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Editorial

This second issue of Loci Communes is devoted to matters of broadly understood perception and reception. The authors of the texts in the volume analyse the perception issue in the context of the latest design practices, cognitive processes and digital technologies. In turn, the reception issue is exemplified by articles discussing cultural practices in contexts alien to one's own culture and the dilemmas encountered by researchers attempting to develop a theory of culture capable of encompassing and explaining the cultural diversity of the human world.

In his considerations, Andrew Witt goes beyond the anthropocentric perception model to present it in relation to mathematics and technology. Discussing design methodologies, he shows how, when used together, they expand the space of data available to the designer for exploration, inaccessible to unaided (not technologically supported) human senses. Witt treats technologies such as scanning, generative and artificial intelligence as inherent elements of the methodology. Their use changes the nature of design itself: a transition from the standard iterative design that characterises creators (in other words, the transformation of seeing into creating) to design based on mathematically described computational processes and generating digital representations. They (technologies) also enable the regulation of the project size depending on current needs and the cataloguing and categorising of data on forms and materials. In Witt's opinion, these technologies are valuable tools for the digital humanities, enabling, for example, the study of architectural culture. The same applies to machine vision technology. Thanks to this, the designer gains insight into the detailed properties of materials and the richness and diversity of diagnosed objects and spaces. Algorithmic ordering makes them more functional, arranges them into a morphological form and

then transforms them into quantity (mathematically understood); it also provides artificial intelligence that transforms them into a new, richer form. Often, the result of such a process is the need to revise the current state of architectural knowledge.

Another author, Jordan Lacey, analyses the possibilities of using artistic sound installations to transform acoustically burdensome (polluted) spaces into perceptually user-friendly places. The transformation process of a given space shows the convergence of the purpose of soundscape design and urban planning: to improve the quality of life of the inhabitants of the cities and villages where the transformation is carried out. By shaping the sound environment, education about the properties of sounds and modelling users' audio perception is also achieved. It is also possible to shape the sound environment not only in urban spaces. It can also be used to treat natural and cultural soundscapes. For the purposes of transformation, Lacey has developed proprietary artistic practices. One of them, Sonic Rupture, gave rise to three further sound analysis methodologies: atmospheric translation, biophilic design and superhuman listening. The first enables the perception and understanding of the affective impact of nature on the urban environment. The second one aims to store and then incorporate the sounds of nature into urban space. The last is based on environmental sounds stored using microphones and incorporated into artistic installations. Using the example of the Sonic Gathering Place installation, the author illustrates the transformation of a built environment that is unfavourable for health. The method used in the installation considers iteration, i.e. repeated repetition of the idea in the prototyping process to select the best solution.

Another example of the relationship between digital technologies and perception is the phenomenon of sensory immersion, a characteristic of computer games, discussed in the article by Justyna Szmel, Oliwia Jasicka, Klaudia Żubryk, Katarzyna Auguścik, Marta Kraczla, Krzysztof Marchewka. The authors suggest introducing computer games into the education of architects. Thanks to multisensory immersion technology, games can be an effective educational tool in the field of sensitivity to sensory stimuli. The user's perceptual and cognitive involvement enabled by games increases the effectiveness of education compared to traditional methods. Knowledge about the content of perceptual experiences - visual and obtained through other senses - is necessary for every designer of spaces and objects, especially in human-oriented and inclusive design.

Kamil Olender considers the relationship between perception and design in yet another context. The author analyses the principles and examples of visual communication design dedicated to spatial orientation. Olender draws attention to the multi-faceted nature of the phenomenon

in question. Therefore, it analyses the linguistic and cultural categories through which community members communicate spatial relations. These include spatial metaphors and descriptions of space experiences. In the 20th century, knowledge about spatial orientation, Olender points out, was deepened thanks to psychological and neurobiological research suggesting the existence of representations of physical space in the brains of animals and humans. Ultimately, their existence was confirmed by neurocognitive research, identifying neurons responsible for spatial orientation and creating mental representations.

The articles by Ewa Kosowska and Jurgita Senuliene share the problem of reception. Senuliene relates it to the native Lithuanian culture and the Lithuanian diaspora living in the United States throughout the 20th century in the context of the festivals and food fairs it organises. Their task was to promote Lithuanian culture. Promoting culture in the United States was aimed at making both members of the diaspora and residents of Lithuania, occupied by Russia and then the Soviet Union, aware of the value of native culture. The author shows the reception of these practices in the example of content analysis of press materials dedicated to exhibitions, exhibition catalogues and festival leaflets. Senuliene considers the lack of interest of diaspora members in self-reflection on their own identity as the result of the Americanization process in a multi-ethnic country and the influence of the coexistence theory of multicultural societies, known as *salad bowl* and *melting pot*.

Ewa Kosowska, based on considerations in the field of cultural theory, asks what problems a cultural theorist faces when trying to "reconcile" the multitude of different theoretical receptions of culture within one theory. The author refers to Marek Pacukiewicz's book *Landscapes of Context* (2021). Pacukiewicz considers the possibilities of constructing a unitary theory of culture, the subject of which would be *culture as culture*, inspired by the Aristotelian metaphysics of *being as being*. Culture as an entity is a set of practices that are first perceived and then interpreted, finding or giving meaning to its individual elements. Pacukiewicz's unitary theory will, therefore, require legitimisation in cultural practices, which, according to Kosowska, have a processual and continuous character, exercised through human, and reflective cognitive acts grounded in perceptual acts. The lack of coherence between them means the need for a cognitive justification for the relationship between perception and the intellectual reception of reality. However, this puts in question the metaphysical framework for the theory of culture, which has been widely practised in the humanities since the second half of the 20th century.

The articles published in this volume concern research areas where cultural practices, scientific theories and technologies intersect. These intersections require further problematisation and in-depth research.

Enjoy reading!

On behalf of the journal's Editorial Board,
Małgorzata Kądziela,
Editor-in-chief

Perception and Experience

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Three Tools for Sonic Rupture: Translating Ambiance, Biophilic Sound Design and More-Than-Human Listening

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Abstract

Sounds of the city shape everyday perception; thus, as sounds change, so do our moods and responses to the environments in which we live. This article is part of a discourse trying to recognise the essential role that soundscape design should play in urban planning to improve quality of life experiences. It aims to discuss three tools for creating *sonic ruptures* in urban environments: *translating ambiance*, *biophilic sound design*, and *more-than-human listening*. The three tools are related to the *sonic rupture* concept, introduced as a form of soundscape design focused on improving the quality of life for urban dwellers and creating new possible approaches for urban design. *Translating ambiance* leverages ambiance theory to explore the prospects of translating the affective qualities of the natural world into cities. The *biophilic sound design* tool combines biophilic design and field recording practices to discover innovative ways to bring the sounds of nature into the city. The *more-than-human listening* tool explores the possible recordings that multi-microphone arrays can make in natural environments that, while impossible to hear with the human ear, can be integrated into urban installations. In combination, this suite of tools presents new ways of thinking about the roles artistic research can play in urban soundscape design as a means to expand the range of human experience – and thus the quality of life – in urban environments. The nature term, as used here, refers to those expanses of land free of urban development that present unique sonic experiences and expressions to the artistic researcher, which can be applied to urban design. The described approach has been tested in the creation of the *Sonic Gathering Place*, an installation that integrates the three post-sonic rupture tools, which will be touched on briefly in this paper.

Keywords

soundscape design, sound art, urban design, biophilia, creative practice

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Introduction: Sonic Rupture and Creative Practice Methodology

A *sonic rupture* is defined as a small urban environment wherein a sound installation transforms the acoustic qualities of that space (Lacey, 2016). Sonic ruptures aim to transform perceptions in small city spaces so that they might expand the possible range of human aesthetic experiences. The creation of sound art installations in urban places contributes to more significant soundscaping questions, which, as will be described in detail in the following section, considers the sounds of the city and their impact on human life quality. This article will introduce three experimental projects that aim to create new tools for urban soundscape design, which led to the three post-sonic rupture tools: *translating ambiance*, *biophilic sound design*, and *more-than-human listening*. The post-sonic rupture tools present new approaches for the creation of sound art installations in small city places. The article characterises the relationship of soundscaping to architectural, design and arts practices, mainly in relation to the transformation of the built environment, which are connected to broader health and well-being concerns (Fraisse et al., 2021; Lacey, 2016; Anderson, 2016).

A *creative practice* research method employed in the creation of the three post-sonic rupture tools is an iterative approach to research favoured amongst researchers involved in making processes. An iterative approach means repeatedly testing an idea, typically through prototyping, until a satisfactory conclusion has been reached. This research approach is comparable to *performative research* (Haseman, 2006), *action-based research* (Brydon-Miller et al., 2003), *creative practice research* (Lacey, 2016) and *material thinking* (Carter, 2004). The commonality of these various descriptions is that the practitioner's actions are the method for discovering new knowledge. This is distinct from more traditional quantitative approaches, which generate data to discover solutions to a stated problem or qualitative approaches, which use other methods, for instance, interviews, fieldwork or videography. In this paper, an overview of the sonic rupture concept (including a practice-based example) will be provided, followed by the development of the three post-sonic rupture tools, which constitute an iterative process leading to the development of the *Sonic Gathering Place* installation.

Soundscaping

Soundscaping as architectural practice can be traced back primarily to the theories of Raymond Murray Schafer - a director of the *World*

Soundscape Project (WSP) in the early 1970s (Schafer, 1977). Schafer and his team undertook various listening-based experiments, including sound recording, sound mapping, soundwalking and creating soundscape compositions to educate the public about the significance of listening. A key proposal from the WSP was the development of the profession of acoustic design, responsible for soundscaping urban environments. The WSP were particularly concerned about rising noise levels in urban spaces, but rather than continuing a negative conversation about urban noise, the project applied the *soundscape term* to establish more positive ways of defining how cities should sound[1]. Parallel to this academic development was the artistic research of Max Neuhaus. Neuhaus was a percussionist who focused in his later career on the creation of publicly-accessible urban sound installations. His installations are varied, but a commonality is the subtle introduction of sounds to environments, which in combination with attentive listening, reveals new perceptual relationships between the human listener and the city. His most recognised work *Times Square* locates a synthesiser beneath a subway grill. Its gentle hum transforms the acoustic environment, an effect that is easily missed in the business of everyday life. It is essential to remember Neuhaus' contribution as his work is too little discussed compared to the work of the concurrent WSP; and yet, his role in the development of artistic research approaches to soundscaping continues to play a crucial and important role in urban soundscape design (Lacey, 2020).

Simultaneously, in the 1970s, studies of a similar nature were conducted in France – at the beginning of that decade, sociologist and theorist Jean-François Augoyard wrote a book *Step-By-Step* (Auyogard, 2007). The study examined people's behaviour in a French housing estate from sensory and everyday perspectives, and it included analysing how people made traces and marks in the landscape based on their behavioural responses to the planned environment (for instance, the paths people create beyond the walking paths established by planners). Augoyard continued his efforts by founding a research centre – CRESSON, at Grenoble University, which conducted research into everyday sonic experiences, resulting in the publication of the book *Sonic Experience* (Augoyard & Torgue, 2005). Its consideration of sound was different to the *World Soundscape Project*, which stemmed from a compositional concern for how the sounds of the urban could be perceived and potentially designed as a city-wide composition. Instead, CRESSON proposed the concept of a sound effect. The sound effect is a concatenation of three factors: the built environment (how

[1] This is emphasised by the title of Schafer's field defining book, *The Soundscape: Our Sonic Environment and the Tuning of the World* (1977).

it shapes sound), the personal perception of the individual (how they perceive sound), and the social and cultural background of that individual. What was most important about this research is its concentration on everyday perceptual experiences of urban environments rather than just the broad compositional concerns of how a soundscape sounded. The strong relationship of the sonic effect with sociology and ethnography creates an understanding of urban sound more grounded in human experience than in any specific listening ideology.

More recently, there has been significant development occurring in the sciences. Although the *soundscape* term was popularised by concerned composers, at least in the Canadian context, nowadays it is picked up by the scientific fields of acoustics and engineering and urban study fields of planning and management, which are developing urban planning models for soundscape built on perception-based modelling (Axelsson et al., 2010). Rather than traditional quantitative methods that use decibel levels and other scientific measurements to determine the noise level of a given public place, perception-led research considers firstly the role of human perception when understanding the value of urban soundscapes. It is a developing interdisciplinary research area that brings scientists and artists together in constructive conversation. The field is being led by internationally renowned researchers, including Jian Kang and Brigitte Schulte-Fortkamp (Kang & Schulte-Fortkamp, 2016) and Catherine Guastavino[2] (at McGill University, Canada), among many others, all of whom are actively engaged in interdisciplinary research. This new field, loosely called the *Soundscape Approach*,[3] puts human perception first in trying to understand the value of a soundscape and the ways in which it might be designed to produce more desirable soundscapes. Such a radical shift in thinking in acoustic science towards perception remains a minority approach compared to, for example, noise mitigation; however, the quality and quantity of research in this area are quickly growing.

Despite this surge of interest in the sciences, soundscaping practices maintain their historical roots in artistic practice. This was acknowledged, for example, when key artistic practitioner and urban sound researcher Peter Cusack was invited to be part of the *Positive Soundscape Project* (PSP) that started in 2006, led by Professor Bill Davies in London. The PSP was an interdisciplinary investigation of human perception of soundscapes, which brought together artists and scientists to investigate a more positive

[2] Catherine Guastavino is Professor at McGill Unviersity, Montreal, who leads a large interdisciplinary team of soundscape researchers in the Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT).

[3] Multiple papers in acoustics and similar disciplines use the *Soundscape Approach* term to describe the approach as perception-led.

approach to the design of urban soundscapes rather than typical noise mitigation approaches (via an Environmental Protection Agency or some such derivative). Indeed, the PSP project could be considered a forerunner to the *Soundscape Approach*.[4] Gascia Ouzounian, an associate professor at Oxford University, was recently awarded a large grant in Europe called SONCITIES, which is working with sound artists to think about how they can contribute to architectural practices in the city.[5] Ouzounian's achievement is important, as her research foregrounds the critical role sound artists have in designing city soundscapes in collaboration with architects, designers and planners and ways in which artistic practice can help discover solutions to urban design problems. Related to this, there are several international sound parks which demonstrate how sound installations can create unique atmospheres in public places. These include Klankenbos, located in Neerplet, Belgium; Caramoor Centre for Music and the Arts Garden of Sonic Delights, located in New York State; and the work of Portuguese curator Raquel Castro, who runs the Lisboa *Soa sound* art festival, which includes explorations of the role of sound installations in public places.[6] Recently, Castro's practice significantly expanded when she was selected to curate the *Sound Art in Public Spaces* project across five European cities, which develops sound art exhibitions to "create an auditory experience that provokes human engagement towards the environment."[7]

Finally, soundscaping has a strong relationship with urban design. Marcel Cobussen's research, based at Leiden University, is an exemplar in this area. He is presently working with the Rotterdam city council, providing sound design advice during the planning phase of major infrastructure projects.[8] One of his many projects is focussed on a Rotterdam port that is to be filled in with earth, with skyscrapers built on top of the newly-formed land. He is providing advice on managing possible noise issues experienced by local residents and how sound design might be incorporated into the development's overall design. Another important urban design reference are the sound-artists Sam Auinger from Germany

[4] For a list of outputs attached to this project see: https://hub.salford.ac.uk/sirc-acoustics/psychoacoustics/positive-soundscapes-project/

[5] See https://www.soncities.org for more information.

[6] See Lacey, 2020a, for further discussion.

[7] See https://www.sounds-now.eu/news/curator-raquel-castro-selected/ for more information.

[8] Marcel Cobussen is Professor of Auditory Culture at Leiden University. He has recently built up a relationship with Rotterdam City Council that sees him providing sound design advice during the planning phase of major infrastructure projects. For instance see: https://hofbogengeluidsbeleving.nl/wp-content/uploads/2022/02/Hoor-de-Hofbogen-een-onderzoek-naar-de-geluidsbeleving.pdf

and Bruce Odland from the USA, known collaboratively as O+A,[9] who together developed the notion of the *Sonic Commons*. The artists state that the sonic commons "can be defined as any space where many people share an acoustic environment and can hear the results of each other's activities, both intentional and unintentional" (Auinger & Odland, 2009, p. 64). Their installation works demonstrate of how soundscapes can be transformed by artistic intervention and the value of working with public places to provide new listening opportunities to the public. For instance, *Harmonic Bridge*[10] uses a 16-foot tuning tube to transform the traffic sounds of a busy overpass into an immersive listening space beneath the overpass, transforming a noisy environment into a pleasantly tuned space for listening and relaxation.

In total, these researchers are asking how artistic intervention can change the way we think about the soundscape and bring about a new awareness of urban sounds. They ask the question: what can sound artists and sound designers do to contribute to urban environmental design that improves city dwellers' quality of life?

Defining Sonic Ruptures

Sonic Rupture proposes an artistic approach to urban soundscape design. Sonic rupture – as a concept and creative practice tool – is an attempt to develop acoustic ecology practices that encourage sound artists to work with urban noise in creative ways, such that noise is approached as a compositional material rather than a nuisance. Typically, urban soundscape design (particularly as advocated by acoustic ecology) has been hamstrung by its negativity towards urban noise and, at times, urban life. Following in the footsteps of artists such as Max Neuhaus and O+A, sonic rupture proposes that the creative transformation of noise could be an effective solution to noise annoyance (Lacey, 2016). It achieves this with the creation of small soundscape interventions that rupture negative perceptions by creating more vibrant, interesting or appealing listening experiences. The sonic rupture model proposes a total of five approaches for the design of urban environments, including Addition, Subtraction, Transformation, Passion and Disclosure. These approaches can be seen integrated into the sonic rupture model below.

[9] See http://bruceodland.net/category/odland-auinger/ for more information.
[10] See: https://massmoca.org/event/bruce-odland-sam-auinger-harmonic-bridge/

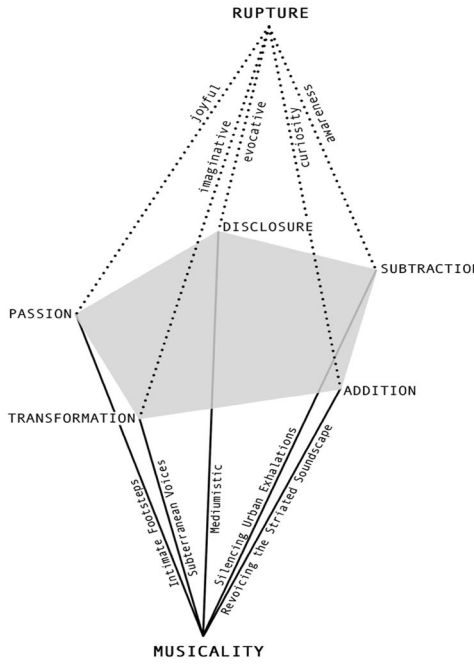

Diagram 1
The sonic rupture model. © Copyrights by the author.

In conclusion to the book, a provocation is presented to artists to apply their skills to transform noisy urban soundscapes into desirable places via project work conducted with prominent industry and government agencies: "…pragmatic terminologies are required when working with government agencies and industries, an entry point that allows creative practitioners to integrate their own skills with urban infrastructures. Approaching government agencies and industry with a language they can relate to is integral to intertwining the creative and the functional." (p. 117). To respond to this challenge, an interdisciplinary research group – led by the author – worked with the motorway company Transurban.[11] Please note that only a brief overview of the project will be described here to connect this work with the three post-sonic rupture tools. Several robustly peer-reviewed articles present a description of the research process and outcomes, including community response. The reader interested in a more in-depth analysis than

[11] Transurban is an international toll-road operator who offer up to $100,000 to invest in university research.

it is possible to present here is encouraged to explore these papers (Pink et al., 2019; Lacey et al., 2019; Lacey et al., 2017).

A Practical Case Study of Sonic Rupture: Designing Motorway Parklands

In 2016 the research team won a $100,000 Transurban Innovation Grant, which encourages innovative research by universities in relationship to motorway infrastructure management to discover a creative practice approach to the design of motorway parkland environments. The project examined how perception can be transformed on the non-noise wall side of motorways. This started with an exploration of parklands along noise walls running throughout the city of Melbourne, Australia. These parklands were more or less neglected and unused. Some of them were transformed into riding and walking tracks or sporting grounds, but mostly they are what geographers call "left-over spaces", as shown in the photo 1.

Photo 1

A left-over space alongside a noise wall, designed to protect adjacent residents from excessive traffic noise. © Photo by the author.

Primarily, these small patches of grass exist because they are not large enough for a house. In some cases, green space is provided for the community alongside motorway noise walls, primarily as recreational or sporting grounds. However, the majority of these places are left unused. This seemed unfortunate given the need for access to green spaces in dense urban environments. A core issue with these grassy spaces (as it is for those house blocks that adjoin them, as seen in photo 2), is the ubiquitous presence of traffic sounds. To completely block the noise would require a full tunnel enclosure or underground road, which is cost prohibitive. Noise walls are the most successful alternative; they reduce the dB levels by about half the amount; however, this solution means there is always some residual traffic noise propagating over the wall. A key research question of the project was to ask how the soundscapes of these parkland environments could be "ruptured" (transformed) so that they became more pleasant and interesting listening environments, which might encourage local residents to utilise these parklands. If this could be achieved, it could present an important step towards landscaping these environments, making them more attractive for exercise and recreation.

