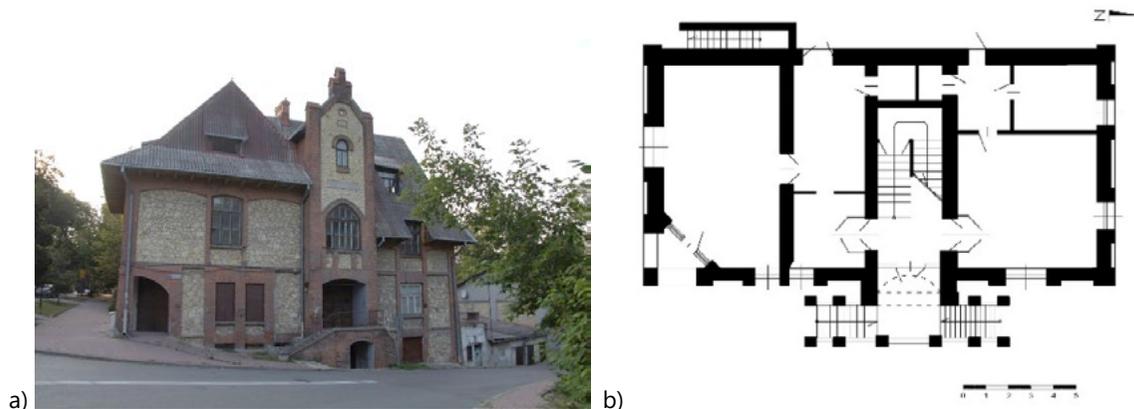


Fig. 8. A – The Community House, the author’s own photograph, 2018, “B The Community House in Nałęczów, 2018, the author’s own photograph, B schematic plan of “the Community House” the author’s archive.



Fig. 9. The Community House, architectural details, author’s own photograph, 2018

31 A. Przegaliński, *W kręgu Stanisława Śliwińskiego i nałęczowskiej oświaty rolniczej na przełomie XIX i XX wieku*, *Rocznik Lubelski* (Lublin yearbook) 35, 2009, p. 149–150.

32 A. Elaszuk, *Czego nas uczono i jak żyliśmy w Szkole Rolniczej w Nałęczowie*, *Odczyt sprawozdawczy na ogólnym zebraniu Włodawskiego towarzystwa Rolniczego w Sosnowicy* (report), Warszawa p. 19–21.

The architecture of the Community House in Nałęczów

The architectural form of the Community House building referred to the national style^{33, 34}. The regional character was emphasized by the construction materials³⁵ used, in the form of limestone and brick, which created a characteristic detail in the form of frame division on the facade. It was later repeated in the architecture of the outbuilding added to the building from the side of Graniczna Street.

The "Ludowiec" building, as it was commonly called, was built in 1906 according to the design of Warsaw architect Zenon Chrzanowski³⁶. The plot of land on which the building was erected had an area of 1482 square ells and was purchased for 50 rubles from Józef F. Bagieński. Due to the law prevailing in the Kingdom of Poland, the parcel intended for the construction of the Community House could not belong to one person³⁷. The construction works and related costs were paid in full by the Nałęczów Credit Society headed by Stanisław Śliwiński and the contributions of the Nałęczów inhabitants and the local community³⁸.

The building has been given a two-storey body covered with a hipped roof with numerous dormers and a three-tiered roof of the risalit of the front façade. Originally, the roof of "Ludowiec" was covered with wooden shingles – now with eternit. The front façade (from the side of Graniczna Street) was emphasised with a single-axis risalit enclosed in brick pilasters and finished with a trapezoidal gable with a crenellation. The building has a protruding eaves³⁹ and an arcade at the corner at the intersection of Lipowa and Graniczna Streets. [Fig. 7, 8A] In the past this was the place where the shop used to operate.

"Ludowiec" was accompanied by an outbuilding erected between 1906 and 1909 and connected to the building with the use of a connector. From the beginning of its existence the building was supervised by the Cooperative "Oszczędność". Similarly to "Ludowiec", it was erected of limestone and brick, from which pilasters, cornices and window frames were made. A characteristic frame division also appeared on the façades. [Fig. 9] The building served as a warehouse, butcher's shop and sewing room. At the beginning of the 20th century, it was partly adapted for the flat and furniture maintenance workshops. It also functioned as a storage facility⁴⁰. [Fig. 8B]

33 The architecture of the Community House building was arousing mixed feelings among the residents of Nałęczów. According to W. Kosmowska, it was a beautiful building with aesthetic lines, preserving the style of the so-called Vistula – Baltic style, showing the artistic aspirations of its creator, who left his mark on all buildings constructed for social institutions in Nałęczów. (...) A similar opinion was also held by one of the students of the agricultural course, A. Elaszuk, who described the popular "Community House" as a beautiful building. Lucia Hornowska, who wrote in her memoirs: "On the corner of Lipowa Avenue (Graniczna Avenue) in front of the church, a heavy, clumsy red-brick bunker was built, the "Community House". After: W. Kosmowska, *Domy ludowe u obcych i u nas*, Warszawa; Lublin : Wydawnictwo M. Arcta, 1918 (Warszawa : Druk. M. Arcta), p. 85–86, . A. Elaszuk, *Czego nas uczono i jak żyliśmy w Szkole Rolniczej w Nałęczowie, Odczyt sprawozdawczy na ogólnym zebraniu Włodawskiego towarzystwa Rolniczego w Sosnowicy*, Warszawa p. 7, J. Babinicz Witucka, *Krótką historia nałęczowskiej herbaciarni*, Głos Nałęczowa magazine, Towarzystwo Przyjaciół Nałęczowa, p. 18.

34 The style of the Community House in Nałęczów is described by some researchers and regionalists as the Zakopane style. An even more intricate term, which proves the eclecticism of the architectural elements that have been used, was given by Ł. Heymann, who wrote that the architecture of the building is a composition in the spirit of processing anonymous, small-town medieval solutions (with motifs of the Zakopane style), after: Ł. Heymann, *Co i jak zbudowano w Nałęczowie między wojennym czyli dzień powszedni architektury ówczesnej*, Między wschodem a zachodem część III kultura artystyczna pod redakcją Tadeusz Chrzanowskiego, Lublin 1992, Lubelskie Towarzystwo Naukowe, p. 450.

35 The materials used in "Ludowiec" were characteristic for most of the public buildings erected at the beginning of the 20th century in Nałęczów (the School of Women Landowners, the Jan Bloch Toy Instructors' School, the Carving School, etc.).

36 The architect Chrzanowski Zenon was born in 1877 in Smotryszew and died in 1922. He completed the architecture in St. Petersburg and designed the parish in Jedlnia (1902–1903), the building of the Gen. P. Chrzanowski gymnasium (later J. Zamoyski gymnasium) in Warsaw and houses "for himself" in Piaseczno. After: S. Łoza, *Architekci i budowniczości w Polsce*, Warszawa Budownictwo i Architektura, 1954, p. 47.

37 The plot was owned by: Stanisław Śliwiński, Antoni Puławski, Bronisław Malewski and Wincenty Wójcicki. After: M. Tarka, *Dzieje Nałęczowa*, Towarzystwo Przyjaciół Nałęczowa, 1989, p. 99.

38 *Ibid.*, p. 99.

39 Karta WUOZ/Lublin, A. Sikora-Terlecka, *Dom Ludowy*, 1996, p. 4518.

40 Karta WUOZ/Lublin, A. Sikora-Terlecka, *Dom Ludowy*, 1996, p. 4518.

Summary

The architecture of the Community House in Nałęczów stands out from other buildings built at the same time in the Lublin Governorate area. It is not without significance that the building was erected in the Nałęczów health resort, which were bringing together people of culture and science, who wanted to educate the poorest social strata, thus fulfilling the demands of positivist work at the grass roots.

The building has been maintained in the national style, as evidenced by its form, sloping roofs and dormers, which are a distant reminiscence of manor house architecture. However, architectural detail of the building that is unparalleled in the area of Nałęczów is remarkable. Through the variety of materials – brick, limestone and a detail in the form of pilasters, decorative gables, crenellation or characteristic frame division, the original building was obtained which is not a typical object promoted in numerous leaflets and instructions for establishing Community Houses. Certainly, it was the designer Zenon Chrzanowski who had the merit here, who tried to create a building that would fit in well with the landscape of the health resort and referred to the tradition of the place and local folk architecture. The use of the above mentioned materials became the norm for the construction of subsequent educational buildings. Therefore, one can risk a statement that the building of the Community House in Nałęczów initiated, in a way, this trend in the architecture of educational facilities of the Nałęczów region in the first half of the 20th century.

Considering this building from a wider perspective in terms of its location and functional solutions and in the context of materials in the form of preserved archival records, it should be noted that the difficult plot of land on which the building was located (both in terms of shape, proximity of the road system and differences in relative height) constituted a huge potential on the other hand. Although it did not meet the requirements for the organisation of space in the form of sports infrastructure and insulating greenery, it provided full exposure of the southern and eastern façade – which is the front façade. The representative staircase highlighting the main entrance to the building and serving as a “compensating run” successfully accentuated the main risalit.

The Community House building became the first representative building (after the church) on the side of the Lublin-Nałęczów route. From the functional point of view, it should be noted that the Community House in Nałęczów was not large. It served as a school, savings bank and shop. However, it is true that the designer did not foresee a theatrical hall in the functional programme of the building, which was widely commented on by the then guests and residents of the resort.

To sum up, the Community House in Nałęczów is an example of aspiring architecture of the beginning of the 20th century, which was part of the then ideological programme without losing the originality of the architecture itself.

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Architecture and typhology. The potential of scientific partnership

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Abstract: The connections between architecture and typhology were not always obvious. Despite many related research problems, these sciences developed separately, and the study results of specialists from both departments did not reach the other discipline. An attempt to reduce this distance was made in the late decades of the 20th century by Polish architects, aware of the possibility of solving specific problems of the blind through architectural activities.

The work is an attempt to constitute an interdisciplinary relationship between architecture and typhology. The author indicates and names common issues important for both sciences, and also attempts to outline areas of their potential cooperation. In addition, she also highlights the values that can flow from this partnership.

Key words: visually impaired people, interdisciplinary research in architecture, universal design

The study has been implemented from the resources of the WZ/AiU/2/2020 public research funds financed by the Ministry of Science and Higher Education of Poland.

Introduction. Research problem, purpose of publication, method

The subject of the author's many years of scientific studies is the issue of relations between blind and visually impaired people and the spatial environment. Research covers various forms of extra-visual experience related to reception and active space on an urban, architectural and interior scale. The search for research includes issues such as:

- Specific problems and spatial barriers affecting blind people.
- Individual and environmental methods of compensating the spatial problems of the blind.
- The use of spatial relations as a link of so-called typhlorehabilitation (comprehensive rehabilitation and rehabilitation of the blind), with particular emphasis on the results of research with reflection and practicing art.

The study results to date have been presented by the author in a number of publications [Kłopotowska 2007, 2009, 2010, 2015 (a), (b), (c)], including monographic studies [Kłopotowska 2016], [Kłopotowska, Kłopotowski 2018 (a), (b)].

The research required the author to go beyond the strict limits of the practiced architectural discipline and to enter the research fields of other sciences oriented at the subject of typhus (people with visual impairments). Interdisciplinary approach to the issues could not have been without the author's proper recognition of the "space of contact" of architecture and typhology, including: identifying common problems and concepts, identifying information gaps and differences in scientific approaches. One of the problems noticed by the author during her preliminary research was the insufficient scientific empowerment of typhology in architecture and architecture in typhology. According to the author, this fact deserves a separate scientific comment.

This text is an attempt to indicate the scientific relationship between architecture and typhology. The author's intention is to outline areas of possible cooperation (exchange of knowledge and values) of both sciences and to highlight the advantages of this partnership. The research was based primarily on studies of multidisciplinary literature on the subject and an examination of the current state of research in the areas of specific sciences. The author also used verbally transferred knowledge and experience of a wide range of experts – theoreticians and practitioners representing knowledge-related areas of work. The author's personal scientific experience played a big role, allowing the confrontation of existing scientific views with her own beliefs.

Research results. Discussion

Between architecture and typhology

Disciplinary clamps for conducted scientific research were: architecture – a discipline of science, classified in the field of engineering and technical sciences, at the same time manifesting a clear gravity towards the humanities and art, and typhology – a department of science not yet having the status of a separate discipline and represented by a number of scientific departments (tyflopsychology, typhlorehabilitation, typhlopedagogy, techniques), inmates in the fields of medical sciences and health sciences, social sciences and engineering and technical sciences. The scientific bridge between the sciences is very wide and includes such branches of science as: psychology of architecture, psychology of perception, psychology of art, environmental psychology, art therapy, ergonomics, anthropology, sociology, humanistic geography, etc.

Perspective of tyflopsychology

Achievements of tyflopsychology (subdiscipline of psychology) have become the reference platform for author's research. The canon literature on the subject and the basis for later studies is the monographic publication of T. Majewski [Majewski 1983], referring to the work of M. Grzegorzewska [Grzegorzewska 1926]. It is significant that, when defining the departments of science supporting the development of typhoidology (medicine, ophthalmology, pedagogy, sociology, social sciences and technology), the author completely omits architecture as a potential partner discipline. In addition to the main accents of the work, the topic of the human-space relationship is also interesting to the author. This is probably due to the fact that psychology for a long time did not show interest in the impact of man on space and vice versa – space on the human psyche. The study of these issues is not an end in this area of science but merely a means to an end (psychological analysis and therapy). These issues, however, appear in the background of the author's considerations, primarily as descriptions of functional and developmental disorders within cognitive processes, spatial orientation, practical activity, motor skills and locomotion, and then descriptions of the possibilities of compensating these deficits by improving cognitive processes, practical activity and movement. On the other hand, issues related to the emotional perception of space are marginalized, which, according to the author, are an important element of social life (conditioning, among others, the use of art).

Significant differences are also manifested in scientific attitudes towards the problem of disability. Majewski's approach is "defectological" approach (aimed at catching deviations in the psychological structure of the blind), while the author is a supporter of the "rehabilitation" approach (referring, according to the philosophy of universal design, to what is common to all groups of space users).

Perspective of typhlorehabilitation

Typhlorehabilitation is a close author of the scientific attitude – practical science focused on achieving human well-being through reduction, elimination and compensation of deviations resulting from visual impairment. This science aims to lead to the maximum development of the individual but also to enable its social integration. The fundamental model of the so-called Polish School of Rehabilitation, assumes a harmonious development

of all human needs (and therefore also spatial needs). The area of interest in joint typhlorehabilitation and architecture includes min. issues related to spatial orientation and locomotion. According to the author's research, typhlological knowledge in this area was developed, however, in isolation from architectural achievements [see: Lynch 2011, Kantarek 2013]. The rapid development of research on this subject became the result of global, multidisciplinary conferences in New York and Chicago (1965, 1969), dedicated to modern apparatus for sightless locomotion [PZN 1974]. Important topics for the architect are: E. Hill and P. Ponder [Hill, Ponder 1983] as well as texts by T. Majewski, which are the result of research in the United States [Majewski 1996]. The engineering and technology branch, associated with the development of orientation and locomotion equipment, is currently developing very rapidly, with Polish centers increasingly competing with foreign teams. It is worth recalling research and experiments carried out at such universities as: AGH University of Science and Technology in Kraków, Cracow University of Technology, Łódź, Gdańsk, Białostocka, Adam Mickiewicz University in Poznan. Another area common to typhlogy and architecture is the issue of exploring space through various types of representations. From an architectural perspective, one of the most important achievements of typhlorehabilitation are tactile representations of architectural and urban space, including: emphasized plans, maps and three-dimensional models. Also this branch of typhlorehabilitation has evolved over many decades practically without the participation of architects. For a long time, these performances were mainly used as aids in route planning. The author also notices and popularizes their cognitive values (helpful in establishing deeper relationships with architectural art). This subject, in terms of architectural models and mockups, became the subject of a separate, detailed study of the author, conducted together with M. Kłopotowski and crowned with a two-volume monograph [Kłopotowska, Kłopotowski 2018 (a), (b)]. The work is practical and is an attempt to systematize the issues used to develop design and implementation standards. Specialist studies on the principles of creating typhlographics (semi-space drawings) were invaluable in formulating conclusions [Więckowska 2009]. The author's attention also focuses on acoustic methods to support orientation and locomotion as well as surrogate knowledge of the city space, including innovative research conducted at the Institute of Acoustics of the University of Adam Mickiewicz University in Poznan (2008–2010) [Kłopotowska (2) 2015].

Perspective of typhlopedagogy

The author's research has also become based on the extensive department of typhlopedagogy dealing with the issues of the education of the blind. This didactics is now understood as an integral component of rehabilitation. The result of such a defined research perspective is the perception of a blind person as a full human being able to develop and actively shape his fate.

