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AGATA GĄSOWSKA
ORCID: 0000-0003-3332-2535
Silesian University of Technology in Gliwice, Poland

CARNALITY OF ARCHITECTURE

CIELESNOŚĆ ARCHITEKTURY

Abstract

Architecture is fundamentally an emotional enterprise. Architects manipulate form, texture, light, shadow, proportion, scale, rhythm, and narrative to craft spatial dynamics and atmosphere. Sharp, contrasting light imparts energy and gravity, whereas soft, diffused light induces calm. By engaging touch, carnality, sexuality, materials actively shape human perception: warm wood and tactile stone evoke a sense of safety, while cold concrete and steel command distance, monumentality, and a hint of existential unease. These emotional shifts shape our spatial experience, towering ceilings elicit awe and humility, whereas intimate, low-ceilinged interiors provide refuge. A dynamic sequence of spaces, transitioning from compressed to expansive, heightens surprise and wonder. Architecture is, ultimately, the physical manifestation of the human interior. Utilizing logical argumentation, this study explores this abstract realm of emotion, highlighting the crucial role of spatial carnality in shaping architecture and living space.

Keywords: *carnality, consciousness in architecture, living space, phenomenology*

Streszczenie

Architektura to operacja emocjonalna. Architekci operują formą i fakturą, światłem i cieniem, proporcją i skalą, rytmem i narracją. Budują nastrój i dynamikę. Ostre, kontrastowe światło dodaje energii i powagi, miękkie, rozproszone sprzyja wyciszeniu. Angażują zmysły, dotyk, cielesność, seksualność. Ciepłe drewno i miękki kamień kojarzą się z bezpieczeństwem. Zimny beton i stal tworzą dystans, a nawet monumentalizm i respekt, strach, niepokój. Emocje wpływają na poczucie przestrzeni. Wysokie, monumentalne stropy wywołują zachwyt i pokorę. Niskie i przytulne wnętrza dają poczucie intymności. Zmienna sekwencja pomieszczeń od ciasnych po otwarte potęguje zaskoczenie i zachwyt. Architektura to cielesność ludzkiego wnętrza. Przyjęta metoda logicznej argumentacji służy zgłębianiu abstrakcyjnej sfery filozofii Martina Heideggera, Gastona Bachellarda i Rogera Penrose'a. Wyniki badań wskazują na rolę cielesności architektury w kształtowaniu przestrzeni zamieszkiwania.

Słowa kluczowe: *cielesność, fenomenologia, pojęcie świadomości w architekturze, przestrzeń zamieszkiwania*

Architecture is deeply rooted in the metaphysical problems of subject and world, interior and exterior, time and duration, life and death[1]
Juhani Pallasmaa

1. INTRODUCTION

Architecture is rarely reduced to merely constructing shelter. At its deepest level, it becomes an externalization of the human interior – our fears, desires, need for security, and relationship with time. Viewed through the prism of carnality, walls appear as a second skin, windows become eyes, and passageways become the bloodstream that gives rhythm to everyday life.

Architecture ceases to be merely engineering and becomes philosophy. Architecture transcends the boundaries of pure engineering and construction at the point where the question of *how to build it?* gives way to *why do we build and who will humans become in this space?* This is where inanimate matter becomes a manifestation. Architecture is philosophy in material form – instead of words and concepts, it uses light, shadow, weight, and emptiness. The philosophical dimension of architecture is revealed on many multilayered levels:

- *The Phenomenology of Space:* A true architect doesn't just create geometry – he designs experience. As Juhani Pallasmaa notes in *The Eyes of the Skin: Architecture and the Senses*, architecture engages our senses in their entirety. The smell of wood, the acoustics of an empty hall, the touch of cool stone, or morning light falling on a wall – all of this becomes a question about how we experience our own existence. Touch is a sense that integrates our experience of the world and ourselves[2].
- *Carnality and Memory:* Gaston Bachelard in *The Poetics of Space* wrote that our first home remains with us forever as a primal matrix of intimacy. The buildings that move us most deeply are not cold solids – they resonate with our inner sensibilities[3].
- *Materializing the Invisible:* When shaping space, we pose purely philosophical questions: Where is the boundary between us and the world? How can we tame emptiness? How can we give meaning to the transience of matter? The combination of architectural carnality – experiencing space through touch, the body, movement, and the senses – as a materialization of the invisible is a fascinating point of contact between the phenomenology of architecture and Sir Roger Penrose's mathematical-physical view of the world.