Photo 2

Listening to traffic noise, mitigated by a noise wall. © Photo by the author.

The process will be briefly summarised here; a detailed account of the process can be found in Lacey et al., 2019. The project's first stage involved listening and recording the sounds propagated by the passing traffic over the noise wall, as shown in photo 2. The second stage was in a laboratory setting, designing a series of computer-based algorithms that could transform traffic noise. This was tested in combination with an active noise cancellation system.[12] Then, the team tested the most successful laboratory-based sound designs in Melbourne and Sydney.

In Photo 3, on-site microphones (which can't be seen in this image) capture noise as it passes over the noise wall, which is then played through a 4-speaker array. The transformed sound playing back through the speakers is set at such a volume level that it doesn't mask the background noise but blends with it. The aim is to create a soundscape combining the transformed and original sounds. This approach is similar to information masking (Hellström, 2004), which intends to distract the listener from an offending sound (rather than completely masking it); however, in this case, the effects are musical, with the combination of transformed sound and original traffic noise creating what the research team called a "soundscape composition." A total of eight transformations (or soundscape compositions, as they were called) were played back through the speakers.

Photo 3
Listening to transformed noise, in-situ. © Photo by the author.

[12] The cancellation system won't be discussed here, but a detailed discussion can be found at Lacey et al. 2019.

Then, with members of the local community, via an on-site, in-person videography ethnographic study, the team tried to understand if there was a perceptual improvement for the local community compared to the typically traffic-dominated parkland soundscapes. Three of the eight transformation algorithms (for details of each algorithm, please see Lacey et al., 2017) played were considered most effective by the respondents.[13] Of course, the optimal solution would be to have no motorway noise at all, but the team's very pragmatic response was: if noise has to be there, then perhaps the first step is to develop a soundscaping approach that improves the listening conditions, which can be followed by landscaping solutions that enhance the amenity of the parklands (such as the design of rest and recreation areas). An explanation of the participants' responses to the noise transformation experiences can be found in Pink et al. 2019 (pp. 242-46). The project is an important example of the pragmatic research encouraged by the sonic rupture approach (Lacey, 2016) and its applicability to large-scale industry projects. While the rest of the article focuses on artistic research processes, it should be kept in mind that sonic rupture is relevant to soundscaping solutions in a variety of scenarios.

Post -*Sonic Rupture* Concepts: Three Tools

The remainder of the article will describe the creative practice research process that informed the creation of the three post-sonic rupture concepts and tools. A final installation, *Sonic Gathering Place* which was the final outcome of this creative practice process, will be touched on briefly in this paper; although it is discussed in greater detail in the more-than-sound symposium[14] and at the launch of the *Sonic Gathering Place*.[15]

1. The first tool is called *Translating Ambiance*. Jean-Paul Thibaud,[16] the sociologist and ethnographer, who was the director of CRESSON, turned the research centres' attention from sound effects towards sonic ambiance (which is similar to ambience except that ambiance tends to focus on the emotional and perceptual experiences of the body, rather than an environment's ambient conditions). The sonic ambiance was of particular interest to Thibaud. He claimed that sound was the most affective medium – of the

[13] Please listen to *Listen 1 – Audio showcase Melbourne* and *Listen 2 – Audio showcase Sydney* to hear the three most popular noise transformations in each location: https://sites.rmit.edu.au/transurbaninnovationgrantrmit2016/audio/

[14] For the more-than-sound symposium discussion on the *Sonic Gathering Place* see: https://www.youtube.com/watch?v=VwtAgrj-qOo (accessed: 19 October 2022).

[15] For the launch of the Sonic Gathering Place see: https://jordan-lacey.com/project/translating-ambiance?index=sonic-gathering-place-launch (accessed: 19 October 2022).

[16] Thibaud, J. (2011). A sonic paradigm of urban ambiances. *Journal of Sonic Studies*, online.

five senses – in its power to shape our experiences. Therefore, he argued that research and intervention through practice are worthy of attention. The idea of ambiance is particularly interesting in the way it focuses on the listening body and how the listening body creates our emotional impression of the city. The translation term, which has been added to ambiance in the formation of this tool, refers to ways in which a sonic experience can be translated into a geographically distinct soundscape, particularly from nature into the urban. From a technical perspective, the translation term refers explicitly to field recordings made in natural environments that are then translated into urban environments to try and create restorative and peaceful places.

To test the idea, an art exhibition was curated called *Translating Ambiance*. Twelve respected sound artists were invited to participate. Their task was to go out into a natural environment of their choosing and to record an experience that had meaning for them, then to translate the field recording associated with that experience into an art gallery - the Yarra Sculpture Gallery (YSG). This resulted in the creation of nine installations.[17] Upon installation, the research moved into an ethnographic process, to try and identify the emotional affects expressed by the installations. The idea was to try and discover what affects might have been translated into the gallery along with the artists' works. Written transcriptions taken from recorded ethnographic responses were checked for consistency to try and ascertain what affects were generated by the installations. In turn, each installation was developed into possible urban design approaches, detailed in the recent book *Urban Roar* (Lacey, 2022). Admittedly, this is highly speculative and experimental work; however, the goal is to try and discover ways that artistic processes might be integrated into urban design methods.

2. The second tool developed is *biophilic sound design*. In fact, the translating ambiance approach is a method for achieving biophilic sound design, as will now be explained. Biophilia theory was developed by Edward O. Wilson in 1984.[18] He proposed that human beings have an innate natural love for life and life-like processes because we spent most of our evolution in nature before ending up in urban environments. According to him, there would be a gene that proves the existence of this biophilic love. Unfortunately, such a gene was never found, and the theory somewhat disappeared. However, it has returned, particularly since 2006, in the form of *biophilic design*, as popularised by Stephen Kellert and his co-authors.[19]

[17] For a detailed description see: http://translating-ambiance.com/

[18] Wilson, E. O. (1984). *Biophilia*. Harvard University Press: UK. https://www.researchgate.net/publication/232443793_A_Sonic_Paradigm_of_Urban_Ambiances

[19] Kellert, S. R., Heerwagen J. and Mador M. (2008). *Biophilic Design: The Theory, Science, and Practice of Bringing Buildings to Life*. Chichester: John Wiley & Sons Ltd.

Since the publication of this book, the concept has been developed into 14 patterns of biophilic design by a group of architects and designers led by Browning.[20] Essentially, biophilic design claims that bringing nature into our cities will improve human well-being because humans need nature to feel better. And it is not just in terms of plants but also in terms of architectural design and design patterns of nature. So, I took this idea and started researching what biophilic sound design might look and sound like. In fact, the *translating ambiance* tool grew out of this research question insofar as the translation of field recordings into urban environments is an act of biophilic sound design. If biophilic design is the introduction of nature into urban environments, then biophilic sound design is the introduction of field recordings of nature into urban environments.

Bernie Krause, a well-known acoustic ecologist and field recordist, could be considered the first biophilic sound designer, as I will now explain. He has an extensive library of natural field recordings that he has taken from around the world. As a part of his process, he would visualise the recordings in spectrograms. He discovered that different species would sing in specific frequency spectrums or share bands of the same frequency spectrum – he called this the *niche hypothesis* (Krause, 1993). According to the hypothesis, animals inhabit a specific spectrum so that their calls don't clash. And in instances when they do share bands of the frequency spectrum, they tend towards alternating calls, such that when one singing animal stops, another will begin, thereby refilling that band of the spectrum. So, he claims that there is an aural harmony in natural soundscapes that he discovered. This was sanctioned by Edward O. Wilson himself, who expressed in a widely-circulated email that Krause's niche hypothesis is the "real thing" (this is a direct quote from Wilson), a fact that Krause proudly displays on his website, Wild Sanctuary.[21] Bernie Krause could be considered the first biophilic sound designer, given his development of the niche hypothesis, which is applicable as a sound design tool. There has already been some speculation about whether or not we could design urban sound environments following the principles of the niche hypothesis (Ballas, 2000, p. 718). Such regulations are already followed; for example, the sirens of ambulances and fire engines are in a high-frequency band, so they are less likely to be disturbed by other sonic events occurring in the city. The biophilic sound design tool has a strong relationship to the niche hypothesis in so far as both are reliant on nature-based audio field recordings. The main difference is that biophilic sound design focuses

[20] Browning, W. D., Ryan, C. O., Clancy, J. O. (2014). *14 Patterns of Biophilic Design*. New York: Terrapin Bright Green, LLC.

[21] See: https://www.wildsanctuary.com (accessed: 1st June 2022).

on using recording technology in creative ways to bring nature sounds into the city, so they might augment existing biophilic design approaches, such as introducing plant life. These concepts were tested with the following three experimentations, which present ways to test how plants and technology can be brought together to accentuate each other's qualities. These three experimentations were titled *Grass*, *Forest* and *Water*.

Grass

The first experiment titled Grass was created as part of the launch of the Mexican Acoustic Ecology network,[22] at the Fonoteca Nacional in Mexico City (2019). The work (which was titled *Fielding-Overlay* for the purposes of the launch) included nine field recordings of nature sites in urban places, which were combined Mexican feathergrass. is a weed, however, they are native to Mexico City, and a number of plants were found in nearby building sites. A curated collection of nine sound artworks played amongst the feathergrass.

Photo 4

The installation Fielding_Overlay *included three speakers playing field recordings amongst Mexican feathergrass. © Photo by author.*

[22] The Mexican Forum for Acoustic Ecology is the newest affiliate of the World Forum for Acoustic Ecology.

Forest

The next was called *Forest*, as pictured in Photo 5. Two dead branches were set on either side of a living bamboo plant, and two contact microphones were connected to the dead branches. Contact microphones pick up sounds that pass through solid materials. And so, when the wind caused the bamboo to move against the branches, or when it started raining, typically unheard qualities of the bamboo and branches – namely, vibrations within the materiality of the plants - were activated.

Photo 5

Forest includes contact microphones connected to two dead branches that pick up the sounds of moving bamboo and rain. © Photo by the author.

Water

The third was called *Water*, pictured in Photo 6. A central stand held a tall glass vase filled with black-tinted water, which concealed an aquarium pump that produced a steady stream of bubbles. A hydrophone was suspended from the ceiling into the vase. This sound was sent to a computer that provided subtle sonic transformations to the water sounds, which were then played back through adjacent stereo speakers. The bubbling and transformed water could be heard simultaneously, as shown in the image below.

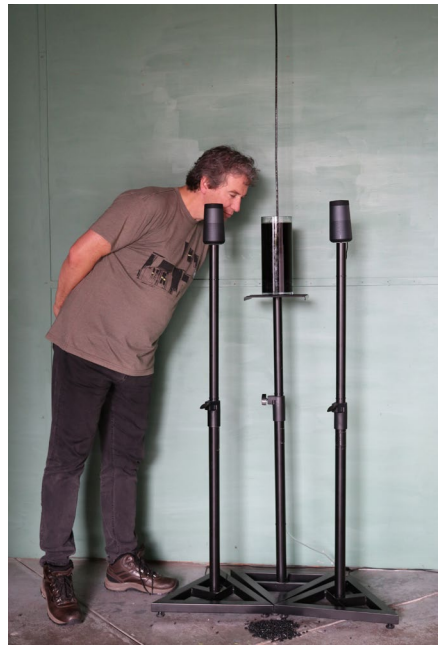

Photo 6

Water *combines the sounds of bubbling water and sounds playing through a submerged hydrophone through a stereo pair of speakers. © Photo by the author.*

The three prototypes from these three biophilic sound design experiments demonstrated unique ways to combine sound and biophilia to create unique listening experiences. The experiments provoked the question, does the city have to sound and look like "original" nature, or can we take advantage of our technology to create new types of nature in a city? Each prototype encourages interaction in two ways: firstly, it would bring listeners closer to the experience because they would want to hear the sounds due to them being very subtle; and secondly, it encouraged people to interact with the works physically due to the fact people were getting closer

to the installations. The three experiments demonstrate that soundscaping can encourage nature immersion by encouraging the listener to seek out subtle acoustic additions. Nature immersion can obviously exist without soundscaping, but the experiments showed that soundscaping is a way of augmenting or encouraging or improving possible biophilic effects, which is the meaning and purpose of the term biophilic sound design.

3. The third tool is called *more-than-human listening*. Field recordings taken from four national parks were included in the *Sonic Gathering Place*, which will be briefly discussed at the end of the paper. In keeping with the biophilic sound design tool, the purpose of the *Sonic Gathering Place* installation was to introduce nature sounds into the city; however, the *more-than-human listening* approach wanted to discover expanded listening possibilities by testing new field recording approaches. A *more-than-human listening approach* tries to distance itself from the idea that we have to try and exactly recreate nature sounds as human ears hear them. Instead, the aim is to create listening experiences that exceed typical human apprehension. The concept has resonance with Jane Bennet's (2010) vital materialism and Rosi Braidotti's (2013) concept of zoë, both of which are suggestive of matter having a vital, or affective. The more-than-human listening tool relates these more-than-human concepts to the sonic experience by investigating how we can use technology to listen to the environment differently. This is not meant in the more common sense of a microphone's fidelity exceeding the human hearing range. Instead, it asks, what can a range of microphones located across space and simultaneously recording the environment achieve? The four field recordings that were embedded in the *Sonic Gathering Place* installation will now be described.

1. *Otways National Park Foreshore*. Located in the southeast of Australia, this is the traditional land of the Eastern Maar people. In Photo 7, an ambisonic microphone to the top left of the image is recording the reflections of the ocean waves in a crevice in the cliff face. Two hydrophones are among the network of collapsed rocks, recording the sound of the water as it recedes back into the ocean. The *more-than-human listening* here is that the resonance of the cliff face and the underwater sound of a wave can be heard simultaneously in real-time.

Photo 7

A combination of an ambisonic microphone and two hydrophones records the sounds of ocean waves at the Otways foreshore. © Photo by the author.

2. *Terrick Terrick National Park*. Located within the grasslands of central Victoria, this is the traditional lands of the Wemba Wamba people. Seen in Photo 8, is a rockpool, quite extraordinary in this dry environment, possibly carved out by the ancestors of the Wemba Wamba. At dusk, flocks of budgerigars come and drink the water. An ambisonic microphone was located within the reeds, close to the water. The *more-than-human listening* experience here is imagining one's head located in the middle of a flock of birds, listening to subtle details, including the collective fluttering of wings.

Photo 8

A rock pool in Terrick Terrick National park is a popular drinking place for local wildlife. © Photo by the author.

3. *French Island*. Located in Western Port Bay close to Melbourne, this is the traditional hunting ground of the Boon Wurrung people. The island has inter-tidal mudflats with extraordinarily high and low tides. Under the mud, during low tide, small organisms can be heard making "popping" sounds. Two hydrophones were buried beneath the mudflats, and a stereo pair of air microphones recorded the sounds of the beach. The more-than-human listening presented here is to provide a simultaneous above and below recording of the water, as pictured in Photo 9.

Photo 9

Two hydrophones and two air microphones record the sounds of a beach on French Island. © Photo by the author.

4. Alpine regions: Located in the central highlands of Victoria, these are the traditional lands of the Taungurung people. The recording occurred during a snow melt, in which underground rivulets formed in an environment of Eucalyptus trees. An ambisonic microphone, as pictured in Photo 10, recorded the ambience of the place, while four hydrophones were placed in four separate "nooks" where the water collected into small pools. The *more-than-human* listening presented here is to provide a simultaneous below and above-water recording of the forest environment.

Photo 10

An ambisonic microphone and four contact microphones record the sounds of underground rivulets in the Alpine region of Victoria. © Photo by the author.

In each case, the recordings try to extend the possibilities afforded by field recording techniques by placing the listener inside impossible listening experiences insofar as only a chosen assembly of microphones can hear the environment in that way. The recordings from these locations were eventually embedded into the *Sonic Gathering Place* installation.

All three post-sonic rupture tools have been entangled in the *Sonic Gathering Place* installation, as pictured in Photo 11, in the following way:

1. Translating ambiance: the discovered ambiance related to small places in four national parks, considered to be of significance to the research team, was translated from the national park into the urban installation;

2. Biophilic sound design: the field recordings from the national parks were embedded in a four-speaker array in the installation. Plants were chosen from the four national parks to be included in the installation. It is expected that by adding sounds, the biophilic effect of the plants will be improved;

3. More-than-human listening: the various spatial configurations of microphones could record unique listening experiences that are impossible to hear with the human ear. By including these recordings in the installation, listeners can uniquely apprehend nature experiences.

Photo 11

The Sonic Gathering Place *is an urban installation in which the three tools were used to create an installation that sought to rupture the immediate environment. Pictured here just after installation, the plants are now lush by comparison. © Photo by Tobias Titz.*

To test whether or not the installation impacts human quality of life, a questionnaire has been designed to test the public's responses to the installation. These results will be reported in a future paper.

Conclusions

The main aim of this article has been to present three post-sonic rupture tools for creating small sound environments in urban places that intend to improve the quality of life in cities. It has detailed the creative process, beginning with the sonic rupture concept and practice (transforming motorway parklands), leading to the development of the three post-sonic rupture tools and their final integration into a permanent sound art installation called the *Sonic Gathering Place*. A sonic rupture is an innovative approach to urban soundscape design that seeks the transformation of offending noises in small city places, particularly where it is impossible to remove those noise sources, such as, for example, traffic noise. Rather than designing soundscapes at a larger scale (which is a more complicated urban planning issue), aiming at a smaller scale enables artists and designers to produce concentrated listening experiences that can be very effective in creating places of respite and difference, which can add value to larger scale soundscaping initiatives.

As discussed in relation to the transforming motorway listening environments section of this paper, the sonic rupture concept is an artistic approach to urban soundscape design that could contribute to landscape design solutions for noisy environments. The three post-sonic rupture tools discussed here include:

1. *translating ambiance*, which investigates the possibility of translating field recordings from nature into small urban environments;
2. *biophilic sound design*, which investigates how nature recordings might augment the effectiveness of plants as restorative agents in urban environments; and
3. *more-than-human listening* takes advantage of the range of available field recording equipment to produce unique nature-based recordings that can be incorporated into small urban spaces.

A common theme underlying the three tools is that the natural world can inform our design of the urban and the types of experiences that the urban is able to generate. The natural world, understood here as those expanses of land free of urban development, presents unique sonic experiences and opportunities for artistic researchers that might transform our understanding of what the city is, how it should be designed, and the types of experiences it can generate. The Sonic Gathering Place installation can be considered the finalisation of the iterative development of the three tools (in keeping with the creative practice research method described above) presenting a place where concentrated listening experiences – informed by the natural world but placed within an urban context – are made possible. This supports the broader aim of discovering ways designers might think about

nature integration in urban places by creatively applying technological and conceptual tools related to creative practice research.

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Cities and Human Experience – the Touchpoints of Space Perception and Wayfinding Systems in the Communication Design Perspective

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Abstract

This paper introduces the topic of wayfinding systems and the related concepts of touchpoints between spatial user experience design and empirical research. It discusses the operationalisation of the concept in the light of various scientific fields and provides the outline of the individual necessary steps crucial to design a signage system that would be the closest and most accurate in the context of spatial cognition, as well as the indication of the most frequently discussed guidelines for designers in both scientific and professional literature.

Keywords

city, wayfinding, human-centred design, communication design, spatial cognition

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Space and Perception - a Review of Selected Studies

Although the issue of navigational systems is closer to industry practices, it is also the subject of scientific research, especially in cartography, neuroscience, and cognitive linguistics. Cartography preoccupies itself with the design of positioning systems (e.g., GPS) and spatial maps. Neuroscience, on the other hand, deals with perception and processes in the human brain and the localisation of the brain areas responsible for them. Linguistics investigates the relationship of space to language and communication, for example, by analysing the linguistic representations of the world and conceptual categorisation. Currently, interdisciplinary analyses that research navigational systems more holistically are increasingly valued (Bond, 2020).

The close relationship between human perception of the world and language was already observed by Edward Sapir and Benjamin Lee Whorf, creators of the concept of linguistic relativism. Their best-known hypothesis, based on comparative studies of European languages (defined by researchers as temporal languages) and Indian languages (e.g., the language of Hopi Indians), are the two main assumptions: linguistic determinism and linguistic relativism concerning the concepts of time, space and matter. Linguistic determinism conceptualised language (understood as a system of signs created by society) as acquired in the process of socialisation which shapes the way we think and perceive the world. Linguistic relativism was an extension and supplementation of the first one – which led to the conclusion that language systems, differentiated in many respects, are the reason for the differences in the perception of the world between the users of different languages (Jedynak, 2007). The Sapir-Whorf hypothesis divided the linguists, leading to many controversies and conflicting opinions on whether it is indeed a language that influences the way of thinking. The main counter-argument indicates the possibility of translating texts into different languages despite differences in the structure of world perception.