In modern typhlopedagogy, there are currently two basic approaches to didactics. The first, referring to the tradition of special centers, envisages the education of blind people in specialized facilities. The second, developed since the 1980s [Hulek (ed.) 1992], is the so-called inclusive model, based on the so-called special education for blind and visually impaired students in schools or integration classes of general schools. This model is of particular interest to the author as an architectural problem of appropriate adaptation of educational institutions.

From the architect's perspective, an interesting typhlopedagogical issue are specialist pedagogical programs aimed at developing specific spatial skills, such as improving orientation and movement, and recognizing shapes, textures and sizes [Brown D., Simmons V., Methvin J. 1985], [Mangold SS 2000].

Perspective of art therapy and art

In the field of typhlorehabilitation knowledge, there is also a current associated with the so-called art therapy. This branch, pushed to the margins of science for a long time, is currently growing in popularity. In her research, the author particularly uses the work of E. Jutrzyzna [Jutrzyzna 2007]. The results of research in the field of music are an inspiration for the author to think about the possibility of using the resources of her own discipline for art therapy.

The author's analyzes cover a wide spectrum of issues related to eye-catching and practicing art. This issue has still not been satisfactorily scientifically valid. An attempt to fill this gap is a publication devoted to the extra-visual perception of a work of art [Setlak 2015]. A significant practical achievement was an innovative educational project: "Study of Art Knowledge for People with Disabilities 2000/2001" – dedicated to min. people with sight impairments [Kłopotowska 2018]. A multidisciplinary conference entitled "Blind people and art" (Silesian Museum in Katowice, 2011). This meeting inspired the author to scientific travels to world centers promoting the sharing of art in Italy (Homer Museum in Ancona) and Spain (Typhoon Museum in Madrid). The author's research resulting from these trips strive to set the goals and directions of Polish anti-discrimination policy in the field of art and artistic education [Kłopotowska 2018].

Architecture perspective

Polish architects, such as H. Grabowska-Pałecka, K. Jaranowska, E. Kuryłowicz, E. Kuryłowicz, H. Skibniewska, demonstrated the awareness of the possibilities of architecture in solving specific problems of the blind in the 70s, 80s of the 20th century. H. Zaniewska. In the following decades, min. architects: Z. Bogucka, M. Budlewska, B. Czarnecki, J. Jezierska, A. Kłopotowska, M. Wysocki.

The issues of *tyflo* have been developed for a long time in architecture in a wider stream of research on people with disabilities [Gałkowski 1986], Skibniewska H., Frąckiewicz. 1994], [Schwartz 1993], [Gałkowski 1996], [Jaranowska 1996], [Kuryłowicz 1996], [Omelańczuk I. (ed.) 2002]. Seminars and scientific conferences have become a sign of the growing interest of the architectural environment in the needs of people with disabilities, such as the seminar "Disabled in downtown Krakow" (1990), and the seminar "Creating common space. Urban and architectural problems of adapting space to the requirements of people with disabilities" (1995), seminars from the cycle: "Accessible space – design for all" (since 2002), conference "Disabled in Urban Space" (2005), conference "Architecture for all – friendly spaces of Europe" (2009), Polish Scientific-Training Conference, "Personalized Medicine. Genom – Architecture – School – Design", conference from the cycle Accessibility – Poland – City Available (2016) in Warsaw. Architectural competitions such as "Krakow without barriers", "Warsaw without barriers", "Gdańsk without barriers" organized by city and provincial governments, and the nationwide competition "Poland have become a valuable initiative encouraging the actual implementation of friendly solutions in architectural and urban space without barriers", initiated in 2009 by the Chancellery of the Sejm together with the Friends of Integration Association. An important element of the struggle for equality of all groups of users of urban space have also become European competitions addressed to future designers, including: the urban and architectural competition Schindler Award (cyclically since 2003), international student design workshops LOCUS (Let's Open Cities for Us), LOTUS (Let's Open Tourism for Us). Due to the author's research profile, the European workshop "Designing in Dark", which focuses on the problems of the blind, also deserves special attention. In the 90s – 2000s, architecture acquired valuable monographic studies popularizing the idea of universal design [Kuryłowicz 1996], [Grabowska-Pałecka 2004], [Wysocki 2010]. The novelty of these works was to redefine the concept of a disabled person (in accordance with the spirit of the philosophy of inclusive design, disability is the result of barriers in the spatial and social environment of man, not his physical, mental or mental disability) [Goldsmith 2000]. The authors broadly raise the topic of barriers in architectural space and look for ways and patterns to share the spatial environment with people with disabilities. All authors also raise the issue of access to cultural and art goods. Another pioneering work by M. Wysocki with a practical dimension, including the author's development of standards for spatial solutions in the city of Gdynia [Wysocki, doc. int.].

Perspective of architecture psychology, psychology of perception

Scientific support for the author were also publications in the field of architectural psychology – a relatively young (developed since the 1960s) branch of science focusing on observation of human relationships with the overall spatial environment. In a work devoted to the principles of this science, K. Lenartowicz shows architecture psychology as an extremely "open" science, drawing on the resources of many disciplines, but also perfectly co-creating other disciplines [Lenartowicz 1992]. Among the extensive, multidisciplinary bibliography

of architectural psychology, the following have become particularly helpful: existential trends [Ch. Norberg – Szulz 2000], proxemic approach [E. T. Hall 2005] and the philosophical construct of experiencing space [Yi – Fu Tuan 1987], [S. E. Rasmussen 1999]. The author's special attention is drawn to the phenomenological texts of the architects: J. Pallasmaa – affirming the value of polisensory in human experience of architecture [Pallasmaa 2012, 2016] and P. Zumthora [2010], catching the inseparable: bodily, psychological and spiritual relationships of man and architecture. An obvious reference point for the author's research were works in the field of psychology of perception [Gregory RL, 1971.], [Deręgowski 1990], [Gregory RL, Colman AM (ed.) 2002], including: perception and representation of the image and visual reception of art [Strzemiński 1969], [Arnheim 2004, 2012]. The author found one of the few sources devoted to perception and tactile aesthetics (including in relation to the blind) in the research of M. Podgórski [Podgórski 2011]. The pretext for searching for visual concepts of learning about spatial reality has also become an original, interdisciplinary project entitled: "Sounds of architecture", dedicated to multi-faceted analyzes of the role of acoustic signals in the perception and use of architectural environment, implemented at the Faculty of Architecture of the Białystok University of Technology (2014 – 2015) [Kłopotowska (2), (3) 2015].

Conclusion

The value of typhology in architecture

The conducted research allowed to see a number of cognitive values resulting from the scientific empowerment of typhological issues in architecture. Given the existing state of knowledge, the author stated that few works on the subject of the blind are part of a number of thematic areas present in the theory of architecture, such as: the availability of space at different scales for people with different perceptive and motor abilities; universal design; human safety and comfort in space as well as safety and ergonomics of the use of spatial forms; spatial orientation, movement and movement in space; mechanisms and methods of direct knowledge of space; mechanisms and methods of indirect knowledge of space through various types of representations; architectural education; didactics in the field of adapting space to the needs of people with disabilities; designing objects and spaces related to receiving and practicing art.

Trying to fill the gap she noticed, the author attempted to enrich these resources with a deepened, holistic and dynamic picture of the relationship between a blind person and the external environment. According to the author's belief, these issues are an important component of the discipline of science and architectural art, for which a thorough understanding of the nature of human encounters with space is a kind of background that determines all intervention and creation in space. Grasping, learning and effectively improving mechanisms that enable exploration and use of the spatial environment in conditions of permanent sight dysfunction, develop architects' key awareness of the needs and capabilities of various groups of users of the built space. The habit of broader understanding of the concept of "persons with disabilities" (instead of repenting to this day identifying disability with people in a wheelchair) can allow us to respond more wisely and more adequately to social needs, making architecture discipline closer to the real person and better embedded in European and global standards.

The value of architecture in typhology

Despite many years of underestimating architecture as a partner discipline for typhology, the potential of architecture in identifying and solving typhological problems is enormous. The most obvious and, at the same time, the best scientifically researched field of practical use of architecture "in service" of typhlorehabilitation is shaping a friendly environment built, supporting the development and functioning of people with visual impairments and conducive to their social integration. The following issues should be mentioned: preventing and eliminating already existing architectural barriers, designing and implementing objects and spaces in a manner friendly to people with sight impairments. Skillful promotion and rewarding of so-called architects by the environment is also of great importance. good design patterns and vice versa, firm stigmatization of

improper solutions. Architecture is also responsible for mature education, meeting European standards, of future designers and space decision makers at various scales, from the city scale, through architectural objects and spaces, to the interior scale.

In addition, the role of architects should be recognized as irreplaceable researchers of the spatial environment, which, properly shaped and organized, can become a rehabilitation environment for the disabled. In practice, this means the desirable (and often necessary!) Participation of architects in carrying out expertise of the availability of used and planned spatial investments, work in interdisciplinary bodies and legislative teams, improving the situation (legal and real) of users of various areas of space. In this aspect, it seems fundamental to lead (as in other European and world countries) to soon establish and implement appropriate accessibility standards, guaranteeing equal motor, cognitive, emotional access to places and spaces of social life. Another active aspect is the active participation of architects in the creation of appropriate substitute tools for learning about urban and architectural spaces (plans, models, audio description studies). In the era of constant insufficiency of scientific studies devoted to the subject of typhoid, the dissemination of scientific research results through publications and scientific conferences as well as educational activities directed at various entities responsible for the quality of the spatial environment (students, officials, authorities, administrators, etc.) are also very important. The role of architects as educators may also extend to specific tasks related to spatial education and artistic education of the blind. Such activities may include: organization of trainings, conferences, workshops and various types of artistic events targeted at this group of recipients, as well as architectural support of activities related to the broadly understood "opening" of educational and artistic institutions for the blind (including: adaptation of buildings, co-implementation various forms of education, design and implementation of appropriate typhological aids).

Summary

The review of the most important research trends presented above, constituting the scientific horizons of the author's research, clearly illustrates the fluidity and interpenetration of the boundaries of individual sciences, shaping the current state of knowledge in the area of research. The author's review of the achievements of typhology seems to indicate unequivocally that it was the mutual complementation of currents and scientific perspectives turned out to be for this young science a real "driving force generating acceleration and progress, observed over the last few decades. This fact seems to clearly indicate the need to continue the broad, interdisciplinary approach (which currently characterizes most contemporary scientific disciplines) and to further use typhology from the achievements of other sciences, including strengthening its connections with architecture.

As with any science collaboration, the interdisciplinary cooperation of architecture and the extensive knowledge department covered by the common name of typhology should be based on clearly establishing the principles of scientific interference and specifying the domains of both branches of science. Due to the well-being of the beneficiary of the given spatial solutions (burdened with a number of serious difficulties and limitations), both architects and typhologists must exercise "healthy" caution before entering the scientific competence of the second discipline. On the other hand, it seems indisputable that the use of knowledge and professional experience of representatives of the partner discipline can bring to each of the sciences a new, interesting view, but also specific practical values.

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Zastosowanie drewna klejonego w konstrukcji budynków wysokościowych, na przykładzie realizacji z krajów zachodnich

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Streszczenie: Z architekturą nowoczesnych, wysokich i wysokościowych budynków z XX i początków XXI wieku kojarzone są przede wszystkim takie materiały jak stal, szkło i beton. Wraz z rozwojem technologii, coraz popularniejsze w krajach zachodnich staje się stosowanie materiałów pochodzenia roślinnego, takich jak drewno klejone. Wykorzystanie drewna jako materiału konstrukcyjnego przynosi wiele korzyści zarówno ekonomicznych, technologicznych jak i użytkowych. Jest to budulec bardziej elastyczny, lżejszy i często wytrzymałszy niż konstrukcje powszechnie stosowane. Dzięki technologii klejenia krzyżowego lub warstwowego, budynki są w stanie uzyskać znaczne wysokości, przy zachowaniu odpowiednich parametrów wytrzymałościowych. Materiał ten okazuje się być łatwiejszy w transporcie, a przy odpowiednim przygotowaniu prefabrykowanych elementów, również przyspiesza procesy budowlane, ułatwiając montaż. Jest to również materiał ekologiczny. Przy odpowiednio zaplanowanej gospodarce leśnej, jest w stanie zapewnić zrównoważone zużycie budulca, jednocześnie minimalizując koszt dla środowiska naturalnego, m.in. obniżając emisję CO₂. Główną przeszkodą w zastosowaniu wspomnianej technologii na szerszą skalę, są liczne obostrzenia prawne, dotyczące wytrzymałości i odporności ogniowej. Przytaczane w poniższym artykule badania oraz przykłady realizacji, pokazują jednak iż drewno klejone jest w stanie zachować odpowiednie parametry, zapewniając trwałość konstrukcji i bezpieczeństwo użytkownikom obiektu.

Słowa kluczowe: architektura, budynki wysokościowe, drewno klejone, bezpieczeństwo pożarowe

Wprowadzenie

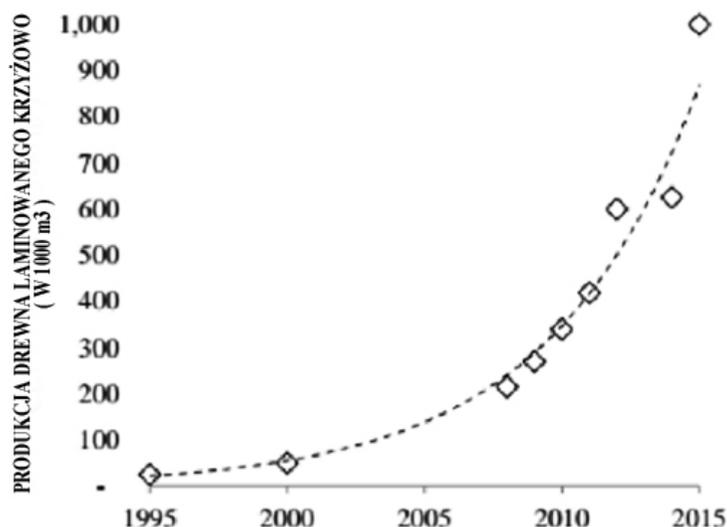
Używanie drewna, jako materiału budowlanego ma swoją wielowiekową tradycję w wielu regionach świata, wynikającą z łatwości obróbki, znacznej wytrzymałości i szerokiej dostępności. Wysokie i wysokościowe drewniane konstrukcje, takie jak na przykład mierząca 67,3 m pagoda świątyni Fogong¹ w Chinach powstawały już wiele wieków wcześniej. Materiał ten był szeroko stosowany również w tradycyjnej architekturze krajów Azjatyckich, Europejskich (Pn.) i Ameryki Północnej. XX-to wieczny intensywny rozwój miast oraz pojawienie się konstrukcji żelbetowych, uważanych jako trwalsze, bezpieczniejsze i bardziej przewidywalne², spowodował wyraźne odejście od stosowania drewna jako elementu dominującego w konstrukcji budynków. Od kilku lat obserwować można jednak powrót materiałów naturalnych używanych w budownictwie. Drewno poddane odpowiedniej obróbce jest w stanie funkcjonować jako zupełnie nowy rodzaj budulca, pozbawiony wad typowych dla surowca

1 Powstała na przełomie XI i XII wieku, Za: Steinhardt N., *Liao: An Architectural Tradition in the Making*, [w:] *Artibus Asiae*, vol.54, nr 1/2, 1994.

2 Ze względu na stosunkowo homogeniczną strukturę elementów konstrukcji betonowej i tradycyjnej murowanej, łatwiej było wyznaczyć model obliczeniowy, w przeciwieństwie do drewna, gdzie jego niejednolita struktura i pojawiające się splekania pozostawia wiele niewiadomych.

wego materiału. O opracowaniu i stosowaniu drewna laminowanego krzyżowo pierwsze publikacje naukowe wspominają już w latach 90` XX wieku. Również w tym okresie materiał uzyskał pierwsze atesty w Niemczech i Austrii. Podstawową zaletą nowego materiału na bazie drewna była możliwość przygotowania elementów o znacznych parametrach wielkościowych, umożliwiając jednocześnie wykonywanie konstrukcji o pokaźnej rozpiętości. Nowy, wysoko przetworzony budulec charakteryzował się dużą wytrzymałością i znaczną odpornością na warunki zewnętrzne (w tym narażenie na ogień czy odporność na korozję biologiczną). Pierwotnie, w omawianej technologii realizowano jedynie niewielkie obiekty budowlane. W kolejnych latach zaczęto jednak wykorzystywać drewno klejone jako element konstrukcyjny hal sportowych i widowiskowych, zapewniający dużą rozpiętość przekryć dachowych. Ze względu na liczne obostrzenia prawne, związane z wymogami bezpieczeństwa, dopiero w ostatniej dekadzie zaczął postępować rozwój budynków wysokich i wysokościowych o konstrukcji drewnianej. Technologia stopniowo zyskuje coraz większą popularność w krajach Europy Północno-Zachodniej, gdzie występuje dostatek naturalnego surowca, jednocześnie istnieją wyspecjalizowane zakłady produkcyjne, zajmujące się wytwarzaniem drewna klejonego. Równie ważnym czynnikiem jest powszechnie panująca inicjatywa związana z implementacją rozwiązań proekologicznych w budownictwie. Razem ze wzrostem popularności materiału, zwrócono uwagę na liczne zalety z nim związane (lekkość, wytrzymałość, odporność na czynniki destruktywne oraz łatwość w transporcie, montażu i obróbce), co w znacznym stopniu wpływa na wyraźny wzrost produkcji i szerokie zapotrzebowanie na rynku budowlanym.³

Wykres poniżej przedstawia dynamiczny wzrost produkcji, związanej z rosnącym zapotrzebowaniem na CLT⁴ na przestrzeni ostatnich trzech dekad.