2. RESEARCH METHOD

The research approach was based on the method of logical argumentation. Existing conditions were interpreted based on selected examples, which allowed for the identification of the key meaning and significance of the collected materials. The research methodology employed included original descriptions, explanations, and critical logical interpretation[4].

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[1] J. Pallasmaa, *Oczy skóry: Architektura i zmysły*, Instytut Architektury, Kraków 2022, p. 23.
[2] *Ibidem*, p. 15.
[3] G. Bachelard, *The Poetics of Space*, Penguin Books, London 2014, p. 3.
[4] E. Niezabitowska, *Metody i techniki badawcze w architekturze*, Wydawnictwo Politechniki Śląskiej, Gliwice 2014, p. 186.

3. INTERPRETATIONS

3.1. MARTIN HEIDEGGER

The Phenomenology of Space – the experience of being in the world. In *Bauen, Wohnen, Denken*, Heidegger demonstrated that housing is not just about having a roof over one's head, but the fundamental way in which humans exist on earth. Architecture becomes philosophical when it begins to operate not only with visual form but also with sensory experience:

- how the body reacts to the acoustics of a room,
- how our sense of time changes, depending on how light falls on the raw concrete,
- what we feel when walking through a narrow, cold passageway into a bright, warm room.

Dwelling becomes the cause, not the effect, of building. Typically, we first build a house, erecting walls and a roof, and then we enter it and begin to live in it. According to Heidegger, humans do not build simply to have shelter. Humans build because, by nature, they are creatures who must *live* (*living*, *finding their place on Earth*). Building is merely a consequence of this deep human need, and space is discovered within a comprehensive being-in-the-world, as its place[5,6].

What does it really mean to live? (Wohnen):

The word *living* today has a simplified meaning – we think of square footage, rent, or an address. Heidegger draws on the old German word *wohnen* and its related word *bauen* (to build) and notes that it originally meant:

- to live in peace and quiet,
- to care for / protect something.

For Heidegger, true *living* means being in harmony with the world. This is not a passive existence within four walls, but an active state: caring for one's surroundings, respecting nature, and creating a safe space for oneself and others[7].

The quadrilateral concept (Das Geviert):

According to the philosopher, when we truly *live*, we combine four elements of the world in one place:

- Earth, standing and using it,
- Sky, opening to sunlight, rain, and wind,
- Mortality, serving humans and their daily lives,
- Divinity, introducing a sense of meaning, the sacred, and peace of mind.

When you build a house according to this philosophy, you are not simply erecting a *machine for living* – you are creating a point where a person finds their place in the entire universe. To illustrate this, Heidegger uses the simple example of a bridge over a river. The bridge is not built to connect two banks that were already there. It is the bridge that makes the banks

[5] M. Heidegger, *Bycie i czas*, [*Sein und Zeit*], trans. B. Baran, Wydawnictwo Naukowe PWN, Warszawa 2004, p. 133.

[6] M. Heidegger, *Budować, mieszkać, myśleć* [*Bauen, Wohnen, Denken*], "Teksty: teoria literatury, krytyka, interpretacja" 1974, no. 6(18), p. 139.

[7] *Ibidem*, p. 138.

become banks, and the space around them acquires meaning. The bridge gathers around itself the landscape, the road, the river, and the people who pass through it. Architecture creates places from nameless space. We do not build to live – we build because we know how to live[8].

3.2. GASTON BACHELARD, PETER ZUMTHOR

Carnality and Memory. The union of Gaston Bachelard and Peter Zumthor is the core of what we call architectural phenomenology. Bachelard gave this field a poetic theory and psychology of interiority, while Zumthor transformed these concepts into tangible, physical matter – stone, wood, light, and sound. Both reject the notion of architecture as a mere visual form or geometric task. For both, space comes alive only when it comes into intimate contact with the human body and emotions.