Regardless of the dispute described above, Sapir and Whorf also discussed the perception and reflection of space in language. The main difference between the European and Indian languages was the use of spatial metaphors. The European languages involved spatial metaphors, whereas, in Indian languages, this feature was replaced by expressions referring collectively to intensity, tendency, duration and succession (Whorf, 1982). However, in contrast to the time domain (Kövecses, 2011), the researchers did not find significant differences in the conceptualisation of the spatial domain in the languages they studied, which was related to excluding proxemic issues from the assumptions of linguistic relativism (Whorf, 2002). Other researchers, like John B. Haviland (1979) and Stephen Levinson (1992), have different insights than the original Saphir-Whorf hypothesis.

Levinson analysed the language of the indigenous inhabitants of Australia, the Guugu Yimithirr tribe, and concluded that the language involved a completely different system of spatial terms than those represented in Indo-European languages. While Europeans use relative terms, that is, dependent on their location (e.g., in front of, behind, to the left of, opposite), the representatives of the Guugu Yimithirr tribe under study used a geocentric, absolute system of spatial references (e.g., in the north from, in the east of) (Levinson, 1996, p. 181). Following this and subsequent studies conducted on more than 20 languages, Levinson distinguished three different interpretative frames defining the relations of observed objects:

1. Relative frame – describes the world from the observer's perspective. for example, phrases such as: in the front, left, on the right-handed side, behind and so on. This frame dominates most European languages.

2. Intristic frame – binary and independent of the observer's position towards the discussed object. The distinctive feature of this frame is the widely accepted agreement that the described object has a clearly distinguishable front and back. It is the second most popular way of describing the proxemic position of objects in European languages.

3. Absolute frame – based on the objective direction of the world, known from cartography: east-west, north-south. This frame is used in European languages only to define the geographic context of an object's location. Nevertheless, many languages use cartography as their guiding framework (Levinson, 2003).

Another fundamental linguistic theory that relates language structures to space is the theory of linguists Mark Johnson (1987) and George Lakoff (2012). Johnson and Lakoff theorised linguistic ways of expressing proxemic relations. Researchers introduced the concept of image schema – mental patterns that connect perception with communication by referring to 27 abstract categories:

Table 1
Image schemas by George Lakoff (2012) and Mark Johnson (1987).

container	balance	compulsion
blockage	counterforce	restraint
enablement	attraction	mass – count
path	link	centre – periphery
cycle	near – far	scale
part – whole	merging	splitting
full – empty	matching	superimposition
iteration	contact	process
surface	object	collection
diversion	up – down	removal
front – back		

Mental Maps

Antique philosophers have been preoccupied with human orientation, but the Enlightenment philosophers – John Locke, David Hume and George Berkeley – contributed significantly to the interest in the human location. British empiricists assumed that people's knowledge of the location is based on the perception of their senses. Modernist Immanuel Kant argued the opposite – that people use the categories of time and space, which are built into our brains independent of the currently perceived reality. This dispute was resolved only in the 1930s by the American psychologist Edward Tolman who established it based on observations of the behaviour of animals placed in a maze. Tolman found that with the gradual exploration of a given place, a cognitive plan of space is created in the brain of animals and humans, which is subsequently used during the next contact with the area (Mazurek & Vetulani, 2015).

Tolman's findings were confirmed in the 1960s with the help of increasingly popular neurobiological methods. The following years gave rise to the concept of a mental map (i.e., an imaginary map). Mental maps were defined as a cognitive representation of external reality, which contains the necessary information about the spatial organisation of the phenomena (Bond, 2020).

Kevin Lynch, an American urban planner, also referred to mental maps in his research. The author of the book *Image of the City* interviewed respondents about Boston, Jersey City and Los Angeles, and then, based

on their descriptions, he created mental maps. Lynch concluded that imaginary maps are constructed using five basic elements:

1. Paths – used for changing location, that is, streets, pavements, railroads;
2. Edges – the features that constitute a barrier, interpreted as real or perceived borders, for example, walls, buildings, shorelines, curbs;
3. Districts – areas of the city of various sizes, having certain common features, for example, districts, parks;
4. Nodes – places of intersection of various types of space, for example, squares, intersections;
5. Landmarks – places characteristic for mapping the road, for example buildings, signs, mountains, shops, urban art, and monuments (Lynch, 2011).

Inner GPS in the Brain

The behavioural research on the cognition of space found that human knowledge of space is not a coherent whole (one mental map) but a conglomerate of independent parts from which it is difficult to create a consistent plan (Kuipers, 1982; Montello, 1993). Perceived space is schematic and has a hierarchical structure of differently organised elements.

One of the ground-breaking research about the perception of space was conducted by John O'Keefe and his students May-Britt Moser and Edward Moser, explaining the structure and operation of the neural system of spatial localisation. The scientists were awarded the 2014 Nobel Prize in Physiology or Medicine. This theory introduced the concept of spatial localisation, also often referred to as the brain's GPS (alternatively, inner GPS or positioning system in the brain). Research proved that neurons of the central nervous system are responsible for the system of exploration of the environment. Inner GPS consists of place cells located in the hippocampus, grid cells arising in the intraparietal cortex, and head wall and head direction cells (Moser et al., 2015). This internal cartographic system is responsible for the experience of navigating a new space and remembering particular routes based on precisely smaller interconnected cognitive maps, usually bounded by the area covered by vision. Learning more elements of space or relocating to other new spaces is made possible by increasing neural connections (Mazurek & Vetulani, 2015, p. 15). Enlargement of the hippocampus was also confirmed by an earlier study conducted among London cab drivers with larger hippocampi than other city residents. Their size also depended on the length of work experience (Maguire et al., 2000).

Wayfinding Systems – Operationalisation

A navigational system is – in a nutshell – a set of elements aimed at helping the user in navigating a given physical space. Another term used more often in the literature is wayfinding. The first definition in the 1960s, by American Kevin Lynch, described wayfinding as the organisation of sensory signals transmitted by the external environment (Lynch, 2011). Further theorisation led to the concept of user spatial orientation (Farr et al., 2012), which allowed the definition of wayfinding to be expanded and consequently reformulated. Wayfinding is the process of moving through space to reach an assumed destination (Casakin et al., 2000). More precisely, it is the process of identifying the current location and gaining knowledge about how to get to the desired destination faster and effortlessly (Brunye et al., 2010). The orientation systems' role will thus be to locate the user in the given space through environmental cues.

Wayfinding can be divided into three minor processes:

1. Decision making, that is, creating and developing a plan of action;
2. Executing the decision, that is, transforming the plan into a legitimate action set in time and space;
3. Processing of receiving information and perceiving it in a given environment (Arthur & Passini, 2002).

To summarise, wayfinding requires developed spatial (orientation in a given space) and cognitive (perception and processing of signals) skills. Therefore, it is crucial to properly design wayfinding systems considering the users' needs and abilities.

This paper uses the broad definition of navigational systems as a set of verbal and non-verbal elements in the form of physical and non-physical carriers. The main goal is to better orient the users while accounting for their cognitive competencies and predispositions.

Methodology - Designing Wayfinding Systems

Martin Raubal, Max J. Egenhofer, Dieter Pfoser and Nectaria Tryfona (1997, pp. 91–99) indicate the three main steps in researching the design of navigation systems. The first step is behavioural: conducting interviews with users of the space. The point of the interviews is to collect observations about the information coming from the environment. At this stage, the group of respondents should receive a task: get from point A to point B. An example described research about the Vienna airport, where the goal of the participants in the experiment was to reach the appropriate gate for a flight to Istanbul. The participants were asked to describe what they

saw en route, particularly in terms of proxemics and directional markings. The next step is the linguistic analysis of the interviews, using the framing of image schema from Johnson and Lakoff to start the modelling. The final step is to develop the structure of the navigation system based on the emerging types of image schemas collected in the previous stages. This allows for creating individual (but ultimately collective) mental maps.

Observing a given space also helps identify potential difficulties in navigating the space, considering multiple variables. Another element of empathic observation is the categorisation of all possible user groups. This categorisation should concern not only the context of the use of the space but also all other possible functional groups of people. For instance, it is not a satisfactory conclusion to find only two basic categories at a railway station: travellers and non-travellers. Ultimately, accurate categorisation, and a thorough understanding of the target groups' needs, result in a better design.

Space Mapping in Design

Mapping of space is not only crucial in planning traditional signage, for example, inside buildings or for urban information systems. Reference to mental maps and image schemas is also used in the design of electronic devices supporting the wayfinding process, such as personal navigation devices, navigation devices integrated with smartphones, GPS maps, portable guides, GPS watches or offline plenaries (e.g., using websites) (Tokarczyk & Frank, 2008). However, the differences in the wayfinding model between systems for pedestrians and motorists are significant. These differences concern the decision scenes, that is, places where the user has to make a selected manoeuvre (e.g., turn). Such places are usually landmarks, such as buildings, monuments, intersections. For motorists, the message about the necessity of manoeuvring must be given well in advance to execute the action safely. The pictorial diagrams from the theory of Johnson and Lakoff are therefore helpful. The most relevant categories are container, blockade, path, part-whole, link, near-far, object, centre-periphery and collection.

Urs-Jakob Rüetschi and Sabine Timpf (2004), in their analysis of the Zurich railway station, presented an interesting modification of some image schemas. The Swiss researchers proposed the introduction of the categories relevant to cognitive mapping: room (instead of a container), region (instead of a surface), gateway (as a specific type of conscious connection, for example, door), unconscious link (as a connection between spaces that is not obvious, for example, a waiting room located within the station

hall) and item (as a type of object). The categories allowed the researchers to map the station space with transfers and connections in line with a hierarchy within the space.

The Features of a Proper Wayfinding System

Anna Charisse Farr, Tristan Kleinschmidt, Prasad Yarlagadda and Kerrie Mengersen from the Queensland University of Technology quote several studies on navigating different public spaces (2012). According to Australian researchers, some critical issues related to wayfinding are incorrect signs placement, height and size.

However, in the literature, there are no clear guidelines for designers. A scoping review of the literature and popular science texts on industry websites in the field of wayfinding design (both urban and private and semi-private buildings) has identified the seven most frequently occurring design remarks, which will be presented below.

Visibility

The road signs, pictograms, signs in the buildings and so on, should be easy to find by users, which can be achieved by using appropriate colours, size of the letters, font, or pictograms. However, the most critical step is locating the signage in places where users look naturally. It is crucial, especially at the beginning of the journey, like near the entrance of the building or at so-called decision points - where users must decide which directions they should take. Therefore, the first step in designing wayfinding systems is to indicate decision points in a given space.

A designer should also think of different categories of users. Appropriate and comprehensive categorisation should be done during a so-called empathetic stage using proper research methods like observation or interviews. Initially, visually impaired and disabled users should be included in the research. Visual impairment challenges can guide designers to use the proper font, pictograms and contrast, whereas, for users using wheelchairs, the height of the signs is crucial not to be placed too high. A variety of groups of users depends on a given space or its purpose. For example, in city design, the important thing is to place maps or signage in places where people enter the city – the main bus stations, railway stations, parks and rides and so forth.

(In)visibility

Another related feature, seemingly only contradictory to the first, is invisibility, understood in a subversive way. The key is to properly integrate the signs into the layout and the colours of the building so that the designed system is not too flashy and aesthetically incompatible. Appropriate signage should harmonise with the surroundings while at the same time being conspicuous and noticeable. That's not an easy task for designers. That is why designers should not only think within the system (understood in line with Luhmann's (2000) and Fleischer's (2007) system theory, which means thinking only from the perspective inside, not from observer's perspective, which brings the bigger picture of possible situations) but more comprehensive by considering the observer's perspective. Therefore, designers should research and predict the behaviour of users in a given space.

Cohesion

The complexity of proxemic solutions also lies in their cross-referencing. Users look for coherent markings in the different stages of the journey to anticipate what kind of sign and type of information they should anticipate. The goal is to quickly acquire competence in the given signage while not straining the user's cognitive abilities. Frequently, designers stick cards with information in places not intended for this purpose, such as office doors or corridor walls in public spaces. Subsequently, due to the increasing amount of data, users decrease their attention or time devoted to analysing it. Total cohesion can also be achieved by placing the signage in repeatable situations, like at the crossroads or the doors to the next corridor.

Photo 1

Świnoujście, Poland. Numbered free-standing signs indicate beach entrances. The location and appearance are consistent. © Photo by the author.

Versatility

The versatility feature is strongly connected with cohesion. In many organisations, new signs are not only visually incoherent but also situated in an inappropriate place due to the wrong design. The navigational system must be created so that it can be extended at a low cost. Expansion can include adding additional elements as structural or physical changes happen or when the mapped facility activities expand.

Intuitiveness

Although the main reason for implementing orientation systems is to help the user find their way in a given space, designers often place visual aspects above functionality. This can lead to doubts and ambiguities in the process of the denotation of signs. Ambiguities within the differentiation and diversification of individual pictograms are particularly glaring. One of the most challenging symbols at the design stage is directional arrows and the ambiguities related to suggested routes straight up and diagonally (with upward diagonal arrows). Other troubling symbols belong to the toilets,

where doubts are two-fold: distinguishing men's and women's toilets and distinguishing toilets from different places, for example, the lift or the exit from the building. The situation is much more problematic when it comes to places visited by culturally diverse and multilingual audiences, like airports or hotels, where signage must be transparent for many people. This is the result of intercultural differences in the perception of symbols. For instance, shapes such as a circle and a triangle used in Poland will not always be appropriate to mark the toilets in different countries and cultures.

Photo 2

Primosten, Croatia. The sign on the sidewalk does not match the other markings and is, therefore, counter-intuitive. © Photo by the author.

Essentiality

Despite the ubiquitous "cargo cult" in the design of navigational systems, it is worth sticking to the minimalist "less is more" introduced into architecture by Ludwig Mies van der Rohe. In semiotic solutions, it is not essential to present every detail but to focus on those necessary for the proper denotation of the sign. Therefore, a sound orientation system should mainly be based on space's most important directional elements, landmarks, reference points, etc. Essentiality can often be observed in examples of underground line diagrams, in which only the most important reference points such as the rivers or monuments appear, while the rest of the elements are reduced.

Steerability

The last but not least feature is steerability – the sense of navigation. While the earlier features can be described as semiotic-functional, steerability is a primary function of the whole wayfinding system. Steerability

allows the user to locate himself, find the way directly to the destination, and easily process environmental cues after reading a particular sign (e.g., maps). (Foltz, 1998). This feature refers to the human perception of space. Therefore, designers should familiarise themselves with the latest research on neurology, cognitive and communication science. It would be advantageous to conduct their research on the designed space.

Case Study

Using the features mentioned above of a good wayfinding system, the article presents the case study of implementing these features in the central bus station in Wroclaw (Poland). After its renovation, the station shares a building with Wroclavia, one of the biggest shopping centres in Wroclaw. The research involved a participatory observation method, with an observational form consisting of characteristics and their implementation in the orientation system. The study was conducted in May of 2022.

The bus station building is situated in the city centre, opposite the main railway station, and near major intra- and inter-city communication hubs. The bus station is located two floors below the ground. The building consists of 5 floors: 2 underground ones containing a cloakroom, a station car park and the station, and 3 floors above ground with shops, offices, and a shopping centre's car park. The combination of various functionalities made designing a proper wayfinding system quite challenging. At first glance, the structural plan allows one to create a mental hierarchy of the building's structure – the shopping centre takes up most of the space, whilst the station area appears to be side-lined. Due to the location of the mall in the city centre and the building's functionalities, there are various groups of users: shoppers, travellers, office workers, restaurant customers and residents taking walking shortcuts, and so on.

The signage system is not consistent for the building as a whole – the ones used at the station area differ from those used in the shopping centre. Signage in the commercial section has been implemented mainly in the form of blackboards suspended from the ceiling with bright, illuminated letters, signs and lettering on the walls, and free-standing signposts. There are also electronic stations with interactive maps of the facility. North-facing entrance is marked by a giant "Wroclavia" sign above the entrance, but the "bus station" sign is smaller, with a different typeface printed in white on a glass plate, which makes it less visible. The West entrance near the public transport stop and two north entrances are only marked as the shopping centre and lack any information about an entrance to the bus station.

Photo 3

Wroclavia. The main west entrance near the public transport stop lacks information about being an entrance to the bus station. © Photo by the author.

Photo 4

Wroclavia. Signs in the shopping centre. © Photo by the author.

The way to the station is marked throughout the gallery using suspended ceiling signs with text, an icon of a bus, and directional arrows. The directional signage does not stand out and appears second-to-last on a multi-row sign. The entrance to the station from the commercial area is marked with a "PKS" neon light, which, while being a popular abbreviation in Poland, is not necessarily straightforward for foreigners. The ticket hall contains various types of markings which differ significantly from the ones used in the shopping centre area. These include illuminated, wall-mounted departure boards, directional arrows on the floor in the form of stick-on blue lines, and wall-mounted black and white markings. Although signs in a sticker form are a good choice, they might go unnoticed, especially when the area gets crowded.

Photo 5
Wroclavia. The north-facing entrance. © Photo by the author.

Platforms are located at level -2, and their numbers are placed on the vertical columns next to every departure point. These markings are prominent, readable, and have appropriate contrast. "Arrivals" and "departures" directional arrows lead to the correct areas, although their noticeability might also be worse during busy times.

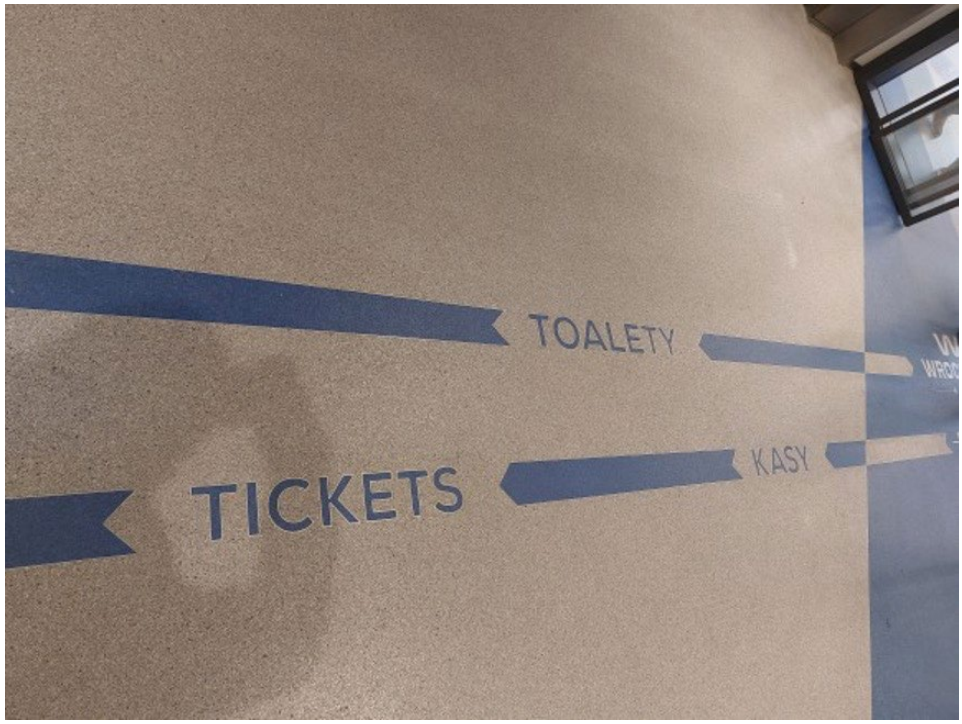

Photo 6

Wroclavia. Directional arrows on the floor in the form of stick-on blue lines in the main hall of the bus station. © Photo by the author.

The following table (p. 16) presents the evaluation of the theorised features. Three main points of wayfinding were considered – [E] building entrances, [W] directional arrows, and [I] markings at the station. The scale range is: excellent, appropriate, partially correct, insufficient, and poor.

In conclusion, signage used throughout the station is largely legible but appears ill-adapted to the small space. That makes some signs, for example, floor markings, unnoticeable and subject to erasure. Using both blue and black-and-white markings remains a questionable choice as they may be unintuitive. Station entrance and exterior signs are unnoticeable, and locating the entrance for travellers without a map might prove challenging.

The biggest shortcoming is the lack of directional signage from the public transport-facing entrance. It would appear that during the building's recent renovation efforts, the commercial area was prioritised, whilst the bus station became less noticeable.

Table 2

The summary of the observation of Wroclaw's main bus station. © Kamil Olender.