Ryc. 1. Światowa produkcja elementów z drewna laminowanego w m³, na przestrzeni lat.

Źródło: Sherifi E, Fager-Thompson M., *Mass timber in tall buildings design A Major Qualifying Project Report*, Faculty of Worcester Polytechnic Institute's Civil and Environmental Engineering Department, 2017

Obecnie na terenie Europy znajduje się ponad 100 budynków wysokich i wysokościowych, zrealizowanych we wspomnianej technologii.⁵

Wykorzystanie drewna w konstrukcji budynków wysokich, poza walorami estetycznymi i technicznymi staje się przedmiotem zainteresowania, ze względu na fakt iż jest to surowiec odnawialny, w przeciwieństwie do stosowanych powszechnie betonu i stali. Oznacza to, że zarówno negatywny wpływ środowiskowy budynku wykonanego w omawianej technologii jest znacznie mniejszy, nie wykorzystując nieodnawialnych zasobów naturalnych, oraz to, że zastosowany surowiec budowlany nadaje się do ponownego wykorzystania po rozbiórce budynku.

3 Mohammad, M., Gagnon, S., Douglas, B., Podesto, L., *Introduction to Cross Laminated Timber*, 2017.

4 Cross Laminated timber – drewno laminowane krzyżowo.

5 Sherifi E, Fager-Thompson M., *Mass timber in tall buildings design A Major Qualifying Project Report*, Faculty of Worcester Polytechnic Institute's Civil and Environmental Engineering Department, 2017.

Współcześnie realizowane budynki

Impulsem do powstawania wysokich drewnianych budynków był zrealizowany w 2008 roku w Londynie budynek mieszkalny Stadthaus. Dziewięciopiętrowy obiekt, zaprojektowany przez pracownię Waugh Thistleton, we współpracy z biurem konstrukcyjnym Techiker i firmą KLH, produkującą drewniane panele, był w chwili powstania drugim najwyższym drewnianym obiektem użytkowym na świecie⁶. Jest to pierwszy budynek tej wysokości (29 m) na świecie, zrealizowany w pełni z elementów drewnianych. Dotyczy to nie tylko konstrukcji obiektu, ale również schodów, stropów, ścian działowych oraz szybów dźwigów osobowych. Realizacja udowodniła, że tego typu konstrukcja jest zarówno uzasadniona ekonomicznie oraz jest w stanie spełnić normy zapewniające bezpieczeństwo mieszkańcom.



Ryc. 2. Budynek Stadthaus z zewnątrz i wewnątrz, 24 Murray Grove, Hoxton, Londyn

Źródło: Strona pracowni architektonicznej Waugh Thistleton, <http://waughthistleton.com/murray-grove/> – licencja otwarta, stan na dzień 20.03.2020.

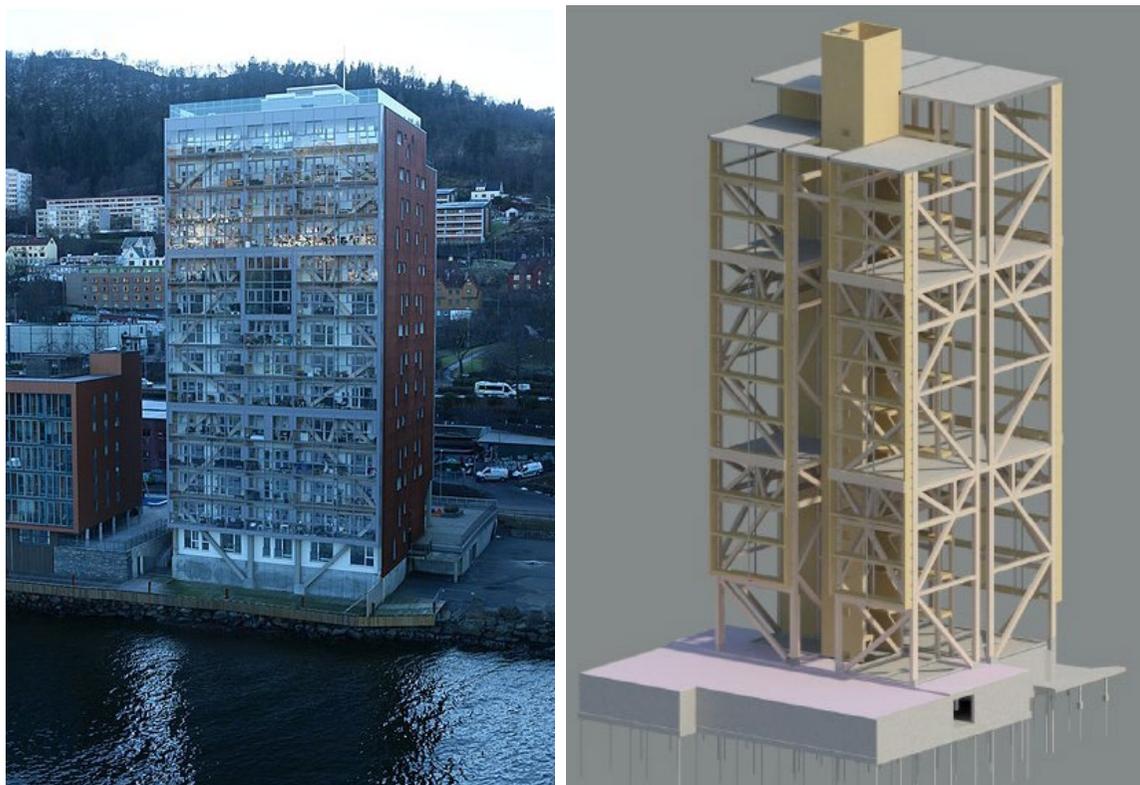
W roku 2015 miano najwyższego, drewnianego budynku uzyskał Treet (*norw. drzewo*), zbudowany w Bergen w Norwegii. Budynek posiada 14 kondygnacji i mierzy 49 metrów wysokości. Cechą charakterystyczną obiektu, jest konstrukcja, wykonana z drewnianych modułów ramowych, o wielkości poszczególnych mieszkań. Elementy konstrukcyjne (belki słupy i stężenia) wykonane są z drewna klejonego. Co pięć kondygnacji zaprojektowano betonową warstwę dociskową, w celu zwiększenia ciężaru budynku i zarazem odporności na kołysanie podczas silniejszego wiatru⁷. Zewnętrzna elewacja składa się ze szkła i stali. Projektanci⁸ podjęli liczne starania w celu

6 Po apartamentowcu Forte w Melbourne w Australii

7 Za: Abrahamsen R.B., Malo K.A., *Structural design and assembly of Treet-a 14-storey timber residential building in Norway*, [w:] materiały pokonferencyjne *World Conference on Timber Engineering*, 10.08.2014 r.

8 Biuro Artec AS

zapewnienia odpowiedniej izolacyjności termicznej przegród, dzięki czemu budynek spełnia nie tylko norweskie normy ciepłne, jak i również wykonany jest w standardzie domu pasywnego. Częściowo prefabrykowane moduły zostały wykonane w zakładach produkcyjnych na terenie Estonii, następnie dostarczone i finalnie zmontowane w Bergen.



Ryc. 3. Widok na budynek Trett w Bergen, oraz jego schemat konstrukcyjny

Źródło: Wikipedia.pl [https://commons.wikimedia.org/wiki/File:Treet_\(Bergen\)_011.jpg](https://commons.wikimedia.org/wiki/File:Treet_(Bergen)_011.jpg) licencja otwarta, stan na dzień 20.03.2020.

Tendencja do realizacji coraz wyższych obiektów o konstrukcji drewnianej, zapoczątkowana w 2008 roku, nadal się utrzymuje. Wraz z rozwojem technologii drewna laminowanego krzyżowo i lepszym poznaniem jego parametrów technicznych, zaczęły się pojawiać kolejne obiekty, bijące rekordy wysokości. W 2016 roku tytuł najwyższego budynku wykonanego w technologii drewnianej posiadał 18-kondygnacyjny, 55 metrowy akademik Brock Commons Tallwood House zlokalizowany w Vancouver w Kanadzie. Projekt budynku powstał dzięki współpracy kilku biur projektowych (Acton Ostry Architects Inc oraz Fast + Epp) a także firm zajmujących się produkcją elementów drewnianych, laminowanych (Structurlam). Obiekt posiada hybrydowy układ konstrukcyjny, składający się z drewnianych ram, wzmocnionych stalowymi elementami, wspartych na dwóch żelbetonowych rdzeniach. Dzięki precyzyjnemu wykonaniu elementów prefabrykowanych, montaż na placu budowy całego, 18-sto kondygnacyjnego obiektu trwał jedynie 70 dni, co stanowi niezwykle krótki czas, w porównaniu do powszechnie stosowanych technologii budowlanych. Sam proces budowy porównywano do tworzenia obiektu z klocków Lego.⁹

⁹ *Crockett L.*, *World's tallest timber tower tops out in Vancouver*, ArchDaily, <https://www.archdaily.com/794170/worlds-tallest-timber-tower-tops-out-in-vancouver> – stan an dzień 20.03.2020.



Ryc. 4. Widok na budynek Brock Commons Tallwood House w Vancouver, w czasie realizacji i po zrealizowaniu
Źródło: <https://www.flickr.com/> licencja otwarta, stan na dzień 20.03.2020.



Ryc. 5. Widok na budynek Mjøstårnet Brumunddal
Źródło: Wikipedia.pl https://pl.m.wikipedia.org/wiki/Plik:Narsot%C3%A5rnet_IV.jpg licencja otwarta, stan na dzień 20.03.2020.

Obecnie najwyższym budynkiem na świecie, w którego konstrukcji zastosowano drewno klejone jest Mjøstårnet¹⁰ – wielofunkcyjny, 18 kondygnacyjny obiekt, znajdujący się w Brumunddal, w Norwegii. Budynek zaprojektowany przez norweskie biuro Voll Arkitektur ma 85,4 metra wysokości. Posiada część hotelową, biurowo-konferencyjną, a także basen i restaurację. Do budowy obiektu użyto zarówno drewna klejonego w technologii *glulam* (GLT), jak i klejonego krzyżowo (CLT). Materiał dostarczono z zakładów produkujących go lokalnie. Elementami konstrukcyjnymi budynku, niewykonanymi z drewna, a z betonu są stropy od 11 kondygnacji wwyż. Wynika to z potrzeby dociążenia budynku, w celu uniknięcia ruchów spowodowanych naporem wiatru, a co za tym idzie dyskomfortu użytkowników. Elewacje, oraz elementy wewnętrzne obiektu, takie jak ściany działowe, schody, szyby dźwigów osobowych a nawet meble i wyposażenie, również zostały wykonane z drewna klejonego. Projekt budynku otrzymał dwie prestiżowe nagrody: Norwegian Tech Award i New York Design Awards

Technologia wykonania

Technologia produkcji drewna klejonego opracowana została w Austrii w latach 90` XX wieku, a następnie rozwijana była w Niemczech oraz we Włoszech, głównie, jako produkt pomagający zminimalizować ilość odpadów drzewnych. Technologia obecnie znajduje zastosowanie również w krajach Europy Północnej, jak i w Kanadzie. Obecnie wykorzystywane są rozmaite techniki zespajania drewnianych fragmentów, w celu wytworzenia elementu o jednolitych właściwościach. Są to:

- drewno klejone krzyżowo (Cross Laminated Timber – CLT) składające się z kilku warstw paneli (zwykle od 3 do 7), ułożonych do siebie pod kątem, a następnie sklejonych;
- nail-lam (Nail-Laminated Timber – NLT) – panele drewniane łączone są ze sobą przy pomocy gwoździ lub wkrętów, w celu uzyskania jednolitego elementu;
- glulam (Glued-Laminated Timber – GLT), panele drewniane ułożone warstwowo, wzdłuż włókien, następnie sklejone i zabezpieczone wytrzymałym, wodoodpornym spoiwem;
- płyta wiórowa (Structural composite lumber – SCL), jednolity element wykonany poprzez sprasowanie i sklejanie wytrzymałym wodoodpornym spoiwem ścinków drewnianych.

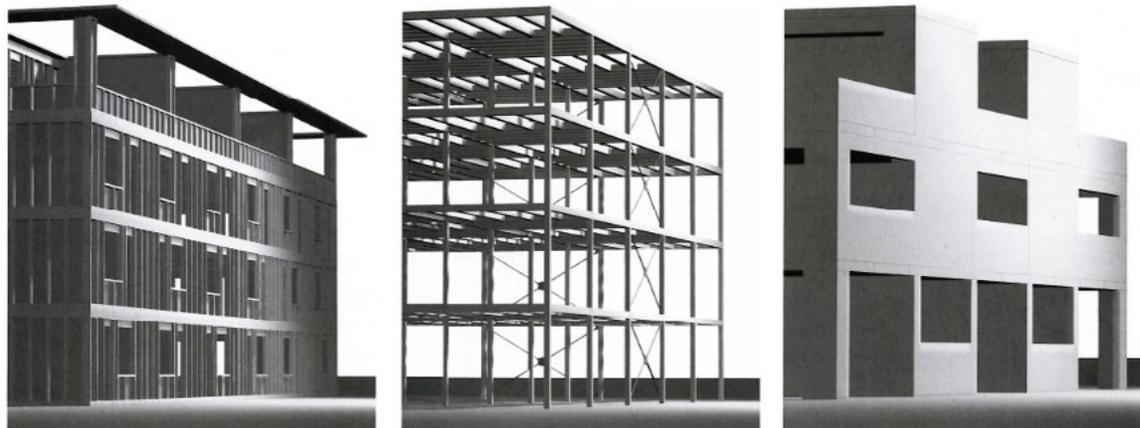
Wszystkie powyższe technologie mają swoje zastosowanie w budowie elementów przytoczonych powyżej drewnianych budynków wysokościowych, z czego ze względu na właściwości wytrzymałościowe, CLT i GLT ma najszerze zastosowanie w ich konstrukcji. Klejenie krzyżowe drewna pozwala uzyskać właściwości mechaniczne które mogą konkurować z innymi technologiami stosowanymi szeroko w budownictwie. Wysoka wytrzymałość i sztywność elementów z CLT porównywalna jest do stali i znacznie lepsza niż elementów betonowych. Wynika to z przeprowadzanego procesu homogenizacji, podczas którego naturalna zmienność struktury i właściwości drewna naturalnego (nieobrobionego) zostaje wyeliminowana. Cały proces odbywa się mechanicznie i jest w pełni zautomatyzowany, dostarczając w efekcie gotowy do użycia surowiec budowlany. W przygotowaniu elementów z CLT bardzo pomocne okazuje się planowanie projektu w 3D (wykorzystując technologię BIM), jak i również wykorzystanie wysokoprecyzyjnych maszyn tnących CNC, które są w stanie wyprodukować element gotowy do złożenia na placu budowy. Niewielka kurczliwość elementów z drewna klejonego również pomaga w rozwoju technologii prefabrykacji i przyspieszeniu procesów budowlanych in situ. Właściwością konstrukcji drewnianych jest również mniejsza masa własna materiału, niż jego odpowiedniki w stosowanych powszechnie technologiach budowlanych.¹¹ Z jednej strony ułatwia to znacznie transport i montaż elementów, jednocześnie stwarza dodatkowe wyzwania w kwestii sił wporu gruntu, bądź narażenia na siły naporu wiatru oraz wstrząsy sejsmiczne. Niższa sztywność na łączeniach elementów oraz mniejsza masa własna materiału, w przypadku omawianych w niniejszym artykule budynków wysokich i wysokościowych, może powodować wyraźny ruch w wyżej położonych kondygnacjach budynku, co przekłada się na dyskomfort jego użytkowników. Zjawisko może pojawiać się nawet w przypadku bardzo niewielkich ruchów na łączeniach elementów. W celu eliminacji

10 Rekord potwierdzony przez Council on Tall Buildings and Urban Habitat – międzynarodową organizację, której celem jest szerzenie wiedzy na temat wysokich budynków.