Gaston Bachelard – Architecture of Soul and Intimacy:

In *The Poetics of Space*, the French philosopher argues that space is not an objective container in which we reside, but a reservoir of our memories, dreams, and fears[9].

- *Home as nest and shelter:* Bachelard analyzes poetic living. Home is the first *universal matrix* of humanity. It gives us a sense of rootedness and allows us to dream.
- *Verticality and darkness*: The philosopher divides the home along a vertical axis:
  - Attic: A place of clarity, pure thought, and dreams,
  - Basement: A dark, subconscious underground, where fears hide, but also the deepest roots of our stability.
- *The art of miniature, nooks, and crannies*: Bachelard devotes considerable attention to closets, corners, drawers, and nests. These spaces possess a dimension of physically condensed intimacy[10].

Peter Zumthor – Materialization of the Atmosphere:

Peter Zumthor puts Bachelard's (and Heidegger's) poetics into practice. If Bachelard writes about the *spirit of space*, Zumthor searches for materials that can embody this spirit[11]. In *Atmospheres* he explains that successful architecture is one that can move a person in a split second, just like music does[12]. The translation of theory into matter can be seen in the following:

- *Material carnality*: Zumthor doesn't treat material as a final touch, but as the very essence of the building. In the thermal baths in Vals, Swiss quartzite, water, and evaporating steam create a monolithic whole. Entering the building, you don't observe the architecture – you experience it with your skin, your body, and the change in temperature.

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[8] *Ibidem*, p. 142.

[9] G. Bachelard, *The Poetics of Space*, Penguin Books, London 2014, p. 6.

[10] G. Bachelard, *Poetyka przestrzeni: szuflada, kufry i szafy*, "Pamiętnik Literacki: czasopismo kwartalne poświęcone historii i krytyce literatury polskiej" 1976, no. 67(1), pp. 233–243.

[11] P. Zumthor, *Myślenie architekturą*, Wydawnictwo Karakter, Kraków 2010, p. 71.

[12] P. Zumthor, *Atmospheres: Architectural Environments, Surrounding Objects*, Birkhauser 2006, p. 22, https://arhitectura2tm2016.wordpress.com/wp-content/uploads/2019/09/peter_zumthor__atmospheres.pdf (access: 15.10.2026).

– *Anatomy of sound and touch*: For Zumthor, every building is an instrument. A wooden floor bending under footsteps, the reverberation in a stone hall, the roughness of hewn wood – this is architecture that resonates with the human senses of touch and hearing.
– *Light as a sculptor of darkness*: Just like Bachelard, who appreciates the darkness of the basement, Zumthor knows how to manipulate shadows. In the Bruder Klaus Chapel in Mechernich, the interior was created by slowly burning tree trunks inside a concrete mold. The smell of burning and the light streaming through the open roof create a space of almost mystical intimacy.



Ill. 1. Thermal Baths in Vals, Switzerland – architecture as a corporeal experience of matter, source: https://pointofdesign.pl/architektura/peter-zumthor-architektura-zmyslow/, (access: 15.10.2026)



Ill. 2. Bruder Klaus Chapel in Mechernich, Germany – architecture as an experience of the carnality of matter, source: https://zumthor.bjorkan.no/project/bruderklaus/ (access: 26.06.2026)

Gaston Bachelard, Peter Zumthor – analogies:

Both Bachelard and Zumthor remind us of this truth: architecture begins within us. Before it becomes concrete or wood, it is our need to *be at home* in the universe.

Table 1. Analogies between Gaston Bachelard's and Peter Zumthor's understandings of space as an experience, own research

	Gaston Bachelard (Philosophy)	*Peter Zumthor (Practice)*
The role of space	A refuge for the human soul and memory	A place of presence that awakens the senses
The main organ of perception	Imagination and the feeling of intimacy	Whole body (touch, hearing, smell, sight)
A key element	Poetic image (nest, corner, attic)	Atmosphere, material density, light

3.3. ROGER PENROSE

Materializing the Invisible. Juhani Pallasmaa's conception of the body in architecture and Roger Penrose's quantum physics / geometry seem distant, but they connect remarkably well on several levels:

Penrose tiling and the haptic and visual rhythm of space:

Roger Penrose is famous for creating aperiodic tiling (mosaics, tiling of space), patterns that cover a plane, exhibiting five-fold symmetry.