Feature	Main result	Comment
Visibility	E: poor W: partially correct I: appropriate	Only one entrance is marked, but the sign is quite small. Signage in the shopping mall does not stand out. The signage is quite visible.
(In)visibility	E: insufficient W: excellent I: appropriate	Concerns only the northern entrance because of background usage. Visually coherent with the wayfinding system of the shopping centre. Despite different colour scheme and styles of signs, is visually coherent with the design of the area
Cohesion	E: appropriate W: excellent I: partially correct	Not always coherent. Fully coherent. Lack of cohesion between blue and white markings.
Versatility	E: partially correct W: appropriate I: appropriate	Requires funding but allows for an extension. Can be easily extended. Can be easily extended
Intuitivness	E: partially correct W: appropriate I: appropriate	No foreign languages, abbreviations used might not be understandable. Mainly well positioned. Mainly well positioned.
Essentiality	E: appropriate W: appropriate I: partially correct	Mainly well-illustrated with words and simple icons Mainly well-illustrated with words and simple icons. Utilises visual markings instead of text.
Steerability	E: poor W: partially correct I: appropriate	Almost no signage or maps outside the building. Not always visible. Not many information points. Steerable during not busy times.

Summary

The article presents an overview of the most important theoretical, research and design knowledge about developing signage systems for different spaces. The observational method and the seven principles for designers acting in accordance with the communication design methodology do not exhaust the subject. However, the paper summarises the most frequently discussed design principles in the scientific literature and industry texts. In line with the communication design theory (Fleischer, 2007), the design stages, such as strategic planning and the creative process, should be preceded and followed by the research phase. The first step should involve an analysis of both the space and the audience that will ultimately use the signage system. Then, the designed signage should be tested by the users.

This article aims to present the complexity of the wayfinding subject and draw attention to the proper analysis of the existing situation and the current state of knowledge to achieve human-centred design solutions. This insight also extends the case of the differentiation of orientation systems for commercial and public spaces.

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Searching for Identity in the 20th-Century Lithuanian-American Food Exhibitions

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Abstract

In this case the author of the article, using quantitative and qualitative analysis of the selected periodical publications, examines ethnic food fairs held in the USA in the 20th century. Focusing on the issue of food as an expression of ethnic identity, the article aims to reveal how Lithuanian emigrants, by organising and participating in ethnic food exhibitions, disseminated and aspired to maintain their ethnic and national identity. The theoretical approach of the research is based on the theories of coexistence of multicultural societies, that is the "melting pot" and a "salad bowl". The author addresses the following questions: 1. How have world and food fairs developed in the USA? 2. What impressions did the Lithuanian diaspora leave in world and ethnic food fairs? 3. How was identity fostered at Lithuanian exhibitions of "national dishes" during World War II? and 4. What role did ethnic food exhibitions organised by the Lithuanian diaspora play in the construction of identity? The author concludes that exhibitions of "national dishes" organised by Lithuanians brings to light a certain fragmentation of the diaspora in terms of food and ethnic identity.

Keywords

Lithuanian-Americans, identity, community, ethnic food fairs, Lithuanian food

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Introduction

The historical sources of world's fairs argue, "of all the events in recent history, only wars have had a greater impact on the expression of civilisation than world's fairs" (*Australian World Exposition Project* cited in Makaryk, 2018, p.5.). Lithuania also had a pavilion at the world's fair held in Europe and the USA in the early 20th century, and its participation was greatly supported and encouraged by the Lithuanian diaspora.[1]

The ethnic food fairs, which became popular in America, especially in the late 20th century, and which were intended to show the cultural traits of the multiethnic American population, could be considered a "smaller" version of the world's fairs. Communities by deliberately selecting certain foods that express heritage and ethnicity and reflect unique aspects of their history, highlight the singularity and exceptionality of their culture. According to John McCarry, fairs "allow us as communities to come together and to meet each other face-to-face" (McCarry & Olson, 1997, p.10.). Moreover, at these events, the connection between participants and visitors from the same community helps to avoid divisions and social alienation, and provides a space and an opportunity to foster a sense of community by building and strengthening belonging. The collective preparation of food and the exchange of knowledge on how to cook and eat are instrumental in establishing and maintaining social links between different social groups and generations in the community.

The topic of Lithuanian participation in fairs and exhibitions is an important one in studying the history of Lithuanian emigrants. However, only a small part of the world's fairs in which Lithuania participated have attracted much interest among the researchers. Stasius Michelsonas, a Lithuanian-American historian, reveals the details behind the idea of the Lithuanian-Americans to organise a "Lithuanian section" at the 1900 Paris Exposition (Michelsonas, 1961). The Reverend Jonas Žilinskas (1902), in an album on Lithuania's participation in the same fair, raises the question of the content of the Lithuanian exposition and its proper

[1] From the second half of the 19th century to the present day, there have been three waves of emigration from Lithuania. The first wave began with the uprisings of 1831 and 1863 against the Tsarist regime. After the defeat, some of the participants of the uprisings left for the USA, but mass emigration from Lithuania began in 1868. It is estimated that 374 000 blue-collar workers, tradesmen, landless peasants and rural craftsmen came to the USA before the outbreak of WWI (*Lietuviškoji enciklopedija* [*Lithuanian Encyclopaedia*], Vol. 1, 1933) and another 30 869 Lithuanians in 1920–1940 (*Eidintas*, 1993) hoping for a better, easier and more prosperous life. The second wave of emigrants was caused by WWII. In 1941, Lithuanians, having experienced the occupation of communist Russia, with the approaching second Soviet occupation,

arrangement. Remigijus Misiūnas's book *Lietuva pasaulinėje Paryžiaus parodoje 1900 metais* [Lithuania at the 1900 Paris Exposition], (Misiūnas, 2006) is perhaps the most comprehensive and extensive account of Lithuania's participation in the Paris World's Fair. It provides a coherent overview of the history of Lithuanian preparation for and participation in the event, as well as testimonies from contemporaries, archival documents and the publications prepared especially for the exposition. The historian Antanas Kučas analyses the issue of the establishment of the Lithuanian pavilion at the 1939 New York World's Fair (Kučas, 1971). Irena Mikuličienė's study (2019) on the preparation of Lithuanians for this exhibition is also very comprehensive. The author recreates and details the history of the preparation, opening and running of the exhibition and the fate of the exhibits after the event.

Unfortunately, fairs that took place in the USA in the 20th century and exclusively presented Lithuanian history and culture, have not attracted much interest among Lithuanian researchers. Exhibitions of Lithuanian food organised by Lithuanian emigrants have not been more widely studied. Most of the studies cover only the informative reports and testimonies of those who participated published in Lithuanian and American press. According to the researchers, the ethnic products and dishes exhibited in such events highlight the distinctiveness of the nation's culture, and the collective cooking and feasting reveal the spirit of communality of the group. Activities based on ethnic cooking practices support and transmit ideas of identity to younger generations. This article analyses ethnic food fairs in America, focusing on the issue of food as an expression of ethnic identity. It aims to reveal how Lithuanian diaspora, through the organisation of and participation in ethnic food fairs and exhibitions, has promoted and aspired to maintain its ethnic and national identity.

Recent research on food-related events emphasised how local, regional, national and international fairs, festivals and exhibitions reflect and construct people's perceptions of food as part of a culture, indicating ethnic belonging, production and consumption. It is seen from the perspective of event organisers, participants and other interested parties who create and experience the diversity of food cultures. In doing so, various research

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fled to the West, mainly to Germany and Austria, taking with them only the necessities. It has been estimated that about 60 000 Lithuanians left the country (Šilbajoris, 2001), most of them intellectuals, prominent artists, politicians, academics and writers. In mid-1948, after the US administration passed the Displaced Persons Act, mass emigration to the New World began (Saldukas, 2013). Some Lithuanians stayed in Europe; however, most of them (more than 30 000) moved to the USA. Others went to Canada, Brazil, Argentina and Australia. When Lithuania regained its independence in 1991, a third wave of emigration began.

methods are applied. For example, Elisa Ascione and Christopher Fink draw on ethnographic fieldwork to show how local community food festivals take every day cooking to a higher level of "heritage cuisine" and functions as a form of identity construction (Ascione & Fink, 2021). Matt Comi and Ruth Stamper's study of an annual community food festival in a small and aging American town in Kansas notes that the food festival serves as a bonding event, helping to maintain a connection between members of the community, becoming a place, which, despite the lack of conventional and everyday spaces, is able to articulate, create, or maintain a sense of neighbourliness and festive traditions (Comi & Stamper, 2021).

In this article, the analysis of ethnic food fairs and exhibitions organised by Lithuanian-Americans applying the "melting pot" (Fox, 2003) and "salad bowl" (Berray, 2019) theories of multicultural societal coexistence as a theoretical approach to the study was performed. In the first decades of the 20th century, the "melting pot" theory was implemented in order to "Americanise" migrants from different countries by introducing them to the civic values of the host country. Later, in the mid-20th century, the "salad bowl" theory emphasized the singularity of individual cultures in order to preserve their distinctive ethnic characteristics. In the context of these theories, which are related to cultural similarities or differences between places and peoples, the article discusses the issues of organising Lithuanian ethnic food fairs and exhibitions in Lithuanian diaspora.

The empirical research was based on quantitative and qualitative content analysis of selected periodical publications. The application of the quantitative content analysis method has highlighted (Neuendorf, 2012) the main trends in the organisation of ethnic fairs, namely their intensity and content. This method also allowed bringing to light how much attention was paid to the presentation of information about the organisation of these fairs in the Lithuanian-American and American press.

Qualitative content analysis, on the other hand, enabled us to identify and analyze the emotional side of the texts, look for hidden meanings and other elements that are relevant to the purpose of the research. The objectives of organising ethnic exhibitions, such as identification of Lithuanian dishes, passing of their preparation practices to younger generations, (Juozelėnaitė, 1945) community attitudes towards these fairs and exhibitions, and changes in the format and content of these events are revealed.

For this research, the articles from the 20th-century Lithuanian-American diaspora and American press were selected. The extensive collection of books and periodicals[2], accumulated by Lithuanian emigrant Dr. Kazys

[2] This collection was donated to the Klaipeda University Library by Dr. Kazys Pemkus. In 1994, the then Rector of the University, Stasys Vaitekūnas, visited the USA, met

Pemkus and currently housed in the Department of Rare Printed Materials of the Klaipeda University Library, provided an opportunity to analyse the periodicals published by the Lithuanian diaspora *de visu*, searching for information about the ethnic fairs in a targeted manner. The American periodicals were searched in the US archive *Newspapers*, by formulating queries using such keywords as "Lithuanian food exhibition," "Lithuanian food fair," "Lithuanian food festival," "International food festival," and "Lithuanian food." Due to the extremely large archive, the search was accomplished in stages: using the archive's search filters, the analysed period was divided into decades. For each decade, the information was searched by repeating the above-mentioned keywords.

A comparative analytical approach to periodicals published in the USA considers the following questions: 1. How did world and ethnic food fairs develop in the USA? 2. What footmark did the Lithuanian diaspora leave on world and ethnic food fairs? 3. How was identity fostered at Lithuanian exhibitions of 'national dishes' during World War II (WWII)? and 4. How significant ethnic food and drink fairs organised by the Lithuanian diaspora were for the construction of its national identity?

A Historiographical Overview of World and Ethnic Food Fairs

The first food fairs can be traced back to Europe, where the Great Exhibition of Products of French Industry was organised in Paris in 1798–1849 to help French producers compete with the British on the international market. Later, in 1851, on the initiative of Queen Victoria's husband, Prince Albert, the Crystal Palace Exhibition was held in London in an attempt to compete with the French. It was the first modern world cultural and industrial exhibition that later became popular in the 19th century, highlighting the scientific and technological achievements of different countries.

The emergence of world's fairs in the USA was inspired by the early exhibitions in Europe. Exhibition of the Industry of All Nations, more commonly known as the New York Crystal Palace Exhibition, took place in 1853–1854. In content, it was similar to the one organised in London, but it fell short in terms of the number of participants, thus costing the organisers a financial loss. It is likely that this circumstance was the

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the collector and was introduced to his archive. The collection, which is versatile and multilingual in content, contains books published in the 16th–19th centuries, as well as other publications and periodicals published between the two world wars, in Soviet Lithuania and in the diaspora. It may be used by the researchers working in various fields.

reason why the organisers hold another exhibition only after more than twenty years, in 1876 in Philadelphia. The success of that exhibition which attracted almost 10 million visitors secured the triumph of the world's fairs in the USA for the next 40 years (Findling, 2018).

The American world's fairs were different from the exhibitions held in Europe. At that time, the US government only provided federal aid for fairs organised in the States and only for US government pavilions and exhibits. In European exhibitions, US participation was based on private initiatives only, whereas European countries were mostly represented at government level. Another attribute that differentiated the European and American exhibitions was that the latter much earlier introduced attractive elements, such as foreign or indigenous "villages", which showed the everyday life of the inhabitants of what were then considered to be "primitive" societies, such as those of Africa, Asia and the South Pacific Islands (Findling, 2018).

Food is one of the many exhibitions offered to visitors at world's fairs. The rise of industry and science has inspired exhibitors to showcase technological innovations that promoted food production efficiency, improved the sanitary environment and enhanced taste appeal. World's fairs provided an opportunity for companies to present new food products, showing the production process from raw material to ready-to-eat product. The comparison of different regional and ethnic food cultures has highlighted gastronomic differences and strengthened the creation of culinary identities (Scholliers & Teughels, 2015).

Alongside the world's fairs that attract millions of visitors, there are also much smaller but not inferior, local food fairs and festivals held in towns or communities, usually focused on trade, religious practices and/or harvest festivals. These events bring the community together to share agricultural achievements, cooking experiences and a sense of togetherness in sharing food. Small, monocultural exhibitions are characterised by a more intimate space and activities based on the local community: traditions of ethnic food produced by residents and local businesses, exhibits created by local organisations and artists, and a program of local performers. These exhibitions support shared values, bring out the experiences of local participants and promote communality.

A chronological analysis of community food fairs in 20th-century America reveals several trends. In the early decades, food fairs aimed at introducing new foods (e.g. breakfast cereal). As the focus fell more and more on separate ingredients of the products, the attention was shifted to new quality foods (e.g. brown rice). The target audience for these fairs were housewives; therefore such events contained plenty of useful tips for

the home, such as how to keep food fresher for longer or how to make it easier to clean a stain on the carpet.

Another trend of early 20th-century food fairs refers to festivals dedicated to a specific dish or product, where different variations of one dish or product were demonstrated and enjoyed. According to the American press, "food festivals which celebrate everything from artichokes to zucchini are the classic American tribute to local products" (*Food Festivals Whet Country's Appetite*, 1944, p. 16). In these homogeneous food events, a particular product was made into an icon or symbol, in the attempt to brand a region or a city as the "world center" for a particular food item.

Unfortunately, the outbreak of WWII had an impact on food fairs. Their content and the issues raised reflected the moods and concerns of the civilian population at the time. The latter were the result of the food rationing introduced by the US government and put into effect in the spring of 1942,[3] which limited the availability of the necessary products and severely cut the daily diet of the population. The fairs of that period focused on cheap and, above all, complete nutrition for the population, on the representation of the harvests grown in the "Victory gardens,"[4] and on the possibilities of long-term preservation (canning, drying) of vegetables and fruit.

After the end of WWII, in the late 1940s, a different kind of food event sprung up in America. The organisers of these events turned to the individual communities, their ethnic origins and culinary features. One American periodical argued, "the foreign food festival is a great idea, and let us hope that all communities will become part of it" (*Foreign Foods Festival Plans For Fiesta Are Underway*, 1966, p. 1). At these events, participants were encouraged to dress up in national costumes and to decorate their tents with ethnic elements, thus "adding more color" (*Foreign Foods Festival Plans For Fiesta Are Underway*, 1966, p. 1) and highlighting cultural differences. Although food was one of the main attractions at these festivals, the events also featured dance and song groups from various ethnic communities, as well as souvenirs and ethnic merchandise. Such events often drew large crowds, sometimes as many as fifty ethnic communities that lived in the USA, including Lithuanians.

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[3] Food rationing constituted one of the three parts of the US *Food for Freedom Program* introduced during WWII. The program was based on a points system and limited quantities of food. (*Maistas kovoja už laisvę* [*Food Fights for Freedom*], 1943)

[4] To compensate for the shortage of food in the stores and to stock up on canned goods for the troops, the US Department of Agriculture (USDA) encouraged people to start Victory gardens. (*Pažangioji šeimininkė* [*Progressive Housewife*], 1945) The population was encouraged to grow fruit and vegetables in the smallest patches of land in family and community gardens, in backyards, on the roofs of high-rise buildings, or even in flowerbeds.

Lithuanian Diaspora in World and Ethnic Food Fairs

The Lithuanian diaspora was essential in Lithuania's participation in world exhibitions. The idea of Lithuanian participation in the 1900 Paris Exposition originated among Lithuanian-Americans (Misiūnas, 2006). According to one of the theories, the particular person who came up with the idea was Joana Baltrušaitienė, the author of the first Lithuanian cookbook published in the USA, *Valgių gaminimas ir namų prižiūrėjimas* [Cooking and Housekeeping] (1919) (Michelsonas, 1961). It was only at the urging of their fellow countrymen in America that Lithuanians became involved in the organisation of the events. Financial support also came from Lithuanians living in the USA. The majority of the funds needed to set up the Lithuanian exhibitions at the 1900 Paris and 1939 New York exhibitions were raised by donations from private Lithuanian-Americans and their organisations. Thus, the diaspora contributed and helped in every way to promote the name of Lithuania before and during the world's fairs.

The first mention of Lithuania's name in world's fairs was at the 1900 Paris Exposition. Even though Lithuania as a state "did not yet exist on any political map," the decision was made to have a 'Lithuanian section' in Paris (Mikuličienė, 2019). Later, Lithuanians had their exhibitions at the following fairs: the 1925 Paris Exposition, the 1929 Barcelona International Exposition, the Exposition of 1930 in Liege, the Chicago World's Fair of 1933–1934, the Brussels International Exposition of 1935, the 1937 Paris Exposition, and the 1939 New York World's Fair (Vizgirda, 1960). Unfortunately, this tradition was interrupted by the outbreak of WWII in Europe.

The goals of Lithuania's participation in world's fairs had changed. In the first world's fairs, Lithuanians tried to show the world that "on the one hand, Lithuania still exists, and on the other hand, how Russia is trying to destroy it" (Michelsonas, 1961, p. 214). The exhibitions that followed became an important sign of the international presence of the modernising independent state of Lithuania between the two world wars. The Lithuanians used the events to showcase Lithuanian history and culture, the high level of education and economic development, and to create an image of a state that had preserved its deep historical roots and traditions, which would inspire Lithuanians to be proud of their country (Mikuličienė, 2019).

When presenting Lithuania at international exhibitions, the works of fine art, especially of ethnographic nature, were the most popular. Only a small part of the exposition consisted of Lithuanian food products. The 1939 New York World's Fair featured the products of the Lithuanian companies *Maistas and Pienocentras*, mainly canned meat, cheeses and other dairy products. The display of these companies' products at the world's fairs was

considered to be a promotion of their production, so when the Lithuanian government refused to support these companies, they had to prepare the exhibits at their own expense (Mikuličienė, 2019).

In addition to the major world's fairs, Lithuanian diaspora actively promoted its culture in the international ethnic food festivals, Nations of the World, that became popular in the 1940s in the USA. The events were aimed at getting to know better the ethnic communities living in the area, their culture, and traditional dishes. In these local events, unlike the major fairs, the organisers paid a special attention to ethnic food. The opportunity to taste dishes from different countries was highly appreciated by the visitors.

Lithuanians always participated in these events dressed in national costumes. Usually they enriched the table of the world's nations by presenting dumplings, kugel, sausages with sauerkraut, buns with bacon, *grybukai* ("mushroom" cookies), *Napoleonas* cake, and *šakotis* ("tree cake"). In addition to ethnic food, woodwork, amber jewelry, straw gardens, spinning, weaving and other crafts were on display. This cultural exposition was complemented by a program prepared by Lithuanian-American song and dance groups.

Taking part in such events was important for Lithuanians in two ways. Like other nations, they strove to "introduce Americans to [their] culture" (Dosti, 1990, p. H48). However, the participation in the fairs was motivated by a far more important desire to "preserve one's ethnic origins and customs" (*Who They Are, What's Served*, 1977, p. 3) or, in the words of the emigrants themselves, "it's important that people celebrate their heritage – even if it's just once a year at the Folk Fair" (Riegert, 1987, p. 9). Thus, events that brought different communities together around the same table were also important for the promotion of Lithuanian identity.

Presenting the Lithuanian Dishes during WWII

Of all the food- and ethnic-related events organized in the USA in the 20th century, it would be interesting to single out and analyse in more detail the series of exhibitions of "Lithuanian national dishes and drinks"[5] which took place during WWII and differed from the earlier events by focusing exclusively on Lithuanian culture. It was an unprecedented event for the

[5] The first "national food and drink" exhibition was organised on Palm Sunday, 25 March 1945, at the parish hall of Nativity of The Blessed Virgin Mary in Chicago's neighborhood Marquette Park. The second one was held on 22 April at the parish hall of St. Anthony Church in Cicero. The third event took place at yet another Chicago's neighborhood, Bridgeport, at St. George's Lithuanian parish hall on 27 May.

diaspora, because "nobody had ever thought that such an exhibition could be organised among Lithuanians." (*Užkviečiame į Valgių Parodą* [*We Invite You to Food Exhibition*], 1945, p. 5). The Lithuanian-American press announced that "(...) such a novelty is a serious matter. It deserves (our) serious attention. Just as the organisers of the exhibition take the work seriously, so the public must take it seriously" (*Tautinių valgių paroda* [Exhibition of National Dishes], 1945a, p. 4). The special attitude of the organisers of the exhibition is evidenced by at least seven articles in the Lithuanian-American newspaper *Draugas* before the exhibition began, reports in the Lithuanian radio programs, Margučio radijas and Šaltimiera, and the advertising of the event in the Lithuanian churches during the mass.