11 Masa budynków wykonanych głównie z betonu zbrojonego wynosi zwykle ok. 300 kg/m³, obiektów stalowych, z betonowym rdzeniem i stropami ok. 160 kg/m³ a na przykład wykonany z drewna klejonego Oakwood Tower ma masę jedynie 125 kg/m³.

wspomnianego efektu bardzo ważne jest precyzyjne przygotowanie elementów prefabrykowanych konstrukcji drewnianej, jak i również ich umiejętny montaż na budowie. Problemy te, jak wskazano w opisie przytaczanych powyżej przykładów, rozwiązano za pomocą betonowych płyt dociskowych, stosowanych co kilka kondygnacji, zwiększających masę własną obiektu.¹² Istotną jest również kwestia smukłości budynku, gdzie należy stosować kompromis, pomiędzy stosunkowo niewielką powierzchnią strony zewnętrznej budynku, jednocześnie zachowując odpowiednią sztywność układów kratowych. Na przytaczanych wyżej przykładach zaobserwować można, iż budynki posiadają wyraźnie węższe dwie przeciwległe strony, jednocześnie zachowując prostą, zwartą formę, zapewniającą sztywność konstrukcji. Z tych właśnie względów konstrukcja (i estetyka) zrealizowanych do tej pory wysokich i wysokościowych obiektów w technologii drewna klejonego oparta jest na prostopadłościennym ramie oraz wykorzystaniu dużych jednolitych, prefabrykowanych drewnianych paneli, służących jako stropy, ściany i elewacje budynku.

Bernhard Gafner, inżynier konstrukcyjny z firmy Fast + Epp, uważa iż obiekty wykonane z elementów prefabrykowanych z drewna klejonego wykonywane są co najmniej o 25% szybciej niż w przypadku innych technologii, jednocześnie zmniejszając aż o 90% ruch na budowie, związany z dostawami i przygotowaniem materiału. Ze względu na uproszczony sposób montażu, stanowią one również większe bezpieczeństwo dla załóg budowlanych.¹³ Klasyfikacją wysokich i wysokościowych budynków zajmuje się organizacja Council on Tall Buildings and Urban Habitat, dzieląc budynki według typu konstrukcji i zastosowanego materiału. Typologia przyjęta przez organizację przyjmuje następujące kategorie: budynki jednomateriałowe, budynki kompozytowe i układy konstrukcyjne mieszane. Znaczna część z realizowanych wysokościowych budynków drewnianych, kwalifikowana jest jako kompozytowe, ze względu na wykorzystanie cięgien stalowych do usztywnienia konstrukcji, bądź mieszane, gdzie wykorzystano betonowe rdzenie jako element konstrukcyjny. Niemniej, obiekty gdzie 85% konstrukcji wykonana jest z drewna, traktowane są jako drewniane. Podstawowymi typami są konstrukcje wykonane w technologii szkieletu drewnianego (w przypadku budynków niższych), oraz słupowo ryglowej i prefabrykowanych, wielkowymiarowych elementów drewnianych¹⁴ (w przypadku budynków wysokich i wysokościowych).



Ryc. 6. Typy konstrukcji z drewna klejonego: szkielet drewniany, słupowo – ryglowa i prefabrykowanych, wielkowymiarowych elementów drewnianych

Źródło: Opracowanie graficzne firmy Fast + Epp, za: <https://www.thinkwood.com/education>, stan na dzień 25.03.2020.

¹² Foster R., Ramage M, *Rethinking CTBUH Height Criteria In the Context of Tall Timber*, CTBUH Journal, 2017 Issue IV.

¹³ Za: *Mass Timber in North America. Expanding the possibilities of wood building design*, materiały edukacyjne, American Wood Council, dostępne na: <https://www.thinkwood.com/education>, stan na dzień 25.03.2020.

¹⁴ j.w.

Rozwiązania pro-ekologiczne

W intensywnie rozwijającym się świecie istotną kwestią jest dbanie o środowisko naturalne i zrównoważone gospodarowanie zasobami planety. Branża budowlana ma również znaczny wkład w wykorzystanie surowców naturalnych oraz produkcję zanieczyszczeń, wpływających negatywnie m.in. na jakość powietrza i wzrost efektu cieplarnianego. Produkcja betonu wykorzystywanego we współczesnym budownictwie odpowiedzialna jest za 5% światowej emisji CO₂, przyczyniając się wyraźnie do zwiększenia efektu cieplarnianego. Szacuje się że jego transport od miejsca produkcji na place budowlane produkuje pięciokrotnie więcej dwutlenku węgla niż cały ruch lotniczy¹⁵. Jak twierdzi Sylvie Lemmet, dyrektor w dziale Technologii, Przemysłu i Ekonomii w UNEP¹⁶: „W ciągu czterdziestu lat musimy zmniejszyć emisję gazów cieplarnianych o co najmniej 50%, aby uniknąć najgorszych scenariuszy zmian klimatu”¹⁷. Użycie drewna w budownictwie może w sposób znaczny przyczynić się do pozytywnych zmian środowiskowych, jednocześnie polepszając jakość i estetykę przestrzeni miejskich. Całkowite zastąpienie betonu i stali materiałami pochodzenia naturalnego, wg szacunków mogłoby wpłynąć na emisję CO₂, zmniejszając ją o 15–20%¹⁸. Drewno użyte do budowy budynków, z biegiem czasu musi ulec wymianie, bądź konserwacji. Usunięte elementy budynku mogą zostać wykorzystane ponownie, jako budulec w mniej wymagających strukturach, bądź jako materiał opały, tworząc w ten sposób obieg w użyciu materiału. Aby zapewnić stały dostęp do naturalnego materiału budulcowego, jakim jest drewno, należy najpierw zadbać o właściwą gospodarkę leśną. Popularyzacja komercyjnej plantacji drzew na cele budowlane może dodatkowo pozytywnie wpłynąć na jakość środowiska, zapewniając czyste powietrze oraz miejsce do życia dla zwierząt.

Rola lasów jako naturalnych filtrów powietrza, jak i również odnawialnego magazynu surowcowego zdaje się mieć coraz większe znaczenie w dynamicznie rozwijającym się świecie.¹⁹ Ważnym aspektem jest również fakt pozytywnego wpływu wewnątrz wykonanych w drewnie na samopoczucie i zadowolenie użytkowników. Przeprowadzone w Kanadzie badania dowodzą iż drewno jako materiał wykończeniowy odbierane jest jako sielskie, przyjemne i uspokajające²⁰, pomagając jednocześnie w zmniejszeniu poczucia zmęczenia i przygnębienia wśród osób stale przebywających wewnątrz takiego obiektu²¹.

Aspekty prawne. Bezpieczeństwo pożarowe

Główną przeszkodę w realizacji wysokich i wysokościowych budynków z drewna klejonego, zarówno w Polsce jak i w innych krajach stanowią przepisy budowlane, które ze względów bezpieczeństwa ograniczają rozwój budownictwa z wykorzystaniem wspomnianych technologii. Wynika to w dużej mierze z faktu, iż drewno klejone stanowi stosunkowo nowy materiał, który nie jest obecnie odpowiednio zbadany, w celu uzyskania niezbędnych certyfikacji, pozwalających na zmianę przepisów prawnych. Wraz z rozwojem technologii i prowadzonymi licznymi badaniami nad właściwościami drewna, sytuacja prawna w wielu krajach stopniowo ulega zmianie. W 2010 w Japonii uchwalono ustawę o promocji wykorzystania drewna w budynkach użyteczności publicznej, zachęcając do realizacji obiektów w technologii drewna klejonego, gdzie do tej pory stosowano wyłącznie materiały takie jak ceramika, beton czy stal. Z kolei w 2011 dopuszczono w Finlandii budowę drewnianych budynków do 8 kondygnacji nadziemnych (czyli zasięgu drabiny wozu strażackiego), co wpłynęło na popularyzację omawianej technologii. Do 2016 roku przeprowadzono w Kanadzie szereg badań związanych

15 Rosenfield K., *Michael Green presents: 'The Case for Tall Wood Buildings'*, Arch Daily, 2012, <https://www.archdaily.com/220779/michael-green-presents-the-case-for-tall-wood-buildings>, stan na dzień 27.03.2020.

16 Program Narodów Zjednoczonych ds. Środowiska na 2009.

17 Sherifi E., Fager-Thompson M., *Mass timber in tall buildings design A Major Qualifying Project Report*, Faculty of Worcester Polytechnic Institute's Civil and Environmental Engineering Department, 2017.

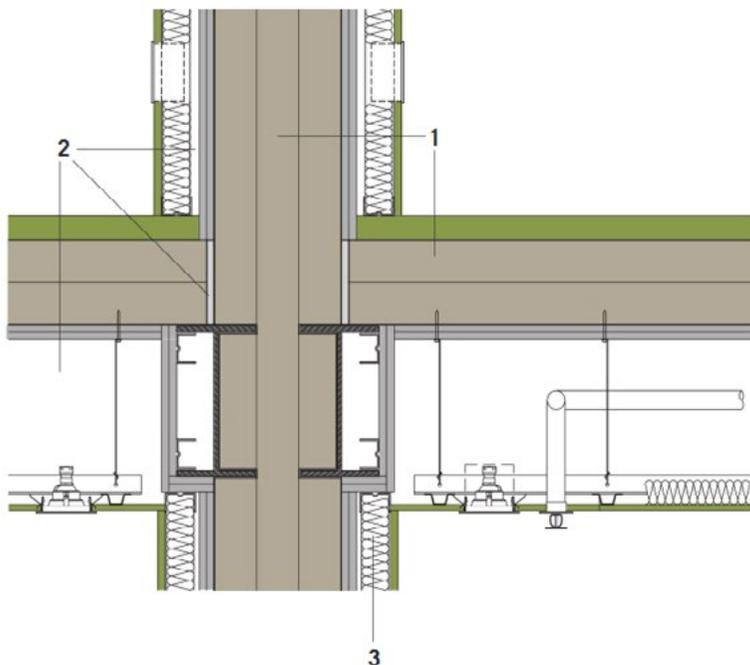
18 Cornwall W., *Would you live in a wooden skyscraper*, Science, 2016, <https://www.sciencemag.org/news/2016/09/would-you-live-wooden-skyscraper> stan na dzień 27.03.2020.

19 Za: Malo K.A., Abrahamsen R.B. i Bjertnæs, M.A., *Some structural design issues of the 14-storey timber framed building "Treet" in Norway*, European Journal of Wood and Wood Products, nr 74(3), 2016.

20 Rice J., Kozak R., Meitner M., Cohen D., *Appearance wood products and psychological well-being*, Wood and Fiber Science, nr 4, 2006.

21 Sakuragawa S., Miyazaki Y., Kaneko T., *Influence of wood wall panels on physiological and psychological responses*, Journal of Wood Science, 2005.

z właściwościami mechanicznymi drewna klejonego, doprowadzając do wdrożenia odpowiednich przepisów budowlanych określających właściwości elementów drewnianych w procesach ścinania i dopuszczalnych ugięć.²²



1. Grubość i gęstość drewnianego elementu
2. Przerwy technologiczne nałączaniach elementu (dylatacje)
3. Pokrycie materiałem absorbującym dźwięk.

Ryc. 7. Metody poprawy właściwości akustycznych budynków drewnianych. Za: Green M.,C., *The case for tall wood buildings – How mass timber offers a safe, economical, and environmental friendly alternative for tall building structures*, Equilibrium Consulting, 2012. Ilustracja na licencji Creative Commons.

Wiele organizacji i firm zajmujących się rozwojem drewnianych technologii budowlanych na przestrzeni ostatnich lat przeprowadziło liczne testy, badające odporność pożarową elementów z drewna klejonego. W federalnym laboratorium badawczym ATF²³ w USA przeprowadzono testy prefabrykowanych elementów drewnianych w kierunku odporności pożarowej. Pięciowarstwowy panel poddano próbie ognia, trwającej 3 godziny i 6 minut w temperaturze ok 982°C. Badania potwierdziły że elementy z drewna klejonego nie tylko spełniają założone normy odpornościowe, ale i wyraźnie je przewyższają. Zaobserwowano iż zewnętrzne włókna, zabezpieczone klejem ulegają zwęgleniu, izolując wewnętrzną część elementu od płomienia i zapewniając jej odpowiednią wytrzymałość. Ze względu na zwartą homogeniczną strukturę, oraz zastosowanie warstwy kleju jako laminat, panele warstwowe mogą uzyskać klasę odporności ogniowej EI30, zapewniającą integralność elementu przez min. 30 minut w czasie trwania pożaru. Wytrzymałość elementu jest oczywiście zależna od ilości zastosowanych warstw drewna. We wspomnianym wyżej budynku Stadthaus w Londynie, zastosowano pięciowarstwowy panel, zapewniający odporność ogniową przez 60 minut. Istnieją również inne metody zabezpieczenia konstrukcji drewnianej przed działaniem pożaru, dodatkowo zwiększające jej odporność. Jedną z metod jest hermetyzacja. Polega ona na obłożeniu drewnianych elementów podwójną warstwą płyt gipsowych, zmniejszając narażenie konstrukcji na płomienie. Metoda ta wykazała iż elementy z drewna klejonego, odizolowane od źródła ognia, są w stanie zapewnić nośność konstrukcji dłużej niż stal, gdyż nie mają tendencji do uplastyczniania się pod wpływem wysokich temperatur.²⁴ Warto również zwrócić uwagę, że wiele przepisów przeciwpożarowych, ograniczających wysokość budynków wynika z zasięgu drabiny wozu strażackiego. Jest to wytyczna nieadekwatna

²² Odpowiednie normy CSAO86 opublikowano w 2015 w dokumencie National Building Code of Canada (NBC).

²³ The Federal Alcohol, Tobacco, Firearms and Explosives (ATF) Fire Research Laboratory.

²⁴ Green M.,C., *The case for tall wood buildings – How mass timber offers a safe, economical, and environmental friendly alternative for tall building structures*, Equilibrium Consulting, 2012.

do czasów współczesnych, gdzie w wielu budynkach na szeroką skalę stosuje się różne instalacje przeciwpożarowe (tryskacze, systemy oddymiające itp.), które są w stanie szybciej i skuteczniej zdusić pożar niż wóz strażacki. Nowoczesne i bardziej niezawodne systemy zraszania, do zastosowania w budownictwie drewnianym są opracowywane w Austrii, gdzie drewniane budowle, przed odbiorem muszą przejść rygorystyczne kontrole²⁵.

Dodatkowym problemem w budynkach z drewna klejonego są właściwości akustyczne. Panel drewniany, szczególnie w przypadku sztywnego łączenia elementów, posiada znacznie wyższy współczynnik przenikania dźwięku, niż tradycyjnie realizowane konstrukcje budowlane. W celu zapewnienia odpowiedniej izolacyjności akustycznej, elementy drewniane muszą zostać pokryte warstwą materiału izolacyjnego. Można również stosować technologie powszechnie wykorzystywane, jak „podłogi pływające”, bądź sufity podwieszane, tworzące pustkę, pomagającą zmniejszać przenikanie dźwięku.

Kierunki rozwoju – podsumowanie

Projektowanie wysokich budynków w technologii drewna klejonego zdaje się stopniowo zyskiwać na popularności. Biura architektoniczne coraz częściej prezentują odważne i kreatywne pomysły. Jak twierdzi Simon Smith z pracowni Smith and Wallwork: „jest to jedynie kwestią czasu, kiedy powstanie pierwszy drewniany drapacz chmur”²⁶. Za przykład może posłużyć projekt budynku Barbican w Londynie. Ten 300-metrowy, 80-cio kondygnacyjny wieżowiec, zaprojektowany przez pracownię PLP Architecture, pokazuje iż drewno daje ogromne możliwości w kształtowaniu nowoczesnej, ekologicznej i estetycznej przestrzeni miejskiej. Jeden z projektantów pracowni, Kevin Flanagan, twierdzi że powszechne wprowadzenie do użycia technologii drewna klejonego może zupełnie zmienić sposób, w jaki budowane są miasta, tworząc przyjemniejszą i kreatywną przestrzeń urbanistyczną, sprzyjającą kontaktom społecznym²⁷.



Ryc. 8. Wizualizacja koncepcyjna drewnianego wieżowca Barbican w Londynie

Źródło: <http://www.plparchitecture.com/oakwood-timber-tower.html>. Stan na dzień 29.03.2020

Inne biura architektoniczne zdają się również wpisywać w tendencję rozwoju wspomnianych technologii, oferując odważne i kreatywne rozwiązania projektowe, wychodzące znacznie poza proste, prostopadłościowe formy zrealizowane do tej pory. Za przykład mogą posłużyć m.in. koncepcje 18-kondygnacyjnego budynku „Hyperion” pracowni Jean Paula Viguier w Bordeaux, czy 80-cio metrowego Barenthus zaprojektowanego przez

25 French, M., Vienna plans world's tallest wooden skyscraper. The Guardian, 2015. Źródło: <http://www.theguardian.com/cities/2015/mar/01/vienna-plans-worlds-tallest-wooden-skyscraper>. Stan na dzień 28.03.2020.