The event also stood out because of its organising committee. In the following years, Lithuanians participated as guests in the events that emphasised ethnicity, together with other communities living in the USA. However, the organisation of these "national food" exhibitions was entrusted to a Lithuanian agronomy teacher, Salomėja Juozelėnaitė-Šagamogienė,[6] member of the Press Section of the Lithuanian American Roman Catholic Women's Alliance (hereinafter—LARCWA). Born and raised in Lithuania, Juozelėnaitė-Šagamogienė graduated from the Academy of Agriculture in Dotnuva, for about ten years worked as the headmistress of the girls' agricultural school in Salaimiestis (Kupiškis district), and later ran a canteen in Klaipeda. She was no stranger to food, to say the least.

The headlines of the publications that appeared in the Lithuanian diaspora press and the invitation issued to Lithuanian housewives, owners of Lithuanian businesses and farms to participate in the exhibitions seemed to imply that the events were to be devoted exclusively to Lithuanian dishes and drinks. However, it was also announced that preference would be given to "national and ancient Lithuanian dishes and drinks, but innovative Lithuanian, European-style, and American well-prepared food will also be considered" (*Lietuvių tautinių valgių paroda*! [Exhibition of Lithuanian National Dishes!], 1945, p. 5). It can be assumed that as Lithuanians settled in a multicultural environment, their cuisine not

[6] Salomėja Juozelėnaitė-Šagamogienė was born in 1893 in the village of Deikiškės, Vabalninkas county, Biržai region. Her sister invited her to visit America, where she met Jonas Šagamoga, a Lithuanian who came to the USA sometime earlier. Salomėja married him and never returned to Lithuania. After WWII, when a new wave of Lithuanian emigrants arrived, Juozelėnaitė-Šagamogienė became involved in Lithuanian activities and was deeply concerned about the fate of Lithuania. Unable to give her savings to Lithuania, where she was educated and lived, she donated generously to the Lithuanian Foundation, Inc. (from 1972 until her death, she and her husband donated $366,000 to the Foundation), which supported Lithuanian education and culture in the USA. She died on 23 April 1990 in Chicago (Juodvalkis, 1990).

only became enriched with "American" and other food or dishes from other ethnic groups living in the vicinity but also, in a sense, replaced the ingredients of Lithuanian dishes with food that was not typical of the Lithuanian cuisine. In other words, it started to assimilate, or to "melt" (Senulienė, 2021).

The idea of organising exhibitions of "national dishes", which was part of the activities of the Lithuanian diaspora, had other important goals. In America, charitable activities organised by Lithuanian diaspora were common. Funds were usually raised to support organisations, activities and initiatives in Lithuania and the USA. The exhibitions of "national dishes" were no exception; the money raised during the exhibitions were to be used for the publication of "[...] a serious, well-grounded study – a work in English on the issue of Vilnius and its region" (*Tautinių valgių paroda jau Bridgeporte* [The Exhibition of Ethnic Dishes Has Arrived in Bridgeport], 1945, p. 6).

Beyond this rather pragmatic goal, there were even higher aims. According to the organisers of the exhibition, the exhibitions of "national dishes" were meant to show what kind of food is Lithuanian, as this question had often been raised at various banquets and parties. It was therefore hoped that "when the dishes made by Lithuanian women from different parts of Lithuania are brought in, it will be easier to determine which dishes are purely Lithuanian and which have an international character" (*Tautinių valgių paroda* [Exhibition of National Dishes], 1945a, p. 4). It was also important to display the variety of dishes from different regions of Lithuania, because, as the press noted, "not all of us are familiar with what each region of Lithuania used to eat" (*Užkviečiame į Valgių Parodą* [We Invite You to Food Exhibition], 1945, p. 5). Moreover, according to Juozelėnaitė-Šagamogienė, "(...) it is not right to think that what we have learned in cooking or baking in Lithuania is all Lithuanian. After all, the dishes and cooking methods of Russian, Polish and Western European nations have been intermixed with those of Lithuania for ages. (...) Only Lithuanian rural cuisine has been less affected by foreign influences" (Juozelėnaitė-Šagamogienė, 1945, p. 5). The organisers of the exhibitions were interested in showing "more characteristic Lithuanian dishes and drinks" (*Vis tik tai didelė naujanybė* [It's a Big Novelty After All], 1945, p. 5) and concerned about preserving the culinary heritage. The Lithuanian dishes exhibited in these events were to serve the younger generations of emigrants "as a sign of the uniqueness of the Lithuanian nation" (Juozelėnaitė, 1945, p. 5) and short instructions on how to cook the Lithuanian way were to ensure the continuity of culinary traditions.

The exhibitions were not only about sharing cooking experience and knowledge but also about introducing cooking innovations. As Juozelėnaitė-

Šagamogienė noted, housewives often make the mistake of thinking "that only they know the right way to prepare this or that dish." Thanks to the progress of science, "improvements are being introduced from time to time in all domestic life, and old tools and methods of cooking are being put aside" (Juozelėnaitė-Šagamogienė, 1945, p. 5). Therefore, the old traditions of Lithuanian cooking when implemented in a modern environment must inevitably change.

Not only scientific progress but also the scarcity of products caused by the war encouraged Lithuanian housewives to change their cooking practices. Thus, one of the more important goals of the exhibitions – to show how emigrants could adapt to wartime conditions, which was accomplished by focusing on "(...) wholesome products that can substitute meat, adapted for wartime" (Juozelėnaitė, 1945, p. 5). Although the food situation in the USA during the war was not as difficult as in Lithuania, where, as the Lithuanian diaspora press reported, "one could not buy rye bread without a '*korčiukė*' [ration card]" (*Sovietiškos kainos Lietuvoje* [*Soviet Prices in Lithuania*], 1945, p. 1), great importance was attached to the provision of a cheap but adequate diet and to the maintenance of people's health. The prevailing opinion at the time was that the health of every citizen reflected the health of the nation. If people are healthy and strong, so is the country. For these reasons, nutrition was a matter of particular concern, since the well-being of the individual and, therefore, the survival of the nation depended on what was eaten.

The cheap diet during the war was juxtaposed with the fasting in Lithuania. It was argued that the dishes, which replicated the cuisine of "ancient" Lithuania, where "long and frequent fasting, (...) the lack of meat taught Lithuanian housewives to cook nutritious and tasty meals without meat" (*Vis tik tai didelė naujanybė* [*It's a Big Novelty After All*], 1945, p. 5) will allow an easier and more nutritious way to survive the period of constraints.

The organisers and the participants of the exhibitions were interested in attracting as many visitors as possible and in presenting their products and dishes in the broadest and best way possible. The visitors could not only look at the food but also taste it. The offer of Lithuanian food was rich and varied. Guests had the opportunity to taste cold and hot beer from the Aukštaitija region, made by the Biržai, Vabalninkai and Pasvalys brewers, Lithuanian *krupnikas* (honey liqueur), liqueurs, mead, and gira, smoked and fresh Lithuanian sausages, hams, roasted piglets, poultry, *skilandis* (matured sausage) from the Suvalkija region, Samogitian *šiupinys* (hash) and *kastinys* (beaten cream dip) with fried potatoes, pancakes, various types of fish, herring, mushrooms and other appetizers. For a desert, the exhibitors served Lithuanian cake *Boba*, fragrant cakes, pies, pastries,

candies, cookies *grybukai*, kissel, puddings, jellies and creams. The abundance and variety of food on offer made an impression that the war did not affect the exhibitors.

The exhibitions tried to show Lithuanian dietary trends, concepts and features, for example, that Lithuanians like and eat a lot of meat (paradoxically, meat was one of the most strictly regulated products in the USA during the war). Exclusive dishes from "ancient" Lithuanian cuisine showcased at the exhibitions in terms of variety and cost, resembled the food of inter-war Lithuanian city dwellers rather than that of rural ones. The articles on exhibitions of Lithuanian dishes did not mention that guests were treated to *cepelinai* (grated potatoes stuffed with meat, cottage cheese or mushrooms), *kugelis* (potato pudding), dumplings or *šaltibarščiai* (cold beat soup) – all of which were very popular dishes among the later second wave of Lithuanian-American emigrants. These dishes became very popular in Lithuania between the wars, but the trend had apparently not yet reached Lithuanian diaspora in the USA.

Although during the war the Lithuanian newspapers paid a lot of attention to the potato – they emphasised its nutritional and energy value, stressed financial benefits for the family, urged people to cook as many dishes using potatoes as possible, the vegetable was considered a symbol of patriotism (*Valgyk daugiau bulvių* [Eat More Potatoes], 1943, p. 3) and even the "food of the national victory" (*Bulvės* [Potatoes], 1943, p. 6) – its place in the exhibitions of Lithuanian dishes was very modest. It was mentioned only in the recipe of *kastinys*. This detail suggests that the first wave of Lithuanian emigrants still perceived the "Lithuanian nature" of their cuisine through historical Lithuanian dishes, and only later was this perception affected by the twisted culinary aesthetics introduced by the Soviet era.

The second exhibition of "national dishes" slightly differed from the first. It dealt not only with practical issues of food production but also looked for aesthetic and entertaining experiences. To this end, there was not only an exposition of Lithuanian food, but also "(...) a demonstration of modern table settings for formal lunches, dinners and coffees." (*Tautinių valgių ir gėrimų paroda* [Exhibition of National Dishes and Drinks], 1945, p. 5) The exhibition featured lectures on topics that were relevant at the time: How to set the table for breakfast, lunch, and dinner for the household and guests? How to serve and behave at the table at home and at the guests? The lecturers also dealt with the composition of dishes and the most important nutrients, the benefits of fresh vegetables and fruit for the human body. It is very likely that the organisers hoped to attract more interest and more visitors by expanding the content of the events.

The exhibitions received mixed reviews. At the end of the first one, several positive comments appeared in the diaspora press describing the impressions of the event. However, the main organiser of the exhibition, Juozelėnaitė-Šagamogienė, stated, "I was hoping that the exhibition of national dishes would be more appreciated by the general public" (*Ir žiūrėjom, ir valgėm, ir gėrėm* [We Watched, Ate and Drank], 1945, p. 5). The county secretary of the LARCWA, Elzbieta Samienė, noted that the exhibition was "a somewhat mediocre success" (*Ir žiūrėjom, ir valgėm, ir gėrėm*, 1945, p. 5). Despite the negative opinions, it was hoped that the exhibitions of Lithuanian dishes would become traditional, organised annually, so that "Lithuanians could be proud of their national dishes" (*Tautinių valgių paroda* [Exhibition of National Dishes], 1945a, p. 4) and that foreigners would see how "Lithuanian women know how to prepare delicious meals" (*Tautinių valgių paroda* [Exhibition of National Dishes], 1945b, p. 4).

Discussion

The Lithuanian food exhibitions organised during WWII were special events in their content (only food was showcased) and purpose (they focused on maintaining and passing on Lithuanian identity). Thus, one might ask what factors had contributed to the fact that the exhibitions did not attract much interest from Lithuanians.

This question can be considered from several angles. One of them is the dissemination of information. It was commonly believed that cooking is a women's activity, and therefore the exhibitions are more likely to be targeted at a female audience. Paradoxically, the women's magazine, *Moterų dirva* [Women's Soil][7] published only one piece of information on one of the three exhibitions that had already taken place. Meanwhile, as many as nineteen news and articles of one kind or another were published in the newspaper *Draugas* [Friend][8]. This large number of publications in *Draugas* may have been because in 1927–1968, its editor-in-chief was Leonardas Šimutis, the chair of the LARCWA from 1940 to 1948, which women's section organised the series of exhibitions. It is therefore possible to assume that not only common ideas but also common views of a Christian orientation motivated this large number of publications. Other Lithuanian-American publications, such as the magazine *Margutis*[9],

[7] *Moterų dirva*: a periodical for Lithuanian women in the USA published in Chicago from 1916 to 1991.

[8] *Draugas*: a Lithuanian-American newspaper published in Chicago since 1909.

[9] *Margutis*: a Lithuanian-American magazine published in Chicago from 1928 to 1965.

which played a very important role in Lithuanian cultural life in the USA, and the newspaper *Dirva*[10] [The Soil] made no mention of the exhibitions. Apparently, the advertisements that appeared in only one of the few Lithuanian diaspora periodicals published in Chicago also contributed to the unusually low number of visitors. Just the same, the news about the Lithuanian food exhibitions in Chicago reached as far as Boston, about 1,500 kilometers away from Chicago. The events were featured in the Lithuanian-American newspaper *Keleivis* [Traveler][11].

Another aspect that might had contributed to the low interest of visitors is the highly unfavourable political context. On the one hand, the exhibitions were constrained by the food rationing already discussed earlier and on the other hand, by the "melting pot" theory that prevailed in America in the first decades of the 20th century. The ideas of the "melting pot" were reflected in the processes that took place in the kitchens of Lithuanians and other ethnic groups living in America. The dishes prepared by housewives of different nationalities blended foods, flavours, cooking and consumption practices. It is not surprising that Lithuanians, influenced by this theory, were unwilling to visit the exhibitions offering Lithuanian food.

However, the exhibitions of Lithuanian food became a kind of forerunner of a new theory of multiculturalism, which began predominate in the USA in the 1950s. The theory, based on the notion of fostering sociocultural diversity, metaphorically was called a "salad bowl". Driven by this theory, emigrants arriving in America, while combining their own culture with others, did not merge into a homogeneous society but retain their ethnic features. Although we do not know to what extent the first wave of Lithuanians, long before the "official" rise of this theory in America, understood the value of ethnic food for the promotion of their identity, it is clear that some of the Lithuanians did understand the value of Lithuanian food.

The biblical adage popular in Lithuania, "no prophet is accepted in his hometown" (or "no one is a prophet in their own land") partly explains the fact that Lithuanians living in the USA showed little interest in their ethnic cuisine. This is what the organiser of the exhibitions, Juozelėnaitė-Šagamogienė, stressed in the press after the series of exhibitions. When summarising the events and discussing the future of the exhibitions of "national dishes" she said, "No one has been a prophet in their own country, and we will not succeed among our own people with our national dishes

[10] *Dirva*: a weekly Lithuanian newspaper in the USA published by the Nationalists in Cleveland since 1916.

[11] *Keleivis*: a weekly socialist newspaper published by Lithuanian-Americans in Boston from 1905 to 1979.

either. (...) In order to see what we have (...) and to appreciate it better, one of our organisations should organise an exhibition of national dishes not in a Lithuanian colony but in the center of a large city, by bringing together experienced housewives and commissioning them to prepare individual dishes." (Juozelėnaitė-Šagamogienė, 1945, p. 5) Apparently, Lithuanians, affected by the ideas of "Americanisation", appreciated much more the food choices offered by multiethnic America.

Nevertheless, the exhibitions of Lithuanian dishes and drinks can be regarded as a phenomenon in the Lithuanian diaspora, which represented identity and contributed to the construction of Lithuanian self-awareness[12]. Representation bears witness to the present and allows for a better understanding of how a certain group of people sees the present. The same representations are perceived differently by people belonging to different interpretive communities, that is, having different knowledge and experience. Lithuanians who, until relatively recently, walked on Lithuanian soil and tasted Lithuanian bread have one kind of knowledge about Lithuanian food. The younger generations of Lithuanian diaspora, who may only know the taste of Lithuanian food from their parents' stories, have a different one. Still others are individuals of other ethnic groups who, driven only by superficial curiosity and unbound by any ethnic ties, are interested in yet another ethnic group in multicultural America. These representations should have created a certain understanding for the Lithuanian diaspora that affects the relationship with their own nation and the society around them. The Lithuanians, influenced by the ideas of the "melting pot" and being at the crossroads of "Americanisation", needed more than ever a signpost to guide them in the direction of fostering their own Lithuanian identity. By using everyday food practices, the organisers of the Lithuanian food exhibitions intended to become just such a signpost.

Conclusions

The analysis of food exhibitions, fairs and festivals in the 20th-century America underlined certain trends. At the beginning of the century, food-related events could be characterised by an ethnic blend, when no specific ethnic group or dish was singled out. Food was presented as a showpiece to emphasise its qualitative uniqueness or taste appeal and not as part of a culture reflecting the features of one or other ethnic community. The

[12] According to Bronislovas Kuzmickas, self-consciousness is an essential aspect of national identity, "a reflection on who we are, who we have been, and who we would like to be" (Kuzmickas, 2009, p. 7).

focus was on the increasing manufacturing of the food industry, economic factors and the promotion of consumerism. It is likely that the ethnic leveling that prevailed at food exhibitions and fairs was a result of the ideas of the "melting pot", which was dominant in America at the time and which sought to make all ethnic groups uniform. In the second half of the century, under the influence of another theory, "salad bowl", food events with a different content thrived. They focused on the individual communities, putting them in one single "bowl", while preserving the ethnic origins and culinary features of each.

Lithuanian diaspora played a significant part in initiating the presentation of the Lithuanian cuisine in world's fairs. Its full support and financial backing allowed Russian-occupied Lithuania not only to declare of its existence to the world, but also to present a culture with deep historical roots. The mobilisation and participation of Lithuanian diaspora in food exhibitions, fairs and festivals in the USA also bore witness to Lithuania's presence and deep culinary traditions.

Meanwhile, the exhibitions of Lithuanian "national dishes" organised during WWII revealed a certain fragmentation of the diaspora in terms of food and ethnic identity. Although the first wave of Lithuanian emigrants in the USA did not have particularly high cultural needs, there were those who understood the link between ethnic food and identity and the importance of preserving and passing on Lithuanian culinary traditions to younger generations. Unfortunately, for a large number of emigrants, these exhibitions did not evoke any sentiment and did not gain much interest. On the one hand, this indifference could be attributed to the grim everyday reality of war, where the satisfaction of physiological human needs was much more important than matters of identity. On the other hand, the passivity of the Lithuanian diaspora brought to light the problem of national self-perception and the emerging features of "Americanisation".

Thus, events based on ethnic food practices, acting as mediators between human and food, provide knowledge or an opportunity to see, be introduced and taste, as well as have the power to emotionally stir and provoke self-reflection of identity. The exhibitions of "national dishes" can be perceived as another medium and an attempt for the Lithuanian diaspora to represent its identity in the multiethnic environment of the USA, to introduce a sense of national consciousness. Although it is difficult to assess the real impact of these exhibitions, one can assume that the efforts of the Lithuanians to present the signs of their own identity to the community as a whole had generated a lot of debate among the diaspora.

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Landscapes

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The Dilemmas of a Culturologist

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Abstract

The article concerns the recently published book by Marek Pacukiewicz, *Landscapes of Context*. The author presents the dilemmas of a culturologist – a theoretician and anthropologist of culture struggling with the multifaceted discourse of contemporary humanities. Leading representatives of these sciences, making culture the declared subject of their research, are often content with the presentation of various epistemological strategies aimed at learning about selected aspects of social practices. The practices they analyse, including those of thought, are relatively rarely embedded in broader contexts, and the concept of culture itself is contested as cognitively non-instrumental. Contrary to these tendencies, Pacukiewicz tries to stand up for the metaphysical dimension of culture and proposes to study it as a self-existent being independent of subsequent methodological fashions. He considers *landscape* and *context* to be key concepts for the proposed approach.

Keywords

landscapes, context, culturology, Aristotle, metaphysics, theory of culture

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Introduction

Marek Pacukiewicz's considerations, devoted to the titular "landscapes of context," focus on the philosophical, theoretical and cultural consequences of four ways of understanding culture: evaluating and non-evaluating, attributive and distributive. Narrow definitions of culture based on a value-based approach with a philosophical provenance emphasize what is particularly important and worth noting in human legacy. They refer to the idea of "cultivating the mind," which in modern Europe has resulted over time in the identification of culture with religion, science, and art. The broad non-evaluating definitions that have appeared since the turn of the 19th and 20th centuries propose to treat culture as an entirety of human legacy. Therefore, narrow definitions make their subject matter some of the phenomena falling within the scope of broad definitions. The mutually supportive discourse between these areas is, on the one hand, autonomous and self-referential, but on the other hand, it is the key to understanding and describing culture in its broadest sense. This conjunction allows us to ask whether the approaches limiting our understanding of the culture solely to the sphere of phenomena derived from the "cultivation of the mind" do not affect all ways of defining culture.

In the attributive approach, adopted in cultural anthropology and sociology, and having a philosophical basis, culture is an attribute of all human societies since man, as such, has the ability to create it. However, in the tradition of anthropological and cultural research, distributive understanding is most often used – it assumes that there is no society that does not have its own culture. Each of these approaches, developed theoretically, surrounded by a network of terms, glosses, explanations and reservations (among which an important role was played by the gradual annulment of the firm opposition between culture and nature in the field of sociology and cultural anthropology), at the turn of the 20th and 21st centuries different concepts of the *cultural landscape* began to be generated, for which the elements of other approaches became a *cognitive context*.

Marek Pacukiewicz (2021) essentially does not ask about the contexts of the cultural landscape but inquiries instead primarily about the landscapes of the context and what constitutes specific landscapes of conditions that allow the perception of *culture as culture*. Pacukiewicz's monograph is a book about context, but reflections on the landscape resonate in it equally intensely. If the book was entitled *Landscapes of Context* it would indicate the cognitive potential of the contexts in which the landscape may be entangled. The reversal of the perspective suggests that it is the contexts of various phenomena, processes, and cultural situations

which form landscapes that allow us to familiarise ourselves and understand multidimensional reality.

The Structure of the Book

The book has a remarkable composition: it opens with *Open Questions* and ends with *Opening Balance*. The opening questions concern two issues: philosophical relations between classical metaphysics, ontology and epistemology, and metaphysical entanglements in the relations between culture, society and man in the contemporary anthropological reflection. The author, among other things, looks at the actor-network theory of Bruno Latour as a concept of experimental, relational metaphysics, as proposed by Krzysztof Abriszewski (Abriszewski, 2012), dependent on the point of view (Latour, 2010; Pacukiewicz, 2021) and analyses the critique of Latour made by Graham Harman (Harman, 2016). He poses questions about the metaphysical motif in Claude Lévi-Strauss's research (Lévi-Strauss, 2000; 2001) and its continuation in the writings of Eduardo Viveiros de Castro (Viveiros de Castro, 2014) and Philippe Descola (Descola, 2014). He suggests that in Marshall Sahlins's reflection (Sahlins, 2014), metaphysics " also becomes a mental component that builds individual cultural cosmogonies (...) due to which the Western European idea of metaphysics may appear to us as a common research perspective" (Pacukiewicz, 2021, p. 54). Finally, he attempts to demonstrate how this philosophical and theoretical discourse translates into understanding *culture as culture, in other words, an autonomous being* in the proposals of individual researchers. He groups these theoretical concepts into three parts of the book: *Models*, *In the Eye of an Anthropologist*, and *Writing the Landscape*. The fourth part, *Representations*, focuses not so much on theoretical discourse as on denoting that the category of landscape, crucial to the monograph, is not only derived from painting practice, but is still an area of mediation between various forms of scientific and artistic discourse.

Discourse

Discourse (as understood by Michel Foucault) is a derivative of a particular stage in the development of Homo sapiens - it requires delaying the instinctive reaction of man to events taking place in the world (Cassirer, 1977), and it enables reflection. The reflection deepens with the introduction of writing, which allows for multiple analyses of the same phrase and sometimes translates into a verbalised lesson of humility, both in the face of the

findings contained in other people's texts and of one's own experiences. However, it may not always be an autotelic reflection: in cultures devoid of writing, the analysis of the spoken word is difficult. Nonetheless, if research is to be trusted (Ong, 1992), the word as such has the prime force.

Reflection (*reverie*) exists in every culture (Martin Buber drew attention to it, recalling the image of a peasant who pauses for a moment, looks at the sun and indulges in thinking, or maybe just impressions). But what and how the person thinks or feels remains in the scope of his environmental verbal standards,[1] unacceptable in a world dominated by writing conventions (Derrida, 1999). Sometimes the functions of mediators between a peasant (autochthon) and a "civilised man" are taken over by the coryphaeus of European science: philosophers, ethnologists and anthropologists – it is them who attempt to explain the function of reflection in the so-called simple cultures.[2] It is worth emphasising, however, that the number of cultures with a writing, which enables meta-reflection, namely a reflection on one's own reflection (and someone else's, if the latter has been established), and thus the reflection on the way culture exists as a culture, is relatively small: by the mid-twentieth century, one in thirty-eight languages managed to generate literature (Ong, 1992). Currently, most of the cultures considered tribal from the perspective of the West already have literature, although not always written in the native language and for the needs of the local community, but presenting its history and specificity. According to the intuition of Jan Bronisław Pacukiewicz (the author's three-year-old son), culture is a "differentiator" (Pacukiewicz, 2021, p. 47), it is something that makes one group of people unlike another because an individual, limited by his biological condition, is able to remain in close relationships only with a relatively small number of other people.

The Culturology and the Culture

The book *Landscapes of Context* begins with a series of open questions, the most important of which is probably the subject of culturological research. The author's identity declaration that initiates this selection allows the writer to be identified with a discipline which recently formally ceased to exist in Poland. The question of what culturology is and what

[1] This concerns the ways of being expressive – that which is easy to remember and repeat. In pre-literate cultures, the word was not recorded, and thus, the statements that were too simple/crude for the elite who knew the script to be able and willing to pay attention to them were being formulated.

[2] Reflection exists in every culture, that is, it is a feature of human nature in general. The term *simple cultures* here is synonymous with pre-literate or non-scriptural cultures.

is the subject of culturological research has been accompanying the group of researchers for at least several decades, including Marek Pacukiewicz.

It is not easy to find an equivalent of the Polish word *kulturoznawstwo* in other European languages. In the Polish tradition, the word *znawstwo* refers to two types of competences: on the one hand, strictly theoretical competences, and on the other – practical, craft competences.[3] Someone who has specific practical skills, often also possesses a general theoretical knowledge about the subject of his activities and about the principles/mechanisms of the functioning of this subject. However, theoretical competences do not always translate into practical skills. The question about the primacy of practical and/or theoretical knowledge *(znawstwo*) has divided the tradition of cultural sciences and triggered a whole series of questions about culture itself and its essence. Marek Pacukiewicz, attempting to resolve this issue within a specific discourse, juxtaposes various traditions of understanding culture and links the *znawstwo* with selected approaches in this tradition, clearly advocating for the necessity of recognizing the existential entity of culture (in the sense of materialised reality).

By adapting the overview of research methods to this status of culture, he looks for inspiration in the traditions of Aristotelian metaphysics, and by referring to the being as such, existing autonomously, he tries to build up his own reflection that organizes the knowledge about that being. He does it to present a number of approaches in cultural reflection, present in Europe at least since the end of the 18th century – a culturological reflection indebted to philosophical and theoretical thinking, making cultural practices a separate and necessary subject for methodological justification. He attributes an important role in shaping this reflection to Martin Heidegger, who "pointed out that metaphysics (as European thought in general) petrified the fundamental question about the existence of being" (Pacukiewicz, 2021, p. 33).

Culture understood as an entity that exists due to its being is precisely in this process of constitution, that is in the cognitive act of a human, made a creation dependent on human cognitive powers, including the perceptual abilities of an individual. Therefore, if a man does not perceive reality as something coherent as a whole, if his mind instructs him to give coherence to what cannot be coherent in the very process of perception, then the relationship between the act of perception and the ontological

[3] "Znać się" is Polish reflexive verb, meaning: 1. "to know your own self", 2. "to know one another", 3. "to be highly knowledgeable or highly skilled in some field"; the verb it's derived from "znać coś" means "to know something", "to know", "to know something about something", "to be able to do something" (PWN Polish Dictionary, n.d.).

project[4] requires additional epistemological justifications. Perhaps in the relation between what is perceived and what gives form and sense to the perception process lies the essence of culture, creating a network of acceptable ways of proper perception appropriate to a given group of people and allowing members of this group to create a community of people who perceive the surrounding reality in a similar way.

In the novel by Stanisław Lem, *Eden*, there is an extremely instructive theme concerning the effects of the non-native way of perceiving the planet on which earthly cosmonauts have landed. The cause of the initial misunderstandings with the inhabitants was a different distance between the eyes – only specially constructed glasses allowed the inhabitants of the Earth to enjoy the beauty of Eden. It seems that every culture, built over a long period of time in relative isolation, has developed its own glasses (glasses of language, a hierarchy of values, specialised competences, useful and useless goods, etc.) through which the man of this culture looks at the world. This does not mean that the "glasses" of one's own culture influence its ontic status. Rather, they allow us to see the diversity of other cultures, the axiological shifts in them, the type of social relations, the "higher" or "lower" level of scientific and technical development, etc. Observations of these differences and attempts to summarize them theoretically led to the formulation of distributive, anthropological and sociological definitions of culture, which were an alternative, but at the same time, complementing the attributive, universalising definitions of philosophers. In the era of modernity, a discourse in which the philosophical approach was first relativised by anthropological and sociological thought began to take shape (Sapir, 1978, 2010; Whorf, 1982), and the initially competitive definitions of culture became complementary over time. Later, however, due to, among other things, the questioning of the results of empirical research, a return to the search for universal tools allowing for the description of various forms of the existence of the human world took place.

The Metaphysics

Pacukiewicz's book is the evidence of a multifaceted search for an answer to the question about the ontic (existential) dimension of culture. The author does not hide that his intention is – on the theoretical level – to restore the metaphysical status of culture or, on the practical level, an attempt to look at *culture as culture* as a specific type of entity. The beginning

[4] An ontological project, namely a construction (Heidegger, 1989), enabling the reception of the world to the measure of human cognitive powers.

for his considerations is the metaphysics of Aristotle, which in the era of late modernity and postmodernity, was turned into a set of ontological reflections, clearly epistemologically limited. The process of replacing metaphysics with ontology in relation to culture found its reflection in the humanistic discourse. The author proves this thesis meticulously and with erudition; his considerations include an overview of the research approaches that had the greatest impact on culturology in the late twentieth and early twenty-first centuries. The obvious rooting of these studies in earlier traditions allows the author to incidentally return to the approaches of both the classics of anthropology and the classics of philosophy. The main goal of the book is to organise research approaches to two basic concepts that Pacukiewicz associates with the metaphysics of culture: the *context* and the *landscape*. Each of them is rooted in the multi-threaded discourse of the humanities and the traditions of individual disciplines.

Pacukiewicz tracks how the substantial[5] non-obviousness of culture as an entity translates – within the scope of theoretical and philosophical reflection – into a series of attempts which, in assumption (not always verbalised), are aimed at eliminating substantial internal differences. Although Aristotle already pointed out that there are beings whose substance is not apparent (Aristotle, 1933), the ontological and epistemological dispute over metaphysics does not die out to this day. One might ask why less cognitive emotions are aroused by the substantiality of reality as such than of *culture as culture*, but this does not resolve the essence of the dispute.

The issue of the substantiality of culture, and in fact, its substantively non-obvious status, is, among other things – as it seems – the result of various particular, local taxonomic divisions taken from tradition (Tyler, 1987/1993). Taxonomies and classifications, as well as typologisations, determine the ways of perceiving various types of beings. Movements between categories, which result in changes in the place in the hierarchy and their inclusion or exclusion from individual sets, affect the perception of the world by people. The conventional nature of classification

[5] "In general, although Wisdom is concerned with the cause of visible things, we have ignored this question (for we have no account to give of the cause from which change arises), (…) and in the belief that we are accounting for their substance we assert the existence of other substances; but as to how the latter are the substances of the former, our explanation is worthless – for 'participation,' as we have said before, (…) means nothing. And as for that which we can see to be the cause in the sciences, and through which all mind and all nature works – this cause (…) which we hold to be one of the first principles – the Forms have not the slightest bearing upon it either. Philosophy has become mathematics for modern thinkers, (…) although they profess (…) that mathematics is only to be studied as a means to some other end." (Aristotle, 1933).

(typologisation) provokes the question of the legitimacy of logical divisions. Various logics, the presence of which were indicated by both Lucien Lévy-Bruhl (Lévy-Bruhl, 1992) and Leon Petrażycki (1985), and ethnomethodologists headed by Ward Goodenough (Goodenough, 1964), developed for the use of various cultural systems, do not allow for obtaining a consensus on the living status of *culture as culture* in the attributive sense. But in the case of a distributive understanding, one must also take into account the heterogeneity of substances, which is characteristic of all complex objects.

The Metaphor

Landscapes of Context is a metaphorical title, but the title metaphor is well-entrenched in the discourse of contemporary humanities. The concept of context began to accompany linguistic deliberations from when Roman Jakobson, in his scheme of linguistic communication, distinguished – next to the sender and receiver – message, code, channel and context (Jakobson, 1960). If the context as a concept was originally related to the act of communication, then the communicative concept of culture derived from structuralism obviously had to adapt the context as a necessary condition for cultural communication. Lévi-Strauss's findings, however, concerned simple cultures, predominantly pre-literate. On the other hand, for hermeneutics irreducibly related to writing, the context of each text was a different text or other texts, which over time was also confirmed by intertextual research (Kristeva, 1983).

Pacukiewicz draws attention to the synchronicity of context (Pacukiewicz, 2021) and emphasises that in the discourse taking place in the humanities, the synchronous option prevails, translated into thinking about the context as space-time in which the phenomenon is actualised. However, he does not use the concept of *context* in relation to tradition and thus limits, at least in *Landscapes of Context*, thinking about a historical context – probably because this context is not so much an object of an experience as a reconstruction.

It might be assumed that culture is the result of a choice that establishes the continuity of reality perceived as discontinuous by the senses. Culture emerges from the surrounding reality as a result of educational processes that make each new member of a community undergo the basic acculturation process: paying attention to what is important and reducing the rest to a background from which only what is essential can be extracted. Therefore, we do not teach children to focus their attention on what is culturally non-discriminatory: when asked "what is that?" we answer "a house," rarely inquiring whether the child meant an element of the

facade or scratched plaster. We warn our children against selected (known to us from the environmental context) types of danger. We get used to certain conventions necessary in the life of a given community and the potential consequences of not following them. *By making a choice, we reject* and use this mechanism to make not only the foundation of acculturation but also, perhaps more important in the light of Pacukiewicz's considerations, the basis for the legitimisation of the metaphysical background of our world, namely the existence of culture.

Several years ago, I had the opportunity to see an exhibition of French Impressionists in Böblingen. It was organised in a separate part of the local school building. The ceilings and walls of the completely darkened classrooms and corridors were lined with black cloth, on which paintings were displayed, illuminated by spotlights. I was surprised, as I was taught that Impressionist paintings look best in natural light. Only the sight of one of the versions of *Rouen Cathedral* by Claude Monet, displayed in a narrow corridor, but viewed from inside the classroom, allowed me to appreciate the professionalism of the exhibition curator: a completely unreadable image, passed indifferently in a tight space, suddenly came to life and allowed not only to identify the presented object but also revealed the mastery of painting technique.

Impressionist painting seems to have discovered the secret of the formation/creation of culture – the appropriate juxtaposition of semantic neutral points next to each other makes them a message. The patterns of some spots bring out the concrete, the patterns of others constitute the necessary context and, at the same time, the background from which the meaning emerges. Individual acquisition of knowledge about how to distinguish an essential cultural message from *what we learn not to perceive*, how to separate text from context, and how to extract meaning from the background is the essence of socialisation and the foundation of any culture[6] (Linton, 1945).

There are no references to impressionism in Pacukiewicz's book, but there are beautiful essays devoted to Zbigniew Blukacz's cosmography and the artistic achievements of one of the precursors of geometric perspective, Paolo Uccello. The latter particularly inspired the researcher, who was convinced that "When trying to reach the metaphysical substance of an image, one must break through the ontological raster of context" (Pacukiewicz, 2021, p. 237). Blukacz interested him, among other things, because in his paintings "the role of the object is taken over by the landscape. Man

[6] "A culture is the configuration of learned behavior and results of behavior whose component elements are shared and transmitted by the members of a particular society" (Linton, 1945, p. 32).

is placed in it, which means both emphasising its natural conditions and limitations, and the need to adopt a specific cognitive perspective" (Pacukiewicz, 2021, p. 231). In turn, in the work of Uccello, Pacukiewicz sees the irreducible importance of the landscape planted as the only local witness of the tragic events depicted on the predella in Urbino (Pacukiewicz, 2021, p. 257). Following in the footsteps of Uccello, Polish graphic artist Szymon Prandzioch in his mezzotints "performs an apparently simple but unusual operation: he moves the whole story, scene by scene, in time" (Pacukiewicz, 2021, p. 258), which allows Pacukiewicz to formulate a significant conclusion: "Uccello recombines the narrative of a variant of the famous legend, Prandzioch – scenes designed by the painter. They both strive for a synthesis based on the landscape present as both a place and a space" (Pacukiewicz, 2021, p. 261).

Conclusions

Marek Pacukiewicz is an outstanding theoretician of culture and, at the same time, a painterly sensitive poet struggling with the matter of the word, inadequate to the reality being described. He is interested in the way the human world exists and, at the same time, the metaphorical dimension of various ways of describing this world. His deliberations are constantly accompanied by the awareness that being as such cannot be translated into something of an ontically different nature. Therefore, he does not identify culture with language but knows that naming is the foundation of culture and an indispensable tool for reflecting on its essence. He is also aware that, paradoxically, not naming but metaphorising turns out to be helpful in approximating what exists beyond the matter of language (Pacukiewicz, 2021). He is also aware that "the more skillfully we manipulate the cognitive perspective, the more individual beings elude us, and our empathy may turn into a cognitive convention" (Pacukiewicz, 2021, p. 208). Throughout the book, we find traces of reflective reading, searching reading, filled with respect for the thoughts of the quoted authors.

Landscapes of Context is an attempt to organize the title issues. This book does not contain didactic attempts, it does not translate into easy recipes – it reflects on the specificity of the place that contemporary humanities have reached. Pacukiewicz proposes an in-depth reflection on the state and prospects of cultural sciences. The anxiety about the future of culturology, its usefulness and credibility, dominates the subtle emotional aura that discreetly surrounds the author's argument. The tendency to objectify, to fairly present the opinions of other researchers, does not translate in this argument into simple judgments – rather into reflection on the

consequences of the discursive constitution of specific cognitive landscapes. Pacukiewicz does not formulate doubts, does not judge, does not criticise – he honestly reports on various ways of practicing science, but at the same time, his juxtapositions of alternative judgments, reconstructions of various thought traditions, are not free from emotional involvement accompanying the unverbalised question "what is next?" Is it possible to return to the study of the essence of things, or are we doomed to spin eternally in the terrible cycle of discourse? What have we replaced "metaphysical dream" with, and how do we shape the landscape after the battle with metaphysics? Can it be ruled out that the successes of modern and postmodern epistemological strategies in the study of culture will ultimately contribute to a Pyrrhic victory?

These are questions that should not be taken lightly. And *Landscapes of Context* is a highly inspiring read worth paying attention to.

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Through a Machine Lens: Case Studies of Computer Vision and Machine Learning in Design Methodology

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Abstract

Machine vision (MV) and artificial intelligence (AI) offer strange new augmentations and transformations of how architects perceive and conceptualise both the creation of buildings and the analysis of existing architecture. Seeing through machinic eyes allows architects to amplify their intuitions and engage in a flood of digitally sensed imagery in more quantifiable and extensible ways. Through a series of case studies of projects developed through the design office *Certain Measures*, this article argues for the potential of machine vision and artificial intelligence in the creative practice of design while situating these new developments in the history of mathematical ways of seeing and conceptualising architecture. These case studies, across large and small scales, combine ideas from human and machine perception and mathematical geometry to create new architectural approaches.

Keywords

architecture, machine vision, artificial intelligence, design, methodology

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Introduction: Architectural Senses, Mathematical Seeing

Vision is an essential faculty of the designer, and media of visual perception shape how architects perceive and conceptualise. Over the last twenty years, machine vision – the computational capacity to recognise and analyse images and video – has advanced, offering architects new media through which to understand design. Feature recognition and deep learning processes have allowed machine vision to exceed the normal capabilities of human perception. Today, human vision, machine vision, and augmented combinations of the two shape the perception and planning of the built environment in hybridised and technosocial ways. For designers, this symbiosis presents new opportunities for creative design. This paper argues for the new potential of intersecting human and machine vision through key design projects by *Certain Measures*, an office for design science founded by Tobias Nolte and myself. *Certain Measures* bridges the creative space of design, art and technology, with a particular interest in the co-evolution of human and machine experience and perception. This more-than-human perspective attends to the reciprocal ways in which humans and machines see, think, and ultimately create. We apply mathematical techniques (including bespoke computational geometry[1] and morphological analysis[2], data science[3] and AI[4]) to a range of projects – from the material to planetary scales.

The office *Certain Measures*

Projects designed by *Certain Measures* foreground perceptual quantification as a creative act and as a way of revealing more rigorous and technically synthetic modes of design. Though our work spans across scales, each project tries to take an architectural approach and experiments with ongoing mutations of design processes introduced by digital sensing. A key part of this experimental practice is the development of bespoke software and hardware to achieve our creative aims. One central example is the collection of "seeing machines" – software tools used to process imagery and video – that we build to organise large sets of digitised visual information.

[1] Computational geometry being the application of digital automation techniques toward generative design.

[2] Morphological analysis being the application of mathematical geometry toward the quantitative comparison of shapes.

[3] Data science being the use of statistics to derive insights from large data sets.