26 Mairs J., PLP Architecture proposes London's first wooden skyscraper at the Barbican, <https://www.dezeen.com>, 2016. Stan na dzień 29.03.2020.

27 j.w.

Reiulf Ramstad Arkitekter AS. Podobnych przykładów można mnożyć wiele, co wskazuje wyraźnie na kierunek przyjęty w rozwoju nowoczesnej architektury.

W obecnych czasach zrozumienie potrzeb zrównoważonego rozwoju i efektywne wykorzystanie zasobów naturalnych może być kluczowe dla dalszego kształtu nowoczesnych miast. Rozwój technologii budowlanych otwiera nowe możliwości, pozwalające tworzyć wysokie budynki w sposób wydajniejszy i bardziej przyjazny środowisku. Drewno jest czymś więcej niż jedynie materiałem budowlanym. Jest surowcem wykorzystywanym przez człowieka od początków cywilizacji i zakorzenionym głęboko w tradycjach lokalnych. Przebywanie w drewnianych budynkach wpływa pozytywnie na samopoczucie użytkowników, a odpowiednia gospodarka leśna jest w stanie zarówno dostarczyć odpowiedni surowiec budowlany, jak i również wpłynąć na poprawę naturalnego środowiska wokół miast. Szerokie zainteresowanie tematem dużych pracowni projektowych może sugerować utrzymanie trendu rozwojowego wspomnianych technologii w najbliższych latach.

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Use of laminated timber in the construction of high-rise buildings, on the example of implementations from western countries

Abstarct: The architecture of modern, 20th and early 21st century high-rise buildings is primarily associated with materials such as steel, glass and concrete. With the advancement and popularity of laminated timber construction in western countries the use of wood as a structural component in high rise buildings brings many economic, technological and logistical benefits. Laminated timber is more flexible, lighter and often more durable than typically used materials in construction. Thanks to cross lamination technology, buildings are able to obtain significant heights while maintaining appropriate structural requirements. This material turns out to be easier to transport, and with proper prefabrication, will also speed up the construction processes at a reduced cost. Timber is an eco-friendly material, that with properly managed forests ensures a sustainable, renewable construction supply. This minimizes the cost to the environment by reducing CO₂ emissions. The main obstacle to the implementation of this technology at a larger scale are numerous legal restrictions regarding strength and fire resistance. The research and implementation examples cited in the article below show that laminated wood is able to maintain appropriate structural requirements, ensuring the durability and safety of its occupants.

Keywords: architecture, high-rise buildings, glued laminated timber, fire safety

Zbór kalwiński w Piaskach – od ruiny do trwałej ruiny

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Streszczenie: Niniejszy artykuł opisuje adaptację ruin dawnego zboru kalwińskiego w Piaskach stosując metodę ochrony konserwatorskiej w postaci „trwałej ruiny”. Analizie poddane zostały metody i rozwiązania zastosowane w obiekcie znajdującym się na terenie województwa lubelskiego w gminie Piaski, który poddany został rewaloryzacji. Przez lata niszczący obiekt jak również teren otaczający ruiny zboru dzięki uzyskanym środkom finansowym z Regionalnego Programu Operacyjnego został poddany w 2019 roku działaniom mającym na celu ochronę ruin dawnej świątyni oraz zagospodarowania terenu przylegającego.

Słowa kluczowe: rewaloryzacja, Piaski, zbór kalwiński, Kościelec, trwała ruina, konserwacja zabytków

Wstęp

Obiekty architektoniczne są milczącymi świadkami mijających epok. Niektóre z nich po licznych zmianach, przekształceniach, rozbudowach czy destrukcjach przestają pełnić swoją pierwotną funkcję. Pojawia się konieczność adaptacji do nowych bardziej aktualnych i potrzebnych funkcji. W przypadku obiektów mocno zdegradowanych, których wartość zabytkowa jest ważna lecz szczątkowa wydawać by się mogło iż forma ochrony w postaci reliktu muzealnego jest najwłaściwsza [1]. Podstawowym celem wykorzystywania historycznych ruin powinno być adaptowanie ich na cele turystyczne. [2] W Polsce za najtrafniejsze rozwiązanie w celu ochrony obiektów popadających w ruinę uznano zabezpieczenie substancji zbytkowej w formie tzw. trwałej ruiny. [3]



Ryc. 1. Lokalizacja w stosunku do miasta ruin dawnego zboru kalwińskiego w Piaskach – opracowanie Autor

Początki zboru kalwińskiego mieszczącego się w Piaskach w województwie lubelskim sięgają roku 1649 kiedy to poświęcono tam zbor ewangelicko reformowany. [4] Ruiny dawnego zboru zlokalizowane są niedaleko piaseckich stawów rybnych (Ryc. 1.). Piaski są niewielkim miasteczkiem w województwie lubelskim leżącym na trasie z Lublina do Zamościa. Dawniej Piaski Luterskie. W 1649 roku ówczesny właściciel miasta Adam Sucho-dolski wybudował murowany kościół [5], który w postaci ruiny istnieje do dzisiaj. Na przedstawionym rysunku z lat 1801–1804 widoczny jest omawiany zbor wygradzony murem oraz istniejący tam cmentarz (Ryc. 2.) W roku 1894 po sprzedaniu miasta przez rodzinę Suchodolskich zlikwidowano parafię kalwińską. [4] Budowla położona na niewielkim wzniesieniu zwrócona frontem na wschód nosi cechy architektury barokowo-klasycystycznej. (Ryc. 3.) Analizując cechy architektury tej budowli domniemywać można iż autorem jej był architekt A. Zylchert – twórca również lubelskiej świątyni ewangelickiej. [6]



Ryc. 2. Rycina przedstawiająca Fragment mapy West Gallicien 1801–1804 – first military survey (dostęp online z dnia 20.12.2020: www.mapire.eu/en/map/europe-18century-firstsurvey)



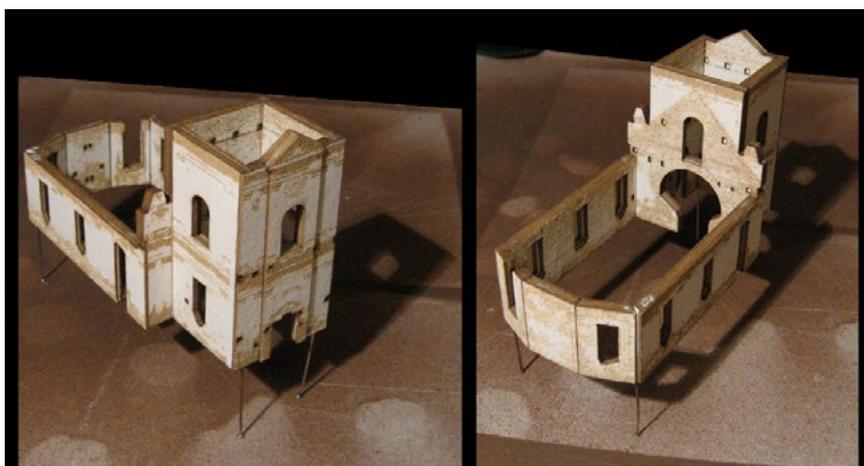
Ryc. 3. Rycina przedstawiająca wygląd obiektu w roku 1899 – zdjęcie źródło: Zarys dziejów powstania i upadku reformacji w Polsce T. 2 cz. 2 hr. Waleriana Krasieńskiego s. 21 (dostęp online z dnia 20.12.2020: www.kpbc.ukw.edu.pl)

Obiekt zlokalizowany jest przy stawach rybnych w niedalekim sąsiedztwie boiska sportowego i krajowej drogi S12. Teren wyniesiony powyżej stawów rybnych na którym jeszcze do roku 2019 znajdowała się liczna nieuporządkowana zieleń inwazyjna. W centralnej części usytuowany jest obiekt dawnego zboru zwanego również „Kościelec”. Ruiny dawnego zboru wraz z otaczającym cmentarzem zostały wpisane do rejestru zabytków województwa lubelskiego decyzją znak: Kl. IV-7/106/71 z dnia 31 grudnia 1971 roku pod nr A/559. [7]

Obiekt murowany z kamienia oraz częściowo z cegły. Pokrycie dachowe z dachówki oraz blach z dwuspadowym dachem, którego narys zauważalny był dzięki pozostałościom tynku nawet po zawaleniu się dachu. (Ryc. 4.) Zbór otoczony był murem którego reliktury zachowały się do dzisiaj. Wejście skierowane było na wschód. Pełnił funkcję kultu religijnego w okresie w którym Piaski należały jeszcze do wyznania ewangelickiego. Do roku 2019 obiekt był trudno dostępny poprzez dziko rosnącą roślinność, która zaburzała odbiór wartości zabytkowej. Budowla przez lata była niezabezpieczona a po zawaleniu się dachu narażony na działania warunków atmosferycznych podlegał stopniowej degradacji tkani zabytkowej. Pozostawiony bez nadzoru stopniowo ulegał degradacji. W roku 2014 władze miasta podjęły działania mające na celu *Rewitalizację ruin Zboru Kalwińskiego „Kościelec” – (Miasto i gmina Piaski)*. [8] W związku z wnioskiem w sprawie opinii konserwatorskiej dot. możliwości rewitalizacji oraz zagospodarowania „Kościeca” oraz przyległego terenu złożonego przez ówczesnego burmistrza Miasta Piaski Ryszarda Siczka uzyskano wytyczne konserwatorskie w sprawie rewaloryzacji obiektu. W roku 2014 Firma „Model w skali” wykonała na podstawie szczegółowej inwentaryzacji makietę obiektu obrazującą stan istniejący na dany rok (Ryc. 5.) (Ryc. 6.). Dzięki temu możliwe było przeanalizowanie otwarcie widokowych oraz ogólnej kompozycji układu przestrzennego a następnie stworzenie najbardziej optymalnego zagospodarowania przestrzeni.



Ryc. 4. Stan zachowania obiektu (rok 2014) – zdjęcie Autor



Ryc. 5. Makieta przedstawiająca bryłę obiektu (rok 2014) – zdjęcie Piotr Jeziński autor makiety



Ryc. 6. Makieta przedstawiająca układ przestrzenny oraz bryłę obiektu (rok 2014) – zdjęcie Piotr Jezierski autor makiety

Wytyczne konserwatorskie

W odpowiedzi na pismo wystosowane przez ówczesnego burmistrza Miasta Piaski pana Ryszarda Siczka Wojewódzki Konserwator Zabytków w oparciu o art. 27 ustawy o ochronie zabytków i opiece nad zabytkami przekazał wytyczne w sprawie rewitalizacji ruin oraz terenu przyległego. Zaplanowane działania rewitalizacyjne winny były uwzględniać:

- objęcie inwestycją całości terenu
- funkcję historyczno-edukacyjną połączoną z rekreacją
- pozostawienie ruin zboru w formie trwałej ruiny
- redukcja drzewostanu nieposiadającego wartości historycznej
- uwzględnienie otwarć widokowych eksponujących ruiny zboru z dalekich najazdów
- stosowanie nawierzchni ciągów pieszych jako nawierzchni naturalnych
- zastosowanie drewna jako materiału podstawowego przy wykonywaniu elementów małej architektury na terenie założenia



Ryc. 7. Fotografia przedstawiająca prace związane z zabezpieczeniem trwałej ruiny (rok 2019) – źródło Urząd Miasta Piaski

Dopuszczone zostały również pewne rozwiązania jak np. realizację pawilonu (zaplecza technicznego) czy iluminacja obiektu. Większość prac należało poprzedzić odpowiednimi badaniami archeologicznymi oraz konserwatorskimi.

Następstwem działań władz Miasta Piaski stał się projekt rewitalizacji, który otrzymał dofinansowanie Regionalnego Programu Operacyjnego. W roku 2019 zostały przeprowadzone prace na zabytkowym obiekcie i jego otoczeniu (Ryc. 7.).

Stan istniejący

Dzięki pozyskanemu dofinansowaniu z Europejskiego Funduszu Rozwoju Regionalnego z programu Regionalnego Programu Operacyjnego Województwa Lubelskiego na lata 2014–2020 możliwe było przeprowadzenie rewitalizacji i zagospodarowania terenu wokół ruin zboru kalwińskiego „Kościelec” w Piaskach (Ryc. 8.). Projekt ten, którego beneficjentem była gmina Piaski polegał na: *„...budowie infrastruktury ułatwiającej dostęp do miejsc i obszarów atrakcyjnych turystycznie oraz stanowiących dziedzictwo kulturowe. Ruiny dawnego zboru kalwińskiego „Kościelec” wraz z przyległym terenem przeznaczone będą do zwiedzania w ramach zagospodarowanego wzgórza parkowego. Otoczenie ruin przeznaczone będzie jako teren rekreacji dla całych rodzin. Szczegółowy zakres projektu: montaż monitoringu wizyjnego, montaż oświetlenia energooszczędnego (lampy solarne LED oraz lampy stylowe podświetlające ruiny), wykonanie ciągów pieszo-rowerowych, wykonanie ciągu pieszo-jezdnego będącego jednocześnie drogą pożarową przystosowanego do potrzeb osób niepełnosprawnych, wykonanie zieleni, wykonanie tablic informacyjno-edukacyjnych. W obrębie wzgórza, stanowiącego teren działki nr ewid. 1265, projektuje się organizację ciągów pieszo-rowerowych przystosowanych do potrzeb osób niepełnosprawnych (podjazdy, barierki) o szerokości minimalnej 2,0 m i nawierzchni mineralnej. Grupą docelową projektu będą mieszkańcy Gminy Piaski oraz inne osoby korzystające z powstałej w wyniku realizacji projektu infrastruktury turystyczno-kulturalnej. Planowane do realizacji zadania mają na celu efektywne wykorzystanie potencjału dziedzictwa naturalnego i kulturowego w osiąganiu korzyści społecznych i gospodarczych, w wymiarze lokalnym...”.*

[9] Założenia dotyczące projektu zostały zrealizowane co w efekcie pozwoliło na uatrakcyjnienie przestrzeni przy jednoczesnej ochronie wartości zabytkowej terenu.



Ryc. 8. Fotografia przedstawiająca Stan istniejący obiektu (rok 2020) – źródło Urząd Miasta Piaski

Zgodnie z zaleceniami Wojewódzkiego Konserwatora Zabytków, dawna świątynia funkcjonuje w formie trwałej ruiny (Ryc. 9.). Mury zostały zabezpieczone przed szkodliwymi działaniami warunków atmosferycznych. Teren wokół zaprojektowany został jako przestrzeń rekreacyjna i wypoczynkowa z siecią ciągów pieszych zieleńią niską uporządkowaną, oświetleniem oraz ławkami. Zachowane zostały otwarcia widokowe, które powodują łatwiejszą identyfikację obiektu w przestrzeni. Nadanie nowej funkcji spowodowało zwiększenie atrakcyjności miejsca zarówno dla mieszkańców jak i dla osób przyjezdnych.



Ryc. 9. Fotografia przedstawiająca Stan istniejący obiektu (rok 2019) – źródło Urząd Miasta Piaski

Wnioski

Ochrona dziedzictwa obiektów znajdujących się w stanie mocno zdegradowanym jest niezwykle istotna. Przywrócenie pierwotnej funkcji jest często nie możliwe. Nadanie nowej funkcji jest niejednokrotnie jedynym środkiem do ochrony zabytkowej tkanki. Przedstawiony w niniejszym artykule przykład jest połączeniem działań konserwatorskich jakimi są metody ochrony w postaci zabezpieczenia obiektu w formie trwałej ruiny oraz wprowadzenie funkcji turystycznej. Po roku użytkowania zrewaloryzowanego obiektu zboru Kalwińskiego w Piaskach można stwierdzić iż zabieg ten przynosi zamierzony skutek, zarówno jako miejsce atrakcyjne turystycznie jak również działania skutkujące ochroną dziedzictwa wartości zabytkowej i historycznej.

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Artistic painted decorations on the outside walls of the castles in western Ukraine

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Abstract: The article describes the newfound fragments of polychrome paintings in the upper tiers of the southeastern castle tower in Pomoriany (Pomorzany – in polish). The pictures are found on the outside wall of the tower. The polychrome murals are preserved in fragments. The paintings decorated the plastered walls of the at the top two levels of the tower and can be dated roughly to the 17th century. Another mural fragment, discovered on the outside of the north wall of the castle in Yazlivets, is much smaller, but with more vibrant colors. Such exterior castle walls decorating with polychrome paintings are rare in Ukraine. It is proposed to preserve and conserve these fragments of murals. Remains of polychrome art paintings are also found in other castles – in Zhovkva, Pidhirtsi, Stare Selo.