[4] AI being artificial intelligence generally and more specifically the application of neural networks and other machine-learning techniques.

These machines integrate open-source codebases like Open Computer Vision (OpenCV) or neural classifiers such as Visual Geometry Group (VGG) with our own data science methods of graph segmentation, mesh fitting, and shape classification. In this way, we apply bespoke Machine Learning (ML) and AI methods to the perception and organisation of reality and, in turn, to the shaping of architecture.

Impossible Objects and Artificial Intelligence

An early inspiration for the "seeing machines" developed by our office was the class of optical illusions known as impossible objects. Impossible objects are two-dimensional drawings which appear to be projections of three-dimensional objects which could either not be constructed spatially or could only be constructed with odd anamorphic distortions. These curious drawings emerged in optical psychology in the 1960s and 1970s as a perceptual test for humans, particularly in the experimental work of psychologist Lionel Sharples Penrose (Penrose, L. S., & Penrose, R., 1958). Many impossible objects seem to have qualities of a Möbius strip, folding back on themselves in contradictory ways. Penrose challenged human subjects to describe what the drawings represented spatially. Interestingly, impossible objects were also among the first challenges posed to machine vision systems and precursors of artificial intelligence. How could a machine make sense of these very strange forms?

Figure 1

An example of a knot-like surface generated from an impossible object diagram. © Certain Measures.

In our early research, we explored how we could make computational sense of these impossible objects by taking these 2D enigmas and making them into 3D architectural forms. Using methods from computational topology, such as spanning and Seifert surfaces, we began developing computational methods that allowed us to construct three-dimensional non-self-intersecting surfaces from those two-dimensional self-intersecting visual conundrums. The resulting surfaces twisted like spatial knots, warping back on themselves in unpredictable ways. We began to develop entire combinatorial catalogues of these complex surfaces, each having strange and illusional properties (see Figure 1).

First, with smaller mock-ups and then with larger ones, we ultimately developed a highly specific way of building these illusional objects while minimising torsion and curvature of construction materials. Using mathematical processes of graph segmentation and discrete differential geometry, we developed highly efficient algorithms to slice these impossible objects up and give them a constructable manifestation in the physical world.

Of course, building an object is different from merely visualising it, so we needed to adapt ML processes to enable more complex constructions. We used an ML method of object segmentation that is similar to AI image recognition which identified critical thresholds in curvature difference between distinct areas of a continuous surface and partitioned the surface along these thresholds. We applied this technique to complex generative meshes through our custom-built software to analyse and slice these impossible objects into pieces. These pieces are materially optimised: they are designed to minimise torsion and twist as little as possible in space. They can thus be constructed with essentially flat material and assembled in the span of a few hours. This differs from the mass customisation process, in which a product can be endlessly varied for the maximum difference because we were trying to minimise the underlying number of pieces. This way, we can build highly complex forms with a few calculated fragments.

Mine the Scrap

Our attempts to build impossible objects and complex geometries in highly efficient ways were successful to a degree. Yet even as we tried to build these structures as cheaply as possible, we realised that we were still wasting 30% to 35% of the original material from offcuts of very irregular shapes. So we began to ask: is there a material we could use to build even more cheaply? In fact, we realised that there is nothing cheaper than garbage. So instead of taking raw new material as the basis for architecture, what if we were to take construction waste? Construction waste is about 30-35%

of the volume of landfills in Europe and much of the developed world (Sáez, 2019). We were interested in taking this raw material and repurposing it for architecture in the act of radical reuse. Of course, there were key challenges. One of the reasons why this material is not used is that when it is demolished, it breaks into all sorts of irregular shapes. Classifying and organising those irregular shapes, those thousands of broken fragments, became a new geometric problem that held the key to radical material reuse.

Could we turn our machine learning and geometric expertise toward this problem of making unclassifiable scraps, unclassifiable waste, usable? Our answer to this was a project called *Mine the Scrap*, a data-driven process designers can use to develop new structures from old construction waste. We developed a forty-dimensional machine-learning and pattern recognition metric that allowed us to classify these very irregular shapes and cluster them into similar groups. This metric leveraged existing shape-comparison techniques such as Hu invariants and Shape Context measures, as well as new bespoke processes that we developed around a spectral comparison of skeletal graphs. We developed a search engine for these irregular scrap pieces, almost like assembling a new puzzle from a set of unrelated and random pieces. The idea is to find the unique best use of each piece in a new structure through the processes of scanning and classification. With this scanning, organisation, and fitting process, we can match what we have with what we want to build and find beauty in the intricacy of the neglected waste. Using computer vision – the application of digital algorithms to process and organise visual imagery – and machine learning, we can invert the typical process of design. Instead of material selection being an afterthought, we can begin with this raw material and ask what we can design with it. *Mine the Scra*p negotiates between the designer's desires and the material at hand. *Mine the Scrap* ultimately uses big data to tackle big waste.

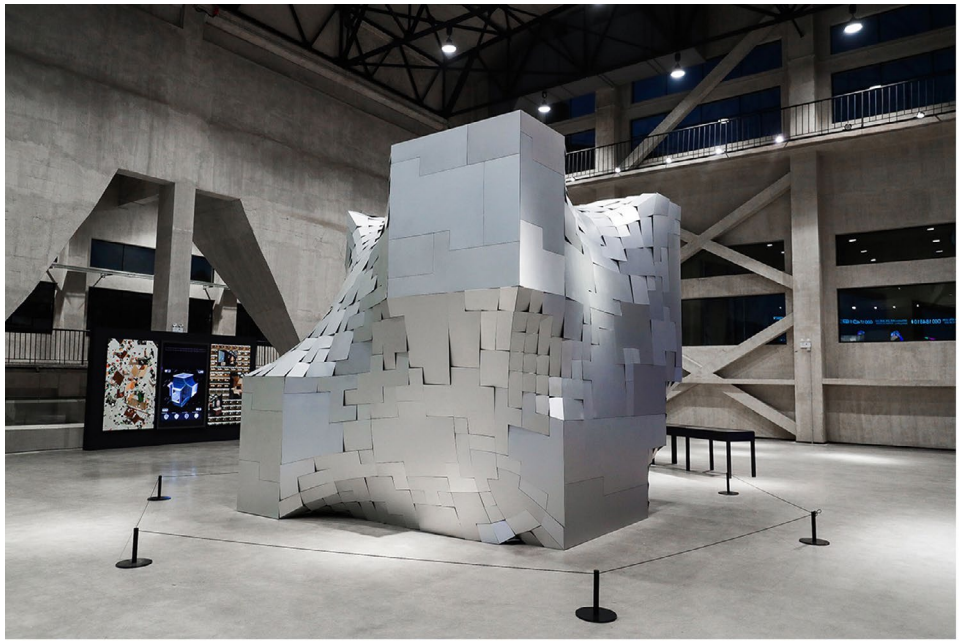

Photo 1
A Mine the Scrap installation at Aiiiii Art Center, Shanghai. © Certain Measures.

We have recently scaled up the geometric methods of the *Mine the Scrap* and presented an installation of that geometric approach in Shanghai at the new *Aiiiii Arts Center*, a museum dedicated entirely to AI and machine learning in design and art (Photo 1). *Mine the Scrap* makes tangible this process of radical reuse and uses AI to classify, sort and see these eccentric geometries in a new way. With this piece, there is an interesting echo of the ideas of the impossible objects that were our first inspiration.

We have begun to also apply the *Mine the Scrap* process of radical waste reuse in other contexts, including with industrial partners. In collaboration with the Austrian fibre-reinforced concrete company Rieder, we have used the *Mine the Scrap* processes to design intricate wall assemblies from waste panels of their fabrication process. Fibre-reinforced concrete is a flat sheet material usually cut with CNC water jets. The cutting process produces offcuts – residual pieces that are not a part of the final intended product. Rieder had retained many of these scrap offcuts and the original digital cut patterns. We compiled these cut patterns into an extensive database from which one could generate larger patchwork assemblies. The resulting panels have a distinct quality similar to the original *Mine the Scrap* structures. In this and most other projects, we were interested in creating these physical artefacts, but we were also interested in developing digital tools

and processes that would allow those artefacts to be not just a single piece of architecture but a system. Our work always develops particular design proposals in the context of a wider systems design.

Sculptural Scale: *Kintsugi++*

After our research into construction waste, we began to see the affinities of our work with other precedents of scrap reuse, particularly the Japanese craft of Kintsugi, an ancient technique of resurrecting shattered ceramic vessels (Roma, 2013, p. 63). When a vessel accidentally shatters, the kintsugi technique stitches it back together with sutures and seams of gold. The original vessel is recovered from its fractured state, but it is also elevated, ennobled by its reassembly with precious metals. We were fascinated by this practice, particularly in relation to industrial processes. In high-end ceramic manufactures, if a ceramic piece is defective, it is deliberately shattered. Sometimes the manufacturers would keep these shattered vessels in a separate room as if they were unsure what to do with them. We took fragments of shattered vessels, and 3D scanned them using our ML process to imagine new designs or assemblages of these pieces. We called the project *Kintsugi++*, to evoke C++, the coding language used to achieve the results. We collect these remnants and use our computational process of nonstandard fragment assembly to reclaim them and ennoble them as elements of complex and intricate new forms. When visualised in an immersive digital space, the process creates a galaxy of shards arranged and related by ML engines. The physical artefacts of this process are a series of custom, 3D-printed frames into which these shards are carefully inlaid. Each joint is very finely calibrated to every ceramic piece within a larger 3D-printed frame. Just as with *Mine the Scrap*, we produce both physical objects and digital experiences from this process (Photo 2). The digital experience of *Kuntsugi++* is an immersive dual projection that allows the viewer to enter the dream state of the algorithm and to see the animated galaxy of fragments and shards as a kaleidoscope of artificially imagined vessels. Visitors could also engage this project as a VR experience, seeing this galaxy as a panorama vertiginously creating endless new forms (Figure 2).

Photo 2

Examples of "Kintsugi++" vessels generated from fragments of ceramic vessels and a generative ML process. © Certain Measures.

Figure 2

A panoramic view of the VR experience of "Kintsugi++". © Certain Measures.

Machine Mediated Processes: *Cloudfill*

We see buildings as temporary states of matter, which can be designed as transitions between previous and next states. As designers, our responsibility is to make this transition between states as seamless as possible. A critical aspect of our *Mine the Scrap* process is that it alters the typical design cycle of the architect. Instead of the design process being entirely human iterations between "seeing" and "making", machine vision and learning transform this into a computationally mediated process of scanning and generating. Machinic scanning allows us to take our human intuitions around specific sorts of forms and scale them up massively, and a computational generating process allows us to combinatorially explore a much more comprehensive range of possibilities for that scanned material.

Photos 3, 4

Installation view of "Cloudfill", an application of generative reuse processes applied to a disused datcha. © Certain Measures.

A further application of the *Mine the Scrap* process comes from our *Cloudfill* project, which began with the active disassembly of a disused datcha, a summer home from the outskirts of Berlin. After deconstructing this structure, we exhaustingly catalogued the pieces through a detailed scanning process. This forensic scanning process allows us to consider not only the shape but also the colour, texture, and weathering of these pieces. It is even possible to use tomographic x-ray scanning to understand the internal structural qualities of these members. Thus, we can take into account not only the geometry but a whole range of other qualities of scrap pieces. Since we divert this scrap from landfill and scan them into the digital cloud, we called this project *Cloudfill*. This common scrap database creates a shared resource for reuse. The visualisation of *Cloudfill* also evokes the quality of this cloud-like construction, dynamically recombining

these pieces into new datchas or houses of the future. The typically linear cladding pieces of the deconstructed datcha induce a very particular ruled surface geometry on the resulting architecture, which differs from *Mine the Scrap* and its more irregular two-dimensional shapes. This ruled geometry produces a series of extrusion intersections of developable surfaces, while the frames act almost like combinatorial drivers for Rubix cube-like transformations.

A full-scale reconstruction of one corner of a Cloudfill-generated datcha was recently hosted at *Futurium*, Berlin's new museum of the future. The project playfully reconfigures not only the exterior of the datcha but the interior as well. Inside, the visitor sees an artfully reassembled patchwork of 1970s-era East-German wallpaper collaged into this new assembly. Both exterior and interior participate in this extreme reuse process. Ultimately projects like *Cloudfill* combine data science with architecture to propose a future for computational sustainability (Photos 3 and 4).

Machine Vision and the City Scale

Beyond the scale of architecture or products, we were also curious how machine vision classification methods could help us understand urban form. How could machine vision organise the world's cities? We began to apply our *Mine the Scrap* algorithm to building outlines and structures of the cities to categorise them morphologically. We developed a series of video interventions called *Machine View of the City*, which made this scanning and morphological classification process tangible. Each video projection shows the progressive scanning of a target city and a gradual remapping of its buildings based not on geographic location but morphological similarity. The first of these interventions was a *Machine View of London*, which presented a bot that scans, categorises, and maps the shapes of over one million buildings in central London. We extended the project further with other scans and remappings, including Berlin, Boston, Liverpool, Tokyo, Shanghai, and Guangzhou. The idea is to transform the relationships of those buildings from geographic to geometric, revealing formal affinities and similarities across the corpus of built architecture.

By creating a dynamic and machine-generated catalogue of architectural form, we are engaging with a longstanding interest in architecture and art in the catalogue as a creative medium. As we scan and geometrically organise these buildings, we are beginning to understand what the built space of architecture is in a city. A wall-sized printout of *A Machine View of Boston* reveals organised clusters of similarly shaped buildings (Photo 5). In some cases, they are very large clusters, indicating many similar build-

ings, and in others, they are very sporadic, suggesting unusual or even unique architecture. As the *Machine View of the City* compiles libraries of style, it begins to map out the space of architecture itself. The *Machine View of the City* is a chance to see the city through machinic eyes and to collage these precisely analytic and geometric views with something more atmospheric.

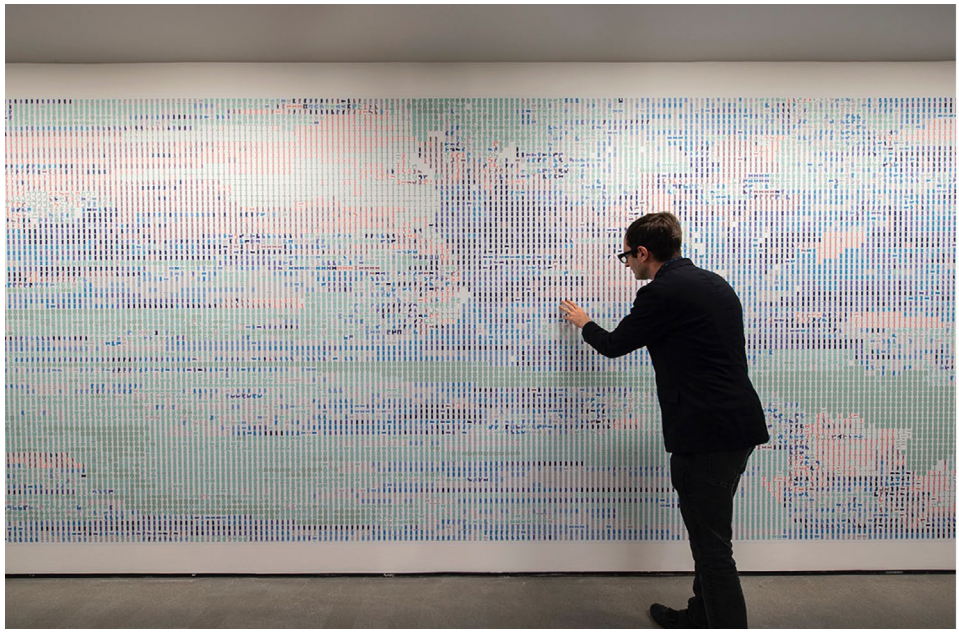

Photo 5

A portion of a large mural of buildings in central Boston, organised by shape. © Certain Measures.

Historic Preservation: The *Neo-Classifier*

The process of machine scanning and classification used in *A Machine View of the City* can be applied to inventory historical building types and chart historic preservation. One example is our recent collaboration with the Office for Urbanization at Harvard to catalogue regional Chinese building typologies using machine vision and satellite imagery. The aim was to identify certain very unusual building forms that were characteristic of particular Chinese areas, train a neural network to identify them, and scan vast areas to detect and inventory their instances. This process could give new insight into the prevalence and distribution of unusual historical building types.

We applied this method to 18 different regional typologies, spanning a variety of geographic regions and building forms. A separate neural network was trained for each building type, which was applied to satellite images to extract outlines of detected buildings. There was considerable variety in how the different typologies cluster and aggregate. Yet this kind of survey can be beneficial for the future of cultural preservation since it gives a comprehensive view of the variety of these unusual building types. We can also apply generative neural networks to speculate on the interior plans of those scanned buildings. When viewed collectively, we can create a self-organising map not only of building outlines but of plans themselves, revealing the intricate interrelationships of spatial structure.

We can apply machine vision processes to data sets of imagery, such as satellite photographs, to identify buildings which might be of historical or cultural interest. But we can also use similar processes to build catalogues of specific architectural styles from elevation imagery of the city. Our *Neo-Classifier* project took the same kinds of ideas that we used to analyse planimetric imagery and applied them to building elevations in the city. We were particularly interested in identifying and tracking architectural styles, so the *Neo-Classifier* was developed to identify the elements of neo-classical style across urban buildings and to extract and compile those elements into exhaustive catalogues of neo-classical style. In the past, when architects talked about style, it was often based on generalisations from a few specific buildings. But with current data and ML methods, we can have a total view of all buildings and understand precisely what is going on with style across the entire range of built architecture.

Beyond the *Neo-Classifier*, we have also looked at other kinds of imagery, such as digitised historical drawings. In one experimental project, in particular, we focused on architectural drawings, such as plans, sections, and elevations, from the École des Beaux-Arts in Paris, during the XIXth century. We compiled a database of 13 000 plan and section drawings of that style and used them to train new neural networks, which could then, in turn, generate new Beaux-arts plans. In effect, we created a machine to produce Beaux-Arts "deepfakes." This is an interesting way in which the AI training process can help us tease out new possibilities that may have been overlooked in historical styles and idioms.

Horizons

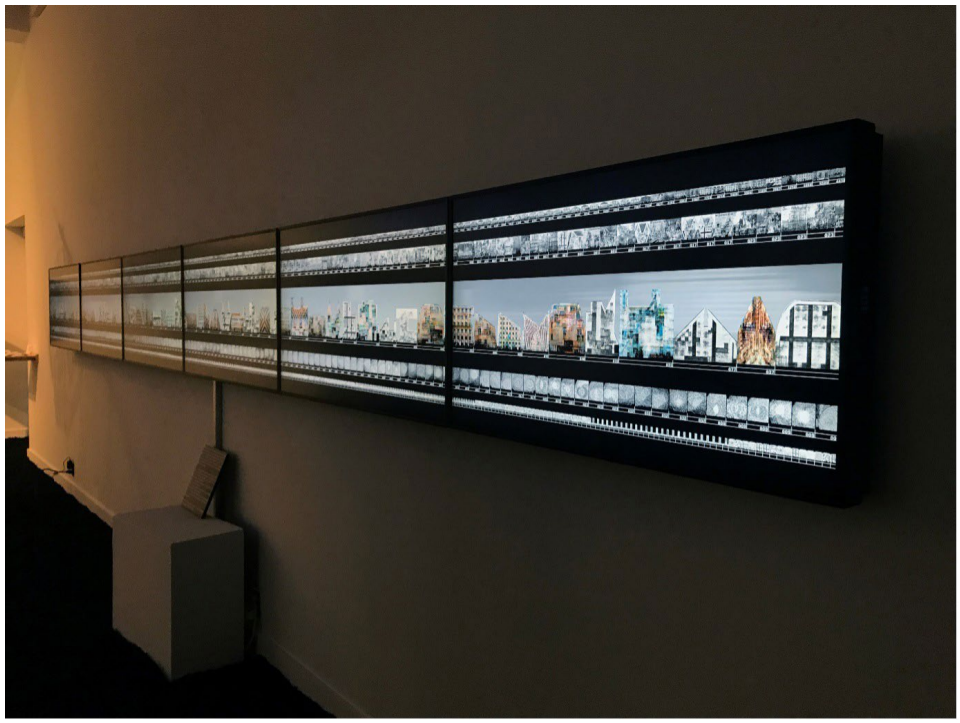

Photo 6
Installation view of Horizons, an endless AI-generated façade. © Certain Measures.

After analysing and classifying architectural forms from imagery, we can also rethink the process of generating new kinds of urban conditions. We can take those fragments and use them to train a new neural network to imagine new city elevations, which is precisely what we did with our project *Horizons*. *Horizons* is a journey into an endless elevation, dreamed by a neural network. We were inspired by the 1966 book of artist Ed Ruscha *Every Building on the Sunset Strip*, a pre-Google Streetview perspective of the city. To create the book, Ruscha mounted a camera on the back of a truck and drove along Sunset Boulevard, a very long and storied street in central Los Angeles. The result is a fold-out book that shows the complete elevation of that strip. We were interested in using our inventoried historical styles and using them to generate an endless elevation produced by an AI. *Horizons* has five related infinite horizontal views. The top is the catalogue of images we take as a training set which is the input for the neural network to imagine these new forms. The second is the outlines of many possible generated buildings. In the centre is the imagined city,

the endless elevation created by AI. Finally, you see a collection of machine vision metrics on the bottom strip, exposing the scanning process. *Horizons* invites one to enter the city that bridges human and machine imagination (Photo 6).

Ecology, Pets and Designing Quality

The last project described in the article conceptualises AI not as a generative tool for designers but rather as a new quality of objects that must be designed. In other words, if AI becomes a property of the objects around us, including furniture and products, what does that mean for how we design buildings? AI is not just a set of form-making techniques, but it's a capacity of physical machines as well. We thus began to think about the status of pets – millions of us have pets, quasi-intelligent organisms that we share our homes with. Those pets are not furniture, they have a kind of perception, understanding, or intelligence. Political scientist Heather Roff, a former animal trainer and current AI researcher, has written extensively about AI's large-scale geopolitical implications (Roff, 2017). But at the small scale, she observes that "Animals and animal training can teach us quite a lot about how we ought to think about, approach and interact with artificial intelligence, both now and in the future" (2017, online). That observation was very compelling for us. It led us to a diagram in which we see humans on a spectrum of other intelligences, including animals and AI. If we consider the range of entities that we might design architecture for in the future, we can take this whole ecology into account. When we design, we are designing in the ecosystem, of which humans are just one part.

An example of a project that embraces an ecology of humans and machines is our *Berlin Buoy*. This project proposes a house that is composed almost entirely of robots. Every human activity aligns with certain machine services. There is an entourage of drones, droids, robots, and other smart objects, digitally augmented devices that are matched to specific times of the day and experiences. Your day is a dance between yourself and the machines you share this environment with. We develop an hour-by-hour diagram of the pulse of life and the machines with which you are sharing that moment that becomes tangible architecture in the *Buoy* – it becomes a framework in which these autonomous objects and robots reconfigure themselves in relation to the human occupant. In fact, the *Buoy* itself is a kind of drone – it can move around and explore the world. The idea is that it could even be a literal buoy at some point, just floating on the water, but it can also attach wheels or rotor blades, and

it can be an autonomous free agent. The *Buoy* presents an autonomous house, not just as one object but as a constellation of objects that are defining an architecture. That means the objects within this house can become more animal-or pet-like, and our relationships with them can become very familiar in a certain way. In this project, you can see a vision of how the machines would see the environment they would live in and how they might interact with it. Those machines would have their own desires, interests, and attractions – ultimately, they would take part with us in a co-creation of these environments and spaces. The key is that these objects are not hard robots – they are robotic but have soft skins or fur, like animals. We found a future in which these machines could have qualities that we don't normally associate with machines or furniture to be fascinating and suggestive of new ways of living.

Conclusions

Technologies of machine vision enable the designer to process visual information at a vastly expanded scale. With this expanded scale of visual analysis, new modes of design are possible that organise visual data, including material elements and the buildings' forms, in new ways. The idea developed in this article was to present the connections between architecture, machine vision, and artificial intelligence through a range of projects that show these various potentials. From scanning historical building types to radical waste reuse, from autonomous furniture to morphological maps of the city, the potential for AI and machine vision to transform architectural processes is significant. New formal methods enable novel generative techniques for architectural projects, but also allow for fresh approaches to categorising visual historical data. In this way, the projects combine generative approaches with digital humanities and cultural analytics methods. These techniques allow unstructured visual data to be algorithmically organised and thus made much more operative within design. More generally, they allow a normalised view of the pattern and morphological analysis that furnishes designers with more objective techniques for engaging visual data that could previously only be understood qualitatively. By quantifying qualities, AI is opening new windows not only for what we design but also for how we design, prompting questions about the very nature of architectural knowledge. With such tools, we are re-exploring what design is and what the discipline of architecture could be.

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Miscellanea

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Perceptual Immersion, or What Computer Games Can Be Used for in Architectural Education

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Abstract

In this case study, the authors suggest that the introduction of computer games to architectural education may contribute to the broadening of architects' knowledge of the processes connected to sensory perception as well as the development of their perceptual awareness and sensory sensitivity. This thesis will be supported by the analysis of selected factors enabling sensory immersion (namely motor, vision and sound) in several fragments of two games: *Half-Life: Alyx* (three-dimensional game in Virtual Reality technology) and *Five Nights at Freddy's* (game for a desktop computer platform). The abovementioned competencies are essential in the process of designing both objects and spaces on a different scale and critical in projects for recipients, especially from the so-called spectrum of neurodiversity.

Keywords

immersion, sensory perception, neurodiversity, computer games, education

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Neuro-environment and Neurodiversity[1]

At the root of many failed implementations of contemporary architecture lie errors that arose at the stage of the design process. According to Krzysztof Kwiatkowski, among them are ineffective planning tools, the lack or inconsistency of objectivizing tools for the verification of design assumptions and the lack of verified (mainly empirically) theories explaining the interactions between the designed/built environment and users, including sensory awareness and perception (Kwiatkowski, 2015, p. 23).

The lack of understanding of the perception processes among representatives of the broadly understood design and the need to supplement the aforementioned areas of designers' education began to be commonly acknowledged at the turn of the 20th and 21st centuries. In 2003 American Institute of Architects in the United States established the Academy of Neuroscience for Architecture (ANFA).[2] In 2005, ANFA conducted research to assess the impact of office space on working conditions. As a result, eight indicators characterising the so-called neuro-environment (Security, Wayfinding, Cohesiveness, Outdoor Awareness, Ability to Retreat and Unwind, Expectations at Work, Support/Comfort, Pride of Work) have been added to the - Post Occupancy Evaluation (POE) procedure applicable in the USA (Kwiatkowski, 2015, pp. 31-32). It is suggested in post-occupancy documents, that the research in the field of cognitive neuroscience gives hope for a better understanding of sensory stimuli and their processing by the brain.

According to Hanna Bertilsdotter Rosqvist, Anna Stenning and Nick Chowan, in 20th and 21st centuries, science developed at least a few concepts/models of understanding and explaining human brains in terms of diversity in cognitive, affectual, sensory perception and behaviour of individuals in societies, which they collectively term as *neurodiversity* (2020, p. 1). The authors stress that the concept of neurodiversity is a reaction to medical models treating neurological differences in individuals' perception as defects, disorders or disabilities, which attempt to improve the "functioning" of individuals in terms of independence, economic productivity, and sociability and giving no attention to their lived experience, and well-being (Rosqvist, Stenning & Chowan, 2020, p. 4; see also Bowel, 2015; Carlson, 2010; Savulescu & Kahane, 2011;).

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[1] *Neurodiversity* as a concept originated as "(…) a movement among individuals labeled with autism spectrum disorders (ASDs) who wanted to be seen as different, not disabled. The first use of the word «neurodiversity» in print was in an article by journalist Harvey Blume published in the Atlantic, in September 1998." (Armstrong, 2010, p. 6).

[2] Further and more detailed information on the webside: https://www.anfarch.org/

Concerning the above arises a question: To what extent are architects familiar with sensory perception and neurodiversity and how is their knowledge implemented in architecture and urban planning? Is education on sensory perception present in the curriculum of architectural studies, and through what methods and technologies is it possible to implement such education? For user-friendly and just (in terms of justice, just cities) design, awareness of neurodiversity issues and sensory perception seem to be among the essential competencies that an architect should have. Advanced technologies such as eye tracking and neuroimaging (for example, fMRI - functional magnetic resonance or EEG - encephalographic measurement), used by scientists to collect data and study the perception processes, are expensive and not commonly accessible, which is a barrier in terms of introducing them into the education (Kwiatkowski, 2015, p. 31).

In this article, authors would like to argue that including computer games in architectural education, especially those in which immersion is possible (not only visual but also motor, sonic and affectual), is one of the available possibilities that could partially fill the existing lack, even if they were not created for that purpose.

Sensory Immersion/Emersion in Virtual Reality

Sensory immersion, in relation to computer games, means the phenomenon of arousing, through technological devices, sensory impressions in the user, accompanied by physiological body reactions (Fox & Bailenson, 2009, as cited in Koziński, 2016, p. 1). Various classifications of types of immersion can be found in the literature on the subject. For example, Staffan Björk and Jussi Holopainen distinguish four types of immersion: sensory-motor, cognitive, emotional, and spatial (Björk & Holopainen, 2005, p. 205, as cited in Auguścik, 2022, p. 8).

Immersing in computer games means cutting the connection with the physical world and diving, through sensory perception, into a virtually created environment (Heim, 1993, p. 153). The state of immersion does not only trigger a physiological reaction in the human body. The nature of perception is neurocognitive. Thus, in addition to sensory processes, the artificially created virtual and immersive reality also involves higher-order cognitive functions.

The opposite of immersion is emersion, the reverse phenomenon from the state of immersion (Kubiński, 2015, pp. 161-176).

The intensity of the immersive experience depends, among other things, on the technology (both hardware and software). In terms of hardware, for example, thanks to Data-Gloves, the user can provide a specific amount

of data to the game's virtual environment and interact with and in it. Currently, the most advanced technology is Virtual Reality (VR) generated with the help of Head-Mounted Display (HMD). It has a built-in display enhancing the stereoscopic vision of space, following the movements of the head. It also has touch controllers and speakers (Ryan, 1999). Space realism, in terms of the VR technology and perception, is based on adequately modelled lighting, which ensures the experience of depth (three-dimensionality; Visual Form, n.d.). The quality of graphics is both hardware and software dependent, as well as image rendering in real-time and intuitive movement mechanics (Epic VR, 2017).

According to researchers, immersion is also strengthened by the player's first-person perspective, enabling interaction (which means identifying players with the game's main character) in the generated game environment (first-person view). It is strengthened by the digital representation of the involved body parts (hands, face, feet), the dynamics of the characters' movements, simulations of environmental physics, and finally, sensory activity - the influence of the environment on the various senses of the individual, including realistic sounds dynamically reflecting current situations, spaces, phenomena, and experience (Malbos et al., 2012; Schubert et al., 2001, as cited in Koziński, 2016, pp. 2-5).

VR games differ significantly from games for desktop computers or consoles regarding the player's mobility, namely kinetic immersion. Moving in VR allows gaining knowledge about the nature of the neurocognition of perception, for example, in the form of the experience of the physiological sensation. An example of such embodied knowledge can be experienced by users nausea, comparable with motion sickness, related to contradictory information received by the player's brain at a given time, as in a situation when the player's eyes register their movement during the game because it changes its position in the virtual world. At the same time, the player's labyrinth signals that the body is standing still.

All kinds of immersion, similarly to the body receiving stimuli from the environment in the physical world, are accompanied by affective reactions (Koziński, 2016, pp. 2-5).

Sensory Immersion in Computer Games: Case Studies[3]

1. *Half-Life: Alyx* (only for VR)

In *Half-Life: Alyx*, a highly immersive factor is the intense action set in the ruined Black Mesa science research institute, invaded by newcomers from an alien dimension. The game's narration makes the user neurocognitively involved from the beginning. A kind of interdimensional police, named Combine, invaded the Earth and enslaved the entire planet. The official surrender of the people takes place at the UN building in New York (Borealis, n.d.). Since then, the human population has lived under the supervision of Combine. Its members oversee the streets and punish anyone who disobeys. They are brutal and unpredictable. The user takes on the role of Alyx Vance, who, together with her father, Elim Vance, tries to defeat the forces of Combine.

The environment of *Half-Life: Alyx* is highly educative regarding the in-depth kinetic, visual and sonic exploration of the environment (in terms of Gestalt principles) and direct interaction with items. The user is presented with a futuristic city with a giant tower in the middle - the Citadel. Its structure resembles a massive metallic skyscraper, and its height is about two kilometres. Many of Citadel's elements are movable (Borealis, n.d.). In the distance, one can hear people talking and robots working. The radio next to the player (main character) is the first thing that draws attention (cognitive function). The player can switch the station and pull the antenna out. Various cans, boxes and bottles are lying around. One can all pick it up, examine its textures and - finally - put it back in its place or throw it away. All these created sounds seem to be real for player. Bottles can be smashed against a wall, and larger boxes must be lifted with both hands as if they had their weight. The advanced physics of objects was used here and accurately visualised. Immersion here is strenghtened by the possibility of unlimited tactile exploration of the environment by the player, as they can interact with any object or surface, gaining physical impressions and strengthening emotional responses. The user is accompanied by the illusion of embodied presence in the game.

[3] The description of the both following case studies is a reworded and abridged excerpt of the description of the both games contained in Katarzyna Auguścik *Immersja w grach komputerowych i jej oddziaływanie na gracza* [*Immersion in Computer Games and Its Influence on Player*] (Auguścik, 2022, pp. 23-37). Permission by the author.

Sound Immersion: *Jeff* Level

At the *Jeff* level, player (main character) meets the blind zombie, titular Jeff. Due to impaired vision, Jeff has acute hearing. After entering the said level, in the safe distance position, the player becomes familiar with the opponent's mechanics and methods of operation: the sound of a crashing bottle makes Jeff follow the noise caused by it. Jeff is guided only by the sound source.

During the game, the player is forced, in search of these bottles, to move around the room filled with toxic vapours, which, when inhaled, cause the main character to choke and cough violently. The coughing simulation is designed in a way that causes immersed players to form a habit of covering their mouths in the physical world outside of the game (proof of immersion). Moreover, the player (overloaded with stimuli) outside the game/in the physical world holds their breath in a moment of accelerated action or tries to move to a minimum extent so as not to make noise.

In the game, the player is primarily forced to traverse tight, dark, claustrophobic rooms and corridors, which triggers highly emotional/affectional responses. If the player stays in one place for too long or makes too much noise, it will immediately attract the hostile aliens' attention. Ventilation shafts and cabinets may be used as hiding places for the player, but they are not always the safest option.

2. Sound in *Five Nights at Freddy's*

Five Nights at Freddy's series is a survival horror game by American game developer Scott Cawthon[4] (Augusik, 2022, p. 31). It consists of five games/episodes. The player takes on the role of a night watchman, who, during their watch, must defend themselves against the attacking ghost-like creatures (animatronics) for the titular five nights while not losing all electricity reserves in the dark spaces of the restaurant.

Sound listening, vision, and sensory information integration[5] are the most critical factors in the series. *Five Nights at Freddy's 1* (2014) does not use sound as a material for creating ambience or an atmosphere; it does not serve as entertainment or as a background - it is a key factor in the game, a way and a hint to deal with the challenges and puzzles in the game.

The most common and characteristic sounds that can be heard in the first part of the game are the sounds of breaking pots and pans. They are indispensable for completing the tasks set by the game, especially since

[4] According to produres's data retrived from https://m.imdb.com/name/nm6926569/ (accessed on 05.04.2022).

[5] The term explained in the article's conclusions.

the player is able to hear them without using the camera system. As the challenge begins, the intensive sounds are experienced as stressors. Still, as the player becomes accustomed to them, they start to serve the purpose of a source of information, as they get louder when the player looks at a kitchen camera. An example of a player using sound as a source of information may be a situation in which the Chica chicken, one of the four animatronics, is not visible on any of the cameras. By listening to the noise, coupled with the inability to see the animatronics with cameras, the player may come to the conclusion that Chica is currently in the kitchen and does not pose any threat to them yet. Another sound that is a potential source of information in the game is the laughter of the animatronic bear, Freddy, which signals him passaging between different rooms. The player can hear this sound regardless of the cameras. At first, players tend to perceive it as threatening because it resembles mockery. Seeing Freddy on cameras is challenging, so to save electricity, it is easier for players to focus on the sound of Freddy's laughter and count them to indicate how close he is to their position (Scruffy, 2020).

Other in-game sounds are intended to create patterns but not to give the player an advantage. Sounds of camera crushing occur as the animatronics suddenly move. Some sounds provide erroneous information or jam valuable sounds. For example, the sound from the camera is so distorted that it is difficult to conclude anything from it. Another distraction is the electric fan's sound in the office. The device makes a buzzing noise, stressing the player and preventing them from receiving the necessary information. If the player looks at the cameras, the fan will be muted, but such action costs the player valuable energy resources. Other sounds that are often confused with clues by the players are phone calls recorded by an employee named Phone Guy. On the first night, Phone Guy introduces the player to the general situation in the pizzeria and what actions must be performed to stop the animatronics. As the game progresses, the player recognises that during these phone calls, the game pauses for a few moments to increase the clarity of the content heard. However, in time, the player realises that the animatronics are moving during time spent on phone calls, and the calls are progressively providing less and less favourable information.

The sounds heard at the end of the game can be divided into three groups. The first occurs when, due to carelessness, the player allows animatronics to enter the office. The loss of the ability to turn on the light is signalled by a short, concise sound of a breaking switch and the sound of animatronics stepping into the room. The second group signals winning the game when the player is able to hear the bells, sounds of praise and children cheering, which are then cut off by silence as the next night (the

next stage of the game) begins. The last, third type of sound occurs when the remaining electricity supply is spent, turning off all electrical devices (accompanied by a long, disappearing hum). These sounds can be associated with comfort because they signal, that the player is free from the compulsion of constantly checking cameras and closing the door to stop the threat.

In *Five Nights at Freddy's 4* (2014), the player has to rely more on sound than in previous game versions. The game takes place at night in a children's bedroom, which is much quieter than the rooms in previous games. The player can only hear a soft hum, an old clock ticking in the distance, and a sound of breathing. If the player hears breathing while checking the door, this suggests that the animatronic is standing in front of it, so the door must be closed quickly. The difficulty in this game is determined by the volume of the sounds heard; for example, the breaths emitted by the animatronics are hushed; sometimes, it is challenging for the players to hear and identify them (Scruffy, 2020). These mechanics mean the player has to increase the sound volume, which causes even more anxiety and heightens player's awareness.

Conclusions

Selected Arguments for the Use of Computer Games for Architectural Education on Perception and Neurodiversity

1. As outlined above, the games can be used to enhance sensory integration or reduce sensory deprivation. Both processes take place in the brain without the participation of consciousness. *Sensory integration* enables the reception and interpretation, namely giving meaning, prioritising and evaluating sensory stimuli, both from the environment and one's own body, directing attention to them and enabling focus and action. It is the basis of social behaviour and education. Variation in any of these functions may indicate a neurodiversity case (in the social model, but in the medical model, it would be called *sensory processing disorder* or *sensory integration dysfunction)*, manifested by hypersensitivity (or too low sensitivity) to sensory stimuli. Computer games allow the architect to experience how the body reacts to high or low-intensity stimuli and observe the extent to which they affect the well-being of the body (Polskie Stowarzyszenie Terapeutów Integracji Sensorycznej, n.d.).

2. Joanna Erbel writes: "If we were to find one concept that could describe the problems experienced by atypical [normative term describ-

ing neurdiverse individuals in medical model – addition by authors] people, it would be stimulus intensity. The excess of stimuli can overwhelm you, (...) the lack of them - makes you dull." (Erbel, 2022, p. 89, transl. from Polish N. Cymorek). Computer games (as analysed above) may help direct architects' attention to the problem of cognitive overload, which is especially uncomfortable for neurodivergent individuals. Sensory factors in games, notes Koziński (2016, p. 2), stimulate various sensory channels simultaneously: the greater their diversity, the stronger the sensations and reactions of the organism, also in terms of distraction/dissociation. Both analysed games are rich in unpleasant sounds: shattered glass, flashes of light, computer equipment and machines causing clinks, squeaking equipment, humming and rumble of machine guns, screams and noises. All this makes us realise how important it is to regulate the sound environment due to psychosomatic reactions, which may also be accompanied by anxiety, leading to an impaired sense of security and communication problems.

3. Discomfort and distraction can also be caused by overly diverse and expressive textures, like those experienced in in-game environments. The stressed organism responds with irritation instead of relief, loss of attention, concentration and productivity.

4. Frequent surprising with stimuli (i.e., at the same time, the available visual richness of the designed architecture and spaces in virtual world of the games) allows drawing the architect's attention to the need for space sequencing, defined by Magda Mostafa as logical, predictable and legible sequences of space that allow predicting what will happen next. For some neurodivergent individuals, it is essential to transition from one type of space to another smoothly, to change from one kind of activity to another gradually, and to gain the possibility of getting used to the changing intensity of stimuli and sensorically neutral spaces with an adjusted level of stimuli (Aspectss, 2015).

The current architectural education emphasis is mainly on visual perception on a detailed characterisation of the formal properties of the environment, including the constructed objects. However, the formal functionality of objects and spaces do not coincide with the perceptual functionality of the human body. In contrast, technologies and computer games utilise knowledge of not only external but also internal body perception and cognitive processes, differentiated in every individual. Thus, they can facilitate architects' opening to cognitive diversity and sensory pluralism. "Opening up to neurodiversity is (...) accepting as the norm that different people feel differently, that is, there is no such thing as a normal [in the normative sense - addition by authors] feeling of physical or social space." (Erbel, 2022, p. 89).

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