Keywords: castles, painting murals, the towns of Pomoriany, Yazlivets, Zhovkva, Stare Selo, the 16–17th century.

Introduction

Painting mural at the exterior walls of castle buildings is a rare occurrence. The defensive function of the outside castle walls with holes cut for firing the enemy required walls to be strong and reliably thick, not decorated or painted. It became popular in recent times only, when castles lost their defensive value and turned into palace objects. We can find paintings usually from the courtyard, where they were used to create heraldic hand-drawn compositions. Therefore, the detection of fragments of such decorative murals on the outer walls of the castle is an extraordinary event and requires detailed illumination and further thorough study.

Purpose of the article: to present general data on the discovered remains of paintings, to analyze their parameters, and to perform a hypothetical reconstruction of their original state.

Analysis of previous research and methods of the study

The study is based on our visits to several castles in Western Ukraine and their field-scale research. We did not have a special expedition to study castle architecture. The study was conducted over several years, analyzing and summarizing field research materials and photo-fixation of results. Five castles were found as the objects with polychrome art decoration – in Pomoriany, in Pidhirtsi, in Zhovkva, in Stare Selo (Lviv region) and Yazlivets (Ternopil region).

There are very few scientific publications on the subject of artistic decoration of Western Ukraine castles. Mostly researchers were interested in the plastic decoration of the castles, the remains of which are preserved more. This information is found in the works of A. Czolowski, B. Janusz, O. Masiuk, V. Vecherskyi, and others [4, 5, 12, 16]. We briefly described the polychrome decoration of the Pomoriany Castle in our 2016 article [2].

The research methods consisted of comparing the field studies' information on stored remains of polychrome paint decor with materials from object history. On the basis of this, a hypothesis was made about the

time of painting decoration, its stylistic features were analyzed, and a hypothesis about its function and hypothetical integral forms were performed.

During fieldwork, we selected samples of plasters and paints for laboratory testing. We plan to dedicate our next publication to the results of laboratory analysis.

Presentation of the research material

The castle in Pomoriary was built in the 15th century. At that time, he belonged to the Russian family of the Kerdey, in particular, in 1462 voivode of Podillia Hrytsko Kerdeyovych was the owner. Later it belonged to his son Sigismund Kerdey, chief of the Terebovlya, who died in 1498 defending the castle from the Tatar attack [11]. Some preserved stone-built wall fragments can be dated to the 15th century. Although most researchers submit a later date of foundation of the stone castle, considering that it originated in the XVI century [13, p. 122; 15, 19]. The castle is built on a low hill among the former swampy valley of the Zolota Lypa river and its tributary Makhnivka. Water surrounded the castle on three sides. Only from the side of the city, it was possible to reach the castle by land. According to our hypothesis, the original castle was built in a square form with an inner courtyard and four corner towers. On the north side of the town, the castle was separated by a moat through which a bridge was constructed.

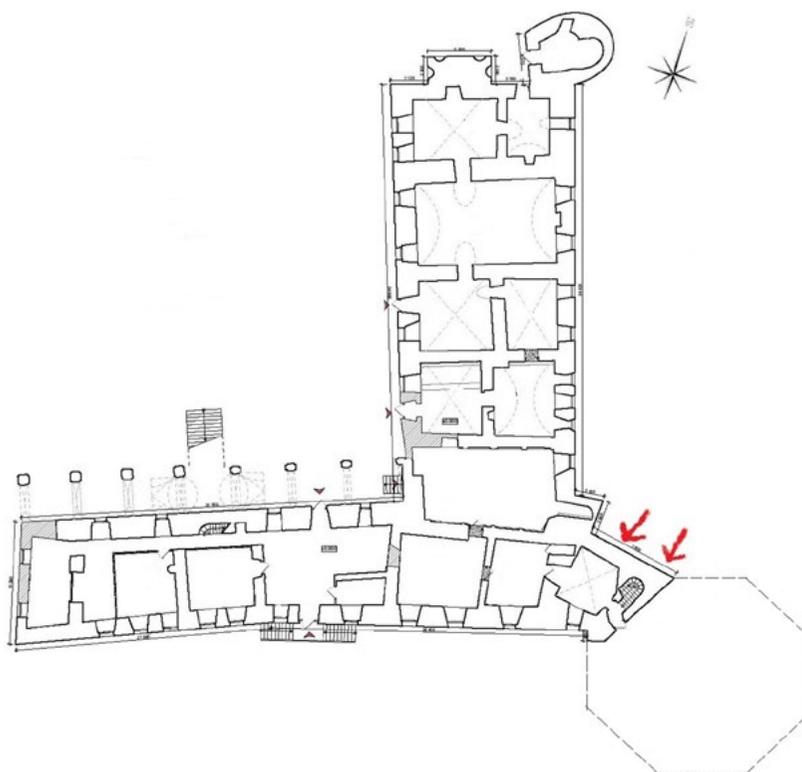


Fig. 1. Plan of the castle in Pomoriary as of 2017. Drawing – by Kalyna Havryliv, Mykola Bevz [7]. The arrow indicates the location of the painted wall, and the dashed line indicates the lost tower.

From publications and historical documents, the following chronology of the castle owners change is traced: the middle and the end of the XV century – the castle belongs to the families of Kerdey and Kerdeyovych; in the 1490s, nobleman Mykola Svyuka is mentioned as an owner of a village and a castle [13]; there is also a mention that at the end of the XV century the castle was owned by Zygmunt Senensky of Olesnytsia (apparently due to his marriage to Jan Svyuka's daughter Anna) [4]; at the beginning of the XVI century the owner was the Lviv casteman Jan Senensky [19]; castle was in the hands of the Senensky family during the whole XVI century; from 1619 the castle belonged to the Sobieski family; in 1740 the castle was bought by Myhailo Radzywill [4, 19]; at the end of the XVIII century the castle became the property of the Pruszyński family; in 1879 the

building was purchased by Stanislav Pototski; the castle belonged to this family until 1939 [4]; in Soviet times the preserved two-storeyed north and west wings of the castle were used as an educational institution. In recent years, the castle is in ruins.

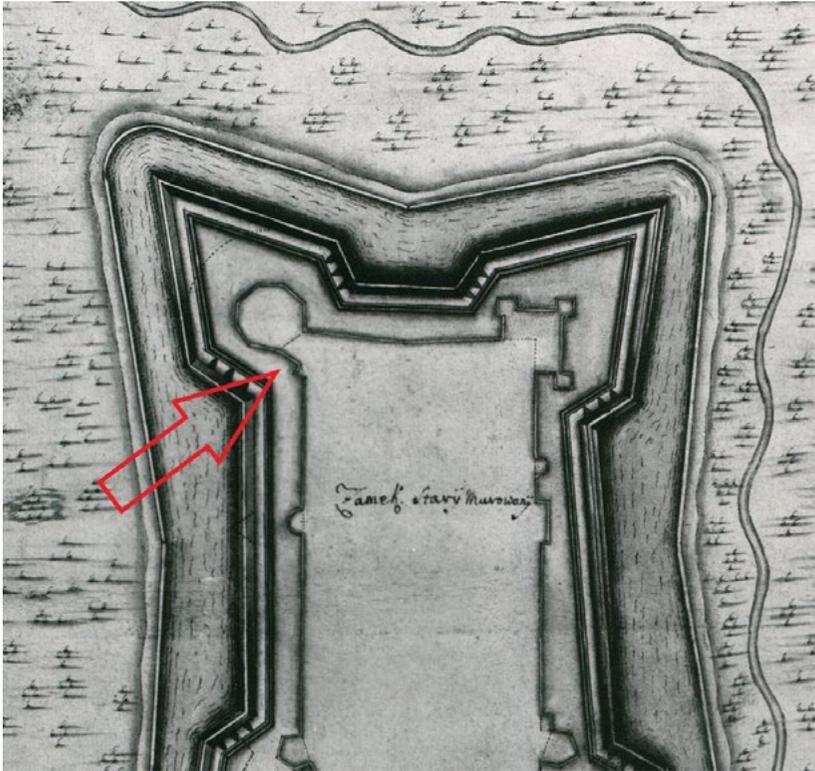


Fig. 2. Drawings of the fortifications of the Pomoriany castle taken from the work of Alexander Czolowski [3]. In the southeast corner, a round tower with facets is marked. The western wall we are exploring is a preserved part of the "neck" to this tower. This wall is marked by an arrow.



Fig. 3. The north wall of the corner tower of the Pomoriany castle. The places where the polychrome paintings preserved are indicated with arrows. Photo by M. Bevz, 2017.

Unfortunately, the architectural history of the castle has not yet been fully explored. Previous publications have paid attention to the change of owners, and in very general terms, described the restructuring of the object. The architectural biography of the castle and the dates of its remodeling remain unknown. The preserved two wings of the castle were created at different times so that they should be carefully examined and dated. It is unclear when a set of four soil bastions was built around the castle. When was the first park laid?



Fig. 4. A large rosette is drawn on the 2nd tier of the outer wall of the corner tower of the Pomoriany castle. Photo by M. Bevz, 2017.

On the walls of the castle are visible traces of bricked-up windows and traces left from annexes, which need to be thoroughly inventoried and identified. The first steps in the identification of the castle building were made several years ago during the completion of the diploma project on the restoration and adaptation of the castle (author of the thesis – A. Vihasty, academic advisor – prof. O. Rybchybskyi, the Department of Architecture and Restoration at Lviv Polytechnic National University) [20]. However, this work is still unpublished.

The preserved ruin presents features of Renaissance architecture with a tall frieze in arcade-style. A careful analysis of the preserved walls shows that these renaissance building forms are not the oldest. They create a newer substance based on older walls, which were built of pieces of stone and had firing ranges in the form of a key for hand-held firearms. We hypothesize that the attic completion of the tower is newer and imposed on older walls (see Fig. 3). An in-depth study of the history of the Pomoriany castle by Alexander Czolowski contains a very valuable plan for the castle complex of the 18th century. On the plan, the tower has a layout scheme in the form of a five-angled defense building, reminding the typical scheme of the “punto” tower. A comparison of the tower plan in A. Czolowski’s documentation (Fig. 2) with the modern plan (Fig. 1) indicates that the three outer walls of the tower were not preserved. Two walls (north and east) were completely lost, and a small fragment remained from the third one. The foundations of the former pentagonal tower have been preserved in the ground and can still be identified today by the topography of the relief.

We found the murals in October 2016 during the inventory and photo-fixing work at the castle within the framework of the master’s thesis work of the student Kalyna Havryliv. During the joint exit to the object, the upper layers of the plaster were observed to disappear in many places on the walls of the castle. From under the plaster, we were able to see, in particular, bricked windows with Renaissance carved rosettes on the second tier (in the gallery) were opened (fig. 12, 13).

The paintings were at the height of the second and third tiers on the outer wall of the southeast corner tower (Fig. 1, 3). This tower has been preserved in its reconstructed form. Its northern wall is best preserved and features Renaissance style with the remains of a “blind” arch belt over which, apparently, once had an attic end (sketch at Fig. 2). Nowadays, the upper part of the tower has a cornice end that is dated to the time of the rebuilding of the castle under Jan III Sobieski. The bricks and the eaves are similar to those parts of the castle

that are identified with the times of reconstructing the castle to the royal palace. The lower part of the tower is made of broken limestone. This is probably the oldest substance. Therefore, the investigated wall of the tower, according to our hypothesis, has three elements that differ in time of construction. Polychrome paintings adorned the second and third tiers of the facade.

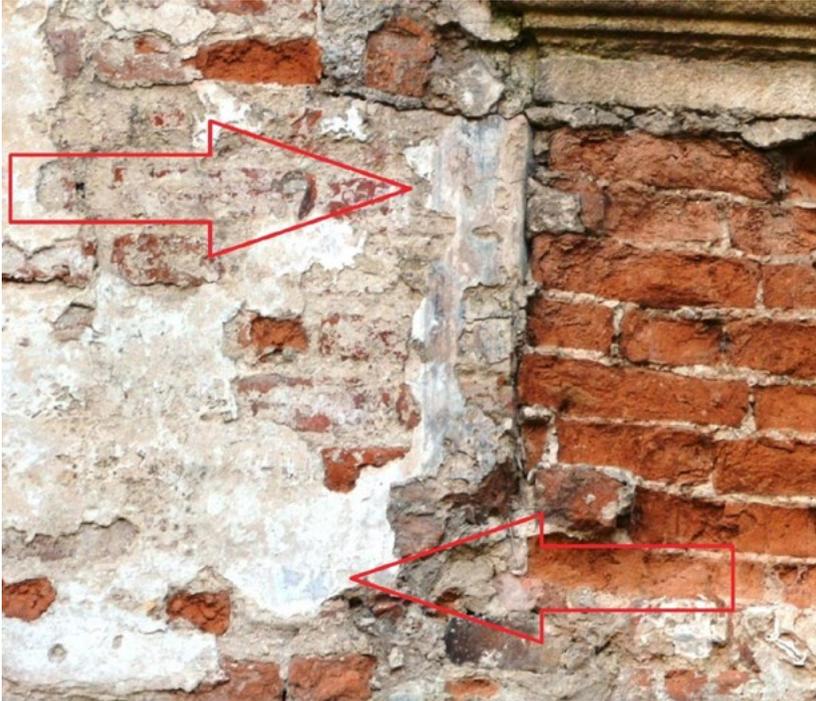


Fig. 5. Vertical hand-drawn painting (arrow 1) near the old bricked-up window opening on the 2nd tier of the outer wall of the Pomoriany castle corner tower. On the left side to the painting remained tiny fragments of some other painting (arrow 2). Photo by M. Bevz, 2017.



Fig. 6. Hand circle-drawn archivolts and half-rosettes in the arch belt on the 3rd tier of the outer wall of the tower. On the left side to the arch are fragments of a rose with branches. Photo by M. Bevz, 2017.

Red, grey, and blue colors dominate in the paintings. The murals are in the state of an emergency. Most of them are lost, although preserved fragments can be used to reconstruct an integral image. The second tier of the tower was painted with rosettes almost two meters in size (Fig. 3), among which were drawn some geometric figures (Fig. 4, 5, 6).

The third tier of the tower, which was built with a blind arcade, was also decorated with polychrome paintings. Their pattern corresponded to the arcade profiling of the wall. Under the arches were painted half-rosettes similar in style to those found on the 2nd tier (Fig. 6, 7). The pilasters had hand-drawn fluting. Their traces are still barely readable. Above the arches, striped archivolts (at seven belts) were drawn in detail. The triangular fields between arches above the pilasters are the most interesting: there is a large rose with symmetric branches (fig. 8).

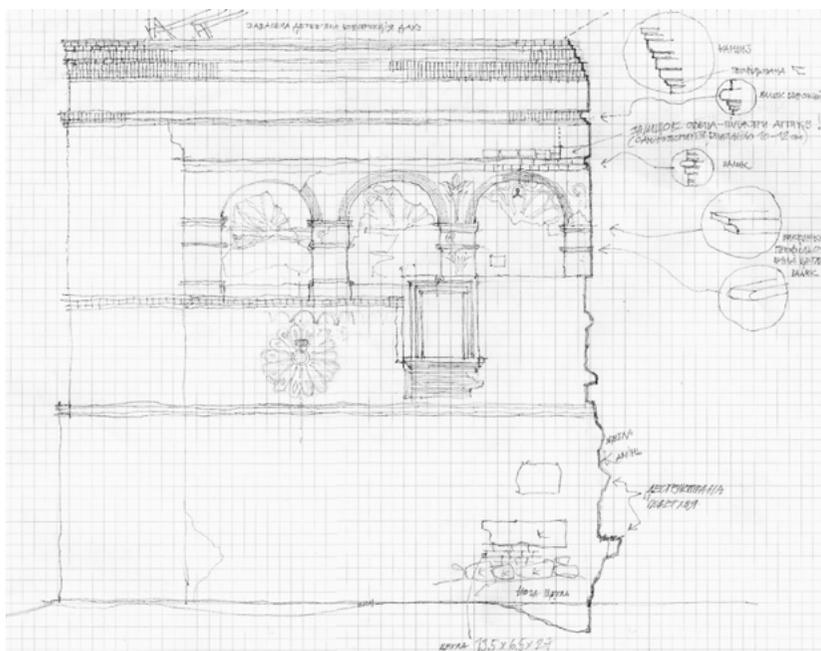


Fig. 7. Field drawing of the preserved part of the wall of the southwest corner tower of the castle in Pomoriary. In the horizontal arcade belt, remnants of polychrome patterns in the form of half-rosettes were fixed. The archivolts of the arches were decorated with colorful lines. In the fields between the archivolts were drawn flower bouquets. Below the arcade belt, hand-drawn rosettes were found between the two horizontal eaves. Their diameter is 120–125 cm. The cornice at the top of the wall is later (from the end of the 17th century) than its lower part with drawings, which can be dated to the end of the 16th or beginning of the 17th century. Made by M. Bevz, 2017.



Fig. 8. Hand-drawn rose with branches on the 3rd tier of the outer wall of the tower in Pomoriary castle. Photo by M. Bevz, 2017.



Fig. 9. The castle in Pomoriary. Photo from 1914 [polona. pl]. The place of the lost octagonal tower.

An arch belt was painted above the large rosettes below the cornice. It could still be explored in more detail since only its small fragments can be seen from beneath the preserved upper layers of the plaster. The rest is hidden under the newer layer of plaster (Fig. 2). By carefully removing this plaster, we can see the whole decoration scenery.

In the winter of 2018, due to unfortunate restoration work, the entire southern wing of the palace and the southern wall of the northern part collapsed. The western wall of the northeast tower we are exploring is completely ruined but has not yet collapsed. The photo fixation of the paintings we did September 2019 shows the slow degradation of the paintings due to the rains washing and the disappearance of the outer layer of the plaster that protected them.

As a result of studies of the walls of Pomoriary castle, we found another interesting detail. On the main facade of the castle palace, as a result of the plaster fall, old bricked opening of windows and doors have appeared (Fig. 12, 13). The edges of these old slits are carved out from a limestone. These slots refer to the earlier period of operation of the castle. They were bricked up during the rebuilding of the castle in the time of Jan III Sobieski. The stone decoration of these original frames of windows have a renaissance character in shape and plastic. In particular, the upper beams of these frames have a very interesting carved decoration in the form of rosettes and triglyphs.



Fig. 10. Photo collage – reconstruction of polychrome painting rosettes on the facade of the castle tower in Pomoriany. Made by M. Bevz, 2019.

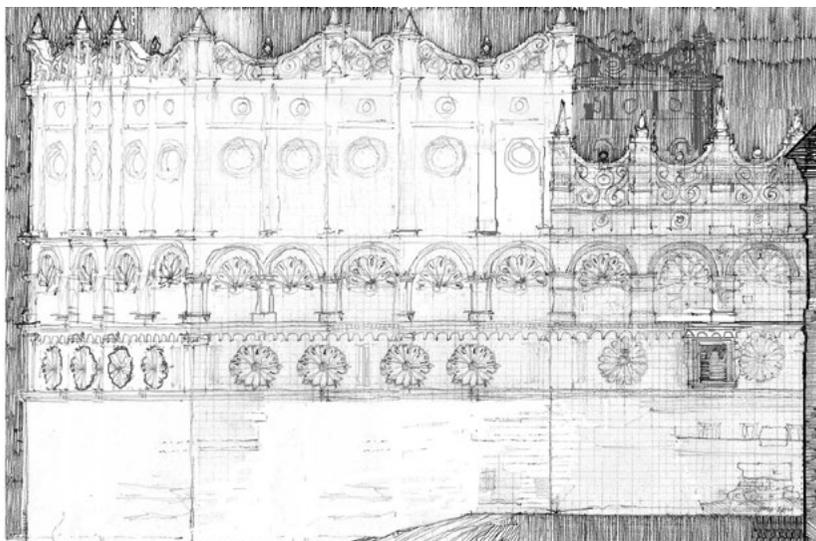


Fig. 11. Hypothetic reconstruction of a lost octagonal Renaissance tower (with a polychrome pattern) of Pomoriany castle. Author – M. Bevz, 2017.



Fig. 12. Fragment of the south wall of the castle in Pomoriany. The carved window framing is made in limestone. The scenery is made up of carved rosettes and triglyphs arranged alternately. The carved forms were partially cut down during the rebuilding of the castle in the 17th century. Photo by M. Bevz, 2017.



Fig. 13. A well-preserved carved rosette from the window framing of the 16th century. Castle in Pomoriary. Photo by M. Bevz, 2017.

The composition and shape of the carved rosettes and triglyphs are very similar to the rosettes and vertical stripes painted on the facade of the southwestern tower (Fig. 7, 10). From this we can conclude that the detected painted decoration on the walls of the castle was made, looking at the carved scenery. That is, the painted and carved decoration of the castle walls were created in stylistic unity.



Fig. 14. Fragments of paintings at the outer wall of the castle in Yazlivets. Photo by M. Bevz, 2017.

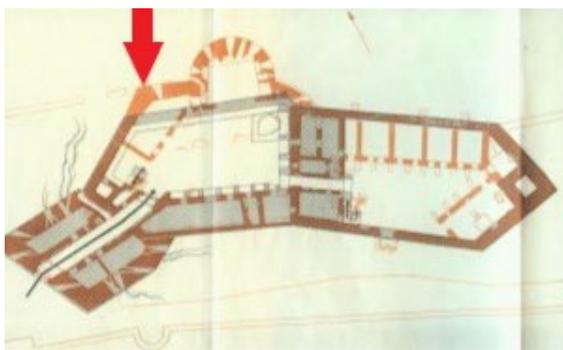


Fig. 15. Location of the found fragment of polychrome painting at the plan of Yazlivets castle (the plan is taken from the publication of B. Queguin [9, p. 113])

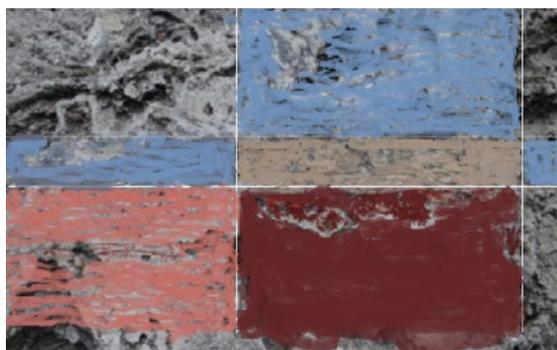


Fig. 16. Reconstruction of the colored scheme of decoration on the walls of Yazlivets castle. M. Bevz, 2019.

The tradition of exterior murals on the walls of the Pomoriany castle has proven to be very enduring. An interesting fact is finding photographs from the early twentieth century, which depicts a dummy painted window on the second tier of the same tower but on its north wall (Fig. 9). This is undoubtedly a later painting decoration. It comes from the time when the tower was already partially dismantled and plastered again. On the newly built part of the tower, a fake window was painted to give a symmetrical composition to the facade. It happened, probably at the end of the 18 – early 19 century. Similar drawings of dummy architectural decorations and elements are known from other objects. Large dummy framed windows were painted on the walls of the second tier. They decorated the lost gallery with a colonnade of Zhovkva Castle after its rebuilding in the 18th century. We were able to fix the polychromy of these windows in the late 1990s. Nowadays, these murals are already completely lost. Similar painted window decor is on the walls of Pidhirtsi Castle at the junction of the second tier with the terrace on the south side of the palace (Fig. 17, 18). In our opinion, these paintings should also be dated to the eighteenth century.

Very small remains of external paintings we discovered on the northern walls of the castle in Yazlivets, Ternopil region. Yazlivets castle has a more researched architectural history [4, 5, 6] than the one in Pomoriany. An outline of his history was covered by Alexander Czolowski [4], and in the interwar period, the castle was thoroughly surveyed and archaeologically investigated. At the same time, its measurements were carried out by a group led by Bogdan Queguin [6]. However, none of the researchers paid attention to the preserved small fragments of polychromy on the north outer wall of the castle. Fragments of the paintings were discovered and recorded by us in 2011, thanks to the attention of architect-restorer Volodymyr Bevz.

Unlike the Pomoriany castle, fragments of paintings in Yazlivets are in the lower tier on the straight section of the northern defensive wall between the semicircular tower and the corner (Fig. 14).

Unfortunately, only small fragments of polychrome survived, so it is unlikely to reconstruct the decoration. However, all fragments of the preserved plastering of the castle are worth examining in detail to determine the remains of polychrome. The preserved fragment shows a geometric pattern (Fig. 16) in several colors (red, grey, blue, white, and ochre). It looks like it was an orthogonal grid of colorful lines that was combined with some other elements of the plant or figurative nature.

Our studies of the architecture of the castle complexes of Western Ukraine have revealed another way of polychrome decoration of the exterior facades. It is a way of drawing illusory architectural details (the so-called picturesque «delusions») to give the facade the desired compositional unity or balance. Most often, the subject of such drawings were dummy windows or decorative elements. At the same time, window fillings with glass, wooden frames, stucco frames could be imitated by painting. It could also be imitations of sticky decorative elements – cartouches, lintels, cornices, etc. We found an example of such a picture in the analyzed castle in Pomoriany. Photo of the castle from the beginning of the 20th century (fig. 9) we see the south wall of the tower, at the level of the second tier, which has two windows. One is true, and the other is drawn to give symmetry to the facade.

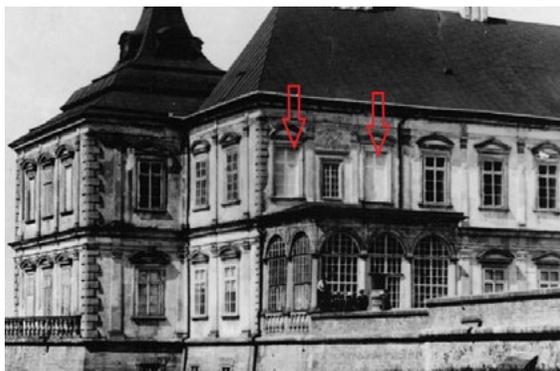


Fig. 17. The southern facade of the castle in Pidhirtsi. Our marking with arrows of fictitious painted windows (photo from the interwar period) [retroua] [11].



Fig. 18. Photo of stucco and painted fictitious windows on the eastern terrace of the castle in Pidhirtsi (present state). Photo by E. Shavlovska [12].

This technique was particularly well applied in Zhovkva Castle. When in the 18th century, the main facade of the palace was completely reconstructed with attachment of stairs and two-tier gallery (fig. 19), then in the side wings of the gallery on the second floor were framed by three dummy windows — made in the technique of murals very professionally. Looking at the palace from the castle courtyard, it was difficult to distinguish between the real windows and the painted ones. Unfortunately, these picturesque windows have been lost in recent years. We have taken photos of their remains in 2012 (fig. 20). We find a similar solution to the palace in the Pidhritsi castle. The object is very known in the history of architecture. The relatively well-preserved windows are located in the lateral risalites of the south facade at the door overlooking the terrace (fig.). The restoration works of these painted architectural elements should be taken into account in the ongoing restoration work of the Zhovkva castle facades. In Pidhritsi Castle, these works require professional restoration.

We know of another way of artistic painting of facades. This is an artistic «domestication» of the shadow effects of the stucco architectural decoration. The remnants of this type of painting were found by professor Oleg Rybchynskiy in the study of the facades of the Baroque church in Uhniv. This rare technique was used in the late 17th century by architect Lenartowicz (from Lublin), trying to enhance the visual effect of deep shadows on the elements of the front decor of eaves, lintels, pilasters, round-bar drafts, etc. [17]. The decorative elements were made in the technique of plaster drawing and, subsequently, in the fresco technique were painted artificial shadows.

Our research shows that in the past, architects not only painted the walls of buildings and their elements in different colors. They often used polychrome as a means of art, artistic decoration. Such methods of artistic furnishing of facades of residential buildings (which had hand-drawn geometric, floral ornaments, or also scene scenes with figures of saints, etc.) are known in many historical cities in Europe. We also know about such polychrome murals on the market building in the Market Square in Lviv (Rynok 31). The above examples of murals in castles in Pomoriany and Yazlivets for the first time have shown that this method of decoration was applied even in defense buildings.

In the Renaissance, another very common way of decorating the facades was spread – the sgraffito technique. This is a sophisticated wall decorating technique. It consists of the initial covering of the wall with several layers (often two) of painted plaster. Each layer of plaster was given a different color. Subsequently, the top fresh wet layer of the top plaster was scraped in the right places (according to the preliminary drawing) with sharp tools. In this way, the color of the lower plaster was revealed in the tattered parties. This way is possible to obtain a two – or several-color composition. Most often, in this way, decorate the facade with geometric ornaments and simple motifs of garlands, rosettes, plants, flowers, etc. [18: c. 378]. Skillful masters in the technique of sgraffito even performed figure compositions and paintings depicting every day or mythical subjects. The Renaissance castle in Krasiczyn in eastern Poland has preserved and professionally restored two-tone compositions on the exterior facades. Facade decoration in the sgraffito technique was very popular in Lublin in the 20th century.

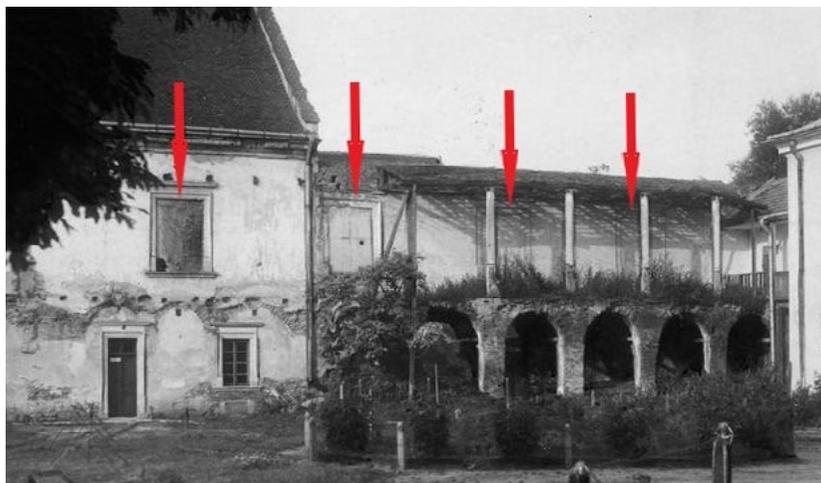


Fig. 19. The elevation of the castle palace in Zhovkva. Photo of beginning 20th cent.



Fig. 20. Photo of the remains of artistic fictional paintings (the window) on a wall of the castle in Zhovkva. Photo by M. Bevz, 2012.

Decorating the walls of the Pomoriany castle was another simpler way. The technique of wall painting decoration can be scribed as:

- Apply two layers of plaster and smooth it to a perfectly flat surface.
- Drawing on a flat moist surface a plaster drawing with a sharp tool; rulers and compasses were used;
- Scraping of those parts of the drawing that were to serve as the background, the top thin layer of plaster, giving it the character of the textured surface (Fig. 8);
- Application of polychrome composition with brushes, using water-soluble paints. Paints were applied on clean, non-textured surfaces. These features can be seen in the photo fig. 4, 5, 6. When drawing rosettes and buds, two colors were red and blue. However, in many places, these colors were mixed. As a third color, masters used whitewash. We selected samples of plaster and paint and submitted them for laboratory analysis. It should also be noted that pigment may have been added to the top layer of the plaster. The plaster has a light yellowish-golden hue (Fig. 6).
- The plaster with polychrome paintings was «chipped» with a hammer, and a new layer of lime-sand plaster was applied to it. In our view, this happened when the castle was rebuilt in the late 17th century when the castle was owned by Jakub and later by Jan Sobieski. Two new layers of plaster are traced to this new layer. The last one is the cement. A very interesting fact is that in some places on the thin first layer of the plaster (the one laid on the found paintings), traces of marking under new paintings with weak traces of the paint layer (Fig. 8) were found. That is, we have arguments that the original paintings of the early 17th century have been updated with a change of pattern. However, it is not possible to read this figure, since this layer is very low in open areas. But in the areas below the later plaster, one can hope to find these two layers of polychrome paintings.
- The paintings were also on the pilasters on the second tier of the tower. This is evidenced by traces of line marking on the pedestal. Unfortunately, the paintings themselves are preserved only under the pedestal eaves in the form of lines of blue and red. Alternately placed remnants of spots of blue and red were also found on the cornices above the blind arcade. It was probably a polychrome imitation of the denticles in the cornice. A more detailed examination of pilasters and other parts of the wall is required, but using scaffolding.
- The condition of plaster with polychrome paintings is an emergency. Because the top of the wall has no roof, the painting is washed away and destroyed by rain, snow, and frost.



Fig. 21. Castle in the village of Stare Selo. Photo by M. Bevz, 2019.



Fig. 22. The photo of the arcade belt of the upper part of the outer wall of the Stare Selo castle. Arrows indicate traces of marking for painting on plaster. Photo by M. Bevz, 2019.



Fig. 23. The fragment of the outer wall of the west wall of the Stare Selo castle. The lines indicate the marking on the plaster for painting. Photo by M. Bevz, 2019.



Fig. 24. Fragment of the outer wall of the southwestern tower of the Stare Selo castle. The lines indicate the marking on the plaster for painting. Photo by M. Bevz, 2019.

We found another example of decorating the castle walls using paintings. This decoration found in 2019 in the Stare Selo castle. This is a castle that was built in the late 16th-early 17th century. Saved in ruins. Its architectural appearance has not been much changed in subsequent periods. Therefore, this castle is analogous to the castles in Pomoriany and Yazlivets. In particular, the architecture of the castle towers in Stare Selo is very similar to that of the Pomoriany Castle tower. The towers of these castles have the same granular plan and the same type of attic tops. On the outer walls of the southwestern tower and on the wall of the south gate, we find the remains of markings under polychrome scenery. This scenery had the character of a geometric ornament (Fig. 21–24).

Conclusions

The results of our pilot studies on polychrome paintings in two castles show very interesting ways of decorating the castle facades. Based on a visual assessment of the stone substance of castles, we date these paintings to the seventeenth century. The paintings found should be very carefully inventoried and examined, including laboratory tests. Small fragments of polychrome paintings on the two castles were fixed at the last moment. If no rescue work is carried out, these fragments will disappear in two to three years. Based on our discoveries, we can suggest that a similar way of decoration could be found in other Western Ukrainian castles. Particular

attention should be paid to the polychromy detection of castles in Ostroh, Medzybizh, Berezhany, Dobromyl and other. These castles were built in the late 16th – early 17th centuries. And their architectural design is similar to the castle in Pomoriany.

Our research shows that in the past, architects not only covered the walls of buildings and their elements in different colors. They often used polychrome as an artistic decoration. The above examples of murals in castles in Pomoriany, Yazlivets, Zhovkva, Pidhirtsi are shown that this method of decoration was applied even in defense buildings.

The preserved fragmentary paintings of the Pomoriany castle should be conserved as an interesting example of the decoration of the castle facades in the 17th century. More detailed research and conservation of the murals would be good to do immediately. More detailed researches and conservation of the remains of the paintings at all the presented castles should be carried out.

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Revitalization of the city's riverside areas on the example of the urstromtal of the Malczewski Stream in Radom

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Abstract: The area of the urstromtal of the Malczewski Stream, located on the border of two blocks of flats inside the Radom housing estate Południe, has remained undeveloped for over twenty years. The existing tree stand is primarily self-seeding with the dominance of *Salix alba* (32%) and *Populus tremula* (16%). In addition, there are: *Alnus incana* (11%), *Quercus rubra* (10%), *Acer negundo* (7%) and others. There are no paved pedestrian routes. Conceptual design of the new development of the valley is a response to the needs of local residents. The project involves creation of a square in the middle of the plot, with a focal point in the form of a fountain. Separation of an area with sports and recreational functions with a fitness and skate park, as well as two playgrounds for children are planned. There is also a designated area for a dog paddock. A part of the park with a roofed gazebo and three paved squares with stone barbecues will serve as a recreation and leisure function for entire families. Referring to the names of the surrounding housing estate Południe and associations with the sun – the place was called the Sunny Park. The name of the park is underlined by the arrangement of alleys, reflecting the wandering of the sun in the sky.

Keywords: city park, revitalization, Radom, housing estate Południe

Introduction

Green areas in the city center form a system of public spaces, constituting an important element in shaping the city's physiognomy. Greenery is an element that enriches the layout of squares and streets with the advantages of psychological impact on users, giving relaxation by changing the material that builds the urban space (Nowakowski 1990). The presence of the river further increases the natural and aesthetic value of the place and allows an attractive reception of urban space. The river has the ability to create characteristic places, distinguished by the originality of form, function and content, due to which the district will be recognizable and associated by both its residents and guests. The river valley in the city creates many possibilities for arranging interesting riverside spaces (Pancewicz 2004, Bernat 2010, Domańska 2012).

The area of the urstromtal of the Malczewski Stream is located on the border of two blocks of flats inside the Radom housing estate Południe. It has remained undeveloped for over twenty years. The stream valley co-creates one of the few open spaces in the district, with free air exchange and a specific microclimate. Despite the

fact that it was described as a reserve for the construction of the park in the local spatial development plan, it has not been developed yet.

The aim of this work was to develop a conceptual design for land development in the vicinity of Park Południe in Radom. With reference to the Radom river valley, the term revitalization will mean adding value to the areas of the Południe housing estate by enriching and refining their form, modernizing their functions, and thus increasing the quality of life of residents.

Material and methods

The area of development are plots with a total area of 6.4 ha owned by the City of Radom. The valley is located between Wierzbicka, Łąkowa and Czarnoleska streets. The area from the north is adjacent to the housing estate "Południe", while from the south, it adjoins the compact development of terraced detached houses. From the west, there is the provincial road No. 744 leading from Radom towards Wierzbica. On the eastern side, there is the Południe Park, newly founded a few years ago. The Malczewski Stream is a periodically drying inflow of the Mleczna River, which is a left-bank tributary of Radomka River, which is in turn a left-bank tributary of the Vistula river. Rapid development of the city after World War II and high demand for water (construction of the pump station on Idalin) resulted in the formation of a large depression funnel, which, combined with low retention of these areas, caused the stream bed to dry out periodically.

Methodology

This work is of a review and design nature. It used the inhouse and field studies, surveys and design works. The research was carried out in 2016–17. The local vision was to define a group of users using the designed area, functional, spatial and viewing analysis. Based on the interview with residents of nearby buildings, an analysis of users' needs was developed. Field studies consisted of detailed dendrological inventory and photographic documentation. On this basis, design guidelines were developed, followed by the park design.

City park – definition and role

The term 'park' first appeared in French garden art at the turn of the 17th and 18th centuries as a designation of the natural parts of a regular garden. It was adopted to describe landscape gardens in England and then throughout Europe (Tołwiński 1963, Majdecki 2009). Currently, a large green area of several to several hectares is accepted as a park. The size of park depends on its location and administrative belonging to the district, e.g. district park up to 5 ha, city park up to 20 ha. Green areas in city centers are subject to common principles for building spatial composition. Basic element of the park is high and low vegetation (trees 20–30%, lawns 70%, flower beds and 1% rebates). Species resistant to urban conditions, i.e. dust, exhaust fumes and low humidity are used here. Flower beds are planted mainly with perennials, and to a lesser extent with annual plants, which require more work. Roads, paths and squares as well as elements of small architecture, i.e. pergolas, trellises, stairs, fountains, cascades, walls, benches, lighting, cover 8–18% of the area. Water reservoirs covering about 10% of the park are interesting and at the same time introducing a unique atmosphere of the park interior. An inseparable element of the parks are playgrounds, cafes, a concert shell or small gastronomy (Borc 2000, Malczyk 2005).

Plant clusters in cities purify the air from harmful carbon dioxide in photosynthesis, and in return, they emit pure oxygen. They accumulate large amounts of harmful compounds emitted by factories in the form of fumes. Large green mass is a place for dust to settle, making the plants purify the air. Compact groups of shrubs or rows of trees provide shelter from winds, suppress noise from traffic arteries, and at the same time, create favorable microclimate (Zachariasz 2012). They are a place of living and breeding for many animals that have permanently settled in cities. Greenery has a positive effect on the urban microclimate by regulating the soil and air humidity due to transpiration, i.e. evaporation of water from the above-ground parts of plants. This

process contributes to cooling the air inside the agglomeration and saturating it with moisture. For example, the amount of evaporation from an open water surface may be 50–70% smaller than the same size of an area covered with compact vegetation (with fully open stomata), assuming identical climatic conditions. Literature data say about the evaporation of about 500 liters of water during the day by one large deciduous tree with an energy consumption of 300,000 kcal from the environment. It follows that a single leaf evaporates five times more water per day than its weight [Adamczyk 2004]. Analyzing the relative humidity values in the parks, it shows that it is higher by 3–8% on average in the cold season and by 5–20% higher in the warm season compared to the rest of the city. Similar interactions take place over large lawn areas (above 3000 m²), where the air humidity definitely increases by up to approximately 90% compared to areas near roads (Oleksiejuk 2005).

Studies and analyzes

Four viewpoints can be designated in the analyzed area. The height difference between the bottom of the stream and the plateau, on which the estate is located, is 15 meters. These are places that dominate the landscape of the proposed park. The indicated points also fulfill the function of entering the park – thus, when entering the park, to admire its entire panorama will be possible.

There are no paved pedestrian paths in the area. There are only wild roadside areas leading to other parts of the district, used by residents of the estate eagerly (fig. 1–3).

The existing tree stand is primarily self-seeding, which gradually took over the area. The species composition is dominated by white willow (*Salix alba* – 32%) and aspen poplar (*Populus tremula* – 16%) (Fig. 3). There is also gray alder (*Alnus incana* – 11%), red oak (*Quercus rubra* – 10%) and ash-leaved maple (*Acer negundo* – 7%). Other trees complete the species composition, and their percentage ranges from 1–3% depending on the species. There are fruit trees individually.



Fig. 1. View of the valley of the Maleczewski stream, 2019 [by S. Kaczmariski]



Fig. 2. View of the valley of the Maleczewski stream, 2019 [by S. Kaczmariski]



Fig. 3. View of the valley of the Maleczewski stream, 2019 [by S. Kaczmarek]

Analyzing the percentage of crown coverage of the soil surface based on the diameter of the crowns of individual trees shows that the most, i.e. 48% of the area covered with trees, is covered by white willow. This is also due to the fact that it is the most numerous species. Gray alder and red oak are followed by 18%. The situation is interesting in the case of aspen poplars, which in terms of quantity, took second place, and taking into account the percentage of crown coverage of the soil surface, is only 4%. On the contrary, ash-maple, the crowns of which cover 12% of the area occupied by trees. Its number is more than half smaller than that of aspen poplars. This comparison shows how different crown sizes are formed by trees in the analyzed area, depending on the species, under similar growth conditions.

When analyzing the surface share of individual herbaceous plants in the area of the study, it was noticed that the largest area, as much as 33%, is covered by dandelion and canine grass (*Taraxacum officinale* and *Elymus caninus*). On the other hand, nettle (*Urtica dioica*) covers 19% of the area. Plants such as cuddly crab (*Galium aparine*) and plantain (*Plantago major*) occupy 3% of the area. Compact fields of Jerusalem artichoke (*Helianthus tuberosus*), greater burdock (*Arctium lappa*), lanceolate (*Calamagrostis canescens*) and caution lanceolate (*Cirsium vulgare*) cover only 2% of the area. Other species listed in the area share of herbaceous plants occupy 1% each. The rest of the developed area, i.e. 29%, is occupied by plants in individual and fine-clump mixing of a few individuals. Analyzing the species composition of herbaceous plants and their distribution in the area of the study, taking into account soil preferences, it can be assumed that the entire southern part of the study is artificially covered with soil brought there. It probably came from excavations during the construction of the surrounding housing estate. Only the central and northern part of the object is the natural fertile soil of the stream valley.

The estates surrounding the development, both from the north and from the south, are compact blocks of flats built in the technology of large slab. The main disadvantage of this type of blocks of flats is very limited space between individual multi-family buildings. Housing estate greenery is often limited to a few trees surrounded by tight concrete or asphalt surfaces. Constantly increasing number of cars parked under the blocks forces the construction of an increasing number of parking lots, which are created at the expense of housing estate greenery. This problem was noticed at the end of the 19th century in European cities, where the increase in population caused shrinking of green spaces. They were replaced by dense residential and industrial buildings. Therefore, both in the past and nowadays, the basic need of local residents is to create as many new green areas as possible. Utilizing the wasteland located in the center of the housing estate will satisfy the basic need of residents, i.e. communing with nature.

As results of the interviews show, the residents of the estate as future park users would like to see, among others, the planned park places to spend time outdoors, divided and adapted to specific age groups. The

interlocutors mentioned here, among others, separate playgrounds for young and old children, as well as recently popular outdoor gyms. Another interesting suggestion is to create intimate, secluded places to spend time in nature with the whole family or friends. In addition, local residents would like the park to create a kind of communication link between the two housing estates, and also be a place encouraging meetings in the open air. Among many postulates, one seems to be very apt, namely one of the inhabitants mentioned the close-to-natural shape of the development area, which should remain as little changed as possible. The naturalistic shape of the slopes and very diverse surface of the terrain introduce the impression of an enclave intact by human hands. Encounters of quadrupeds postulated in their statements that the emerging land development project should also include the latest solutions for dog owners who are *de facto* regular visitors to the city parks.

Design

Referring to the name of the surrounding housing estate – Południe (South) and associations with the sun, it was proposed that the place should be called Sunny Square. In the designed arrangement of alleys, the journey of the sun across the sky was mapped, e.g. a square with a fountain with alleys radiating in a bright tone symbolizes the full southern sun (fig. 4).



Fig. 4. Conceptual design of the Sunny Square in Radom (developed by S. Kaczmarek)

A fragment of the housing estate where a new park is planned to be established will fulfill several new functions. After the investment is completed, it will be possible to separate, among others, a main square with a representative function. It will be a paved courtyard with a fountain. Within the area of the study, areas fulfilling the sport and recreation functions were distinguished, among others, a gym under the cloud and a skate park. Children will have fun on two playgrounds. Each of them will be fenced and adapted to a specific age group. The area marked in green will act as a park for dogs. The roofed gazebo, allowing meetings of larger groups, serves the recreation and leisure function for entire families. It is equipped with a large table surrounded by benches, which will allow to organize various types of meetings. Other equipment in this space will be three paved squares with solid brick grills.

The main park alleys will be made in hot MMA technology (mineral-asphalt mass). Alleys with less pedestrian traffic will be made using the innovative ELASTOPAVE technology (water and air permeable surface). The fountain will be equipped with pump aggregates creating spatial water images illuminated by colored LED

light, and an automatic water treatment and disinfection system in a closed circuit. The area will be illuminated by lanterns with a metal halogen head of varying light intensity, depending on the location and lighting needs from 35 to 150 W. Slopes will be protected by gabion baskets, which act as a "filter", letting excessive amounts of water hold the soil in place. To further minimize the risk of landslides, three retaining walls with a smaller height, so-called multiple walls instead of one high, will be built.

Species of deciduous trees used in new plantings are: silver birch (*Betula pendula*) 'Crispa' and 'Youngii', common beech (*Fagus sylvatica*) 'Pendula', red oak (*Qercus rubra*) 'Aurea', Japanese creeper (*Cercidiphyllum japonicum*), mealworm (*Sorbus aria* 'Magnifica'), Pennsylvanian ash (*Fraxinus pennsylvanica*) 'Aucubifolia', maple (*Acer pseudoplatanus*) 'Brillantissimum' and 'Printz Handjery', Amur cork (*Phellodendron amurense*), silver lime (*Tilia tomentosa*) 'Brabant'. Coniferous trees used in the project are: Douglas fir (*Pseudotsuga menziesii* var. *glauca*), California fir (*Abies concolor*) 'Glauc', Ginkgo biloba (*Ginkgo biloba*) 'Seratoga', Brewer's spruce (*Picea breweriana*), Engelmann's spruce (*Picea engelmannii*) and Caucasian spruce (*Picea orientalis*) 'Aureospicata'. Shrub plants include: Thunberg barberry (*Berberis thunbergii*) 'Bonanza Gold', 'Erecta' and 'Kelleriis' varieties, white dogwood (*Cornus alba* 'Elegantissima' and 'Spaethii'), Japanese viburnum (*Viburnum japonica*) 'Grandiflora', carrageenan Siberian (*Caragana arborescens*) 'Lorbergii' and 'Walker', shrub (*Weigela*) 'Candida', common lilac – *Syringa vulgaris* 'Mme Florent Stephan', Podolian wig (*Cotinus coggygia*) 'Ancot', Lawson cypress (*Chamaecypod laweniana*) 'Golden King', Pfitzer juniper (*Juniperus × pfitzeriana*) 'Blue and Gold', creeping junipers (*Juniperus horizontalis*) 'Glacier' and 'Glauc Group'. Perennials: periwinkle (*Vinca minor*), funkier (*Hosta*) 'Patriot' and 'Wide Brim', Siberian iris (*Iris sibirica*), ostrich plume (*Matteuccia struthiopteris*), and spirea (*Astilbe*) 'Fanal' and 'Irrlicht' will be planted in large single-species groups.

Summary

Inhouse works and field studies confirmed the need for revitalization measures in the urban valley of the Malczewski Stream. The necessity of arranging the park areas was noticed. It will be important to strengthen public safety by lighting embankment areas, as well as shaping recreational offer for various age and social groups. More and more city dwellers practice many spot disciplines in the surroundings of urban greenery. It is also important to connect the valley with the estate through communication routes. The use of natural materials – wood, stone, ceramics – is envisaged for the installation of Sunny Square. The interiors of the area will be filled with decorative greenery, the "skeleton" of which will be plants characteristic of alluvial communities. As part of social activities, it will be desirable to enrich the waterfront landscape with art objects thematically related to the square.

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ODDZIAŁ W LUBLINIE