- *The Carnality Dimension in Architecture*: In conventional modernist architecture, the body interacts with a repetitive, mechanical grid (a modular grid). Such a space can be perceived as sterile and inhuman.
- *Penrose Connection*: The use of Penrose mosaics in floor, facade, or wall textures allows the human body to move through a space that possesses an infinite, organic, and living order. Sight and balance do not fall into a routine – the body constantly reads subtle, unique shifts in geometry, reminiscent of experiencing nature (e.g., leaf arrangements or crystal structures). Penrose tilings cover the surface with two figures so that the pattern does not repeat periodically (aperiodically) after a shift[13].

Critique of the Pure Algorithm – Architecture against Digital Unrealism:

Penrose in *The Emperor's New Mind* states that human consciousness is not algorithmic – it cannot be reduced to computer code or numerical calculations[14]. In the context of this research, this can be understood as follows:

- *The Carnality of Architecture*: Experiencing architecture doesn't happen in the head or on a computer screen in a CAD/BIM program. We experience it with our feet touching cold stone, the weight of a door we open while moving, the acoustics of a room, and the warmth of wood.
- *Penrose Connection*: Incorporating Penrose's thought into design is a protest against architecture focused solely on digital form and rendering. It is a focus on the incalculable dimension of human presence – creating a space that responds to the inexpressible physical and emotional needs of the body, not just a mathematical algorithm[15].

Penrose's impossible geometries and the disturbance of the sense of balance:

Penrose created the so-called *Penrose triangle* and *Penrose stairs*, shapes popularized by M.C. Escher, illusions of objects that appear coherent in 2D but are physically impossible in 3D[16]. Architecture can utilize the principles of illusion and perspective distortions to

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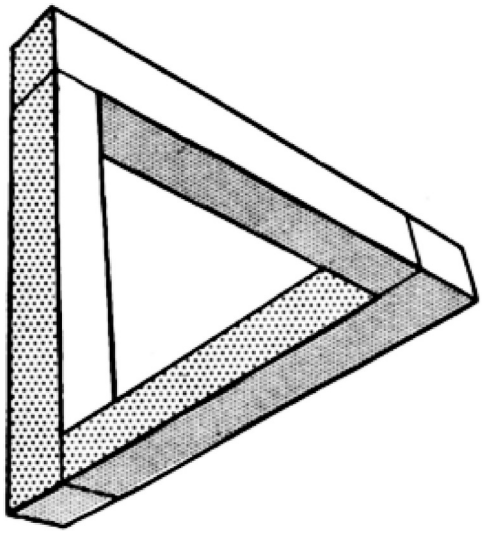
[13] J. Bellissard, *The Noncommutative Geometry of Aperiodic Solids*, [in:] A. Cardona, S. Paycha, H. Ocampo (eds.), *Geometric and Topological Methods for Quantum Field Theory*, New Jersey–London–Singapore–Hong Kong 2003, p. 26, https://doi.org/10.1142/9789812705068_0002 (access: 26.06.2026).

[14] R. Penrose, *Nowy umysł cesarza. O komputerach, umyśle i prawach fizyki*, Wydawnictwo Naukowe PWN, Warszawa 1995, p. 454.

[15] *Ibidem*, p. 456.

[16] L.S. Penrose, R. Penrose, *Impossible objects: A special type of visual illusions*, "British Journal of Social Psychology" 1955, no. 49, pp. 31–33, https://bpspsychub.onlinelibrary.wiley.com/doi/pdf/10.1111/j.2044-8295.1958.tb00634.x, (access: 26.06.2026).

confront the body with its own senses. Entering a building with unusual angles, light refractions, or variable ceiling heights, the sense of the labyrinth (proprioception) must constantly re-establish verticality and horizontality. Architecture compels the body to respond physically – releasing muscle tension, slowing one's pace, sharpening one's attention. The body becomes aware of its existence in space.



Ill. 3. Penrose triangle, perspective drawing of an impossible structure[17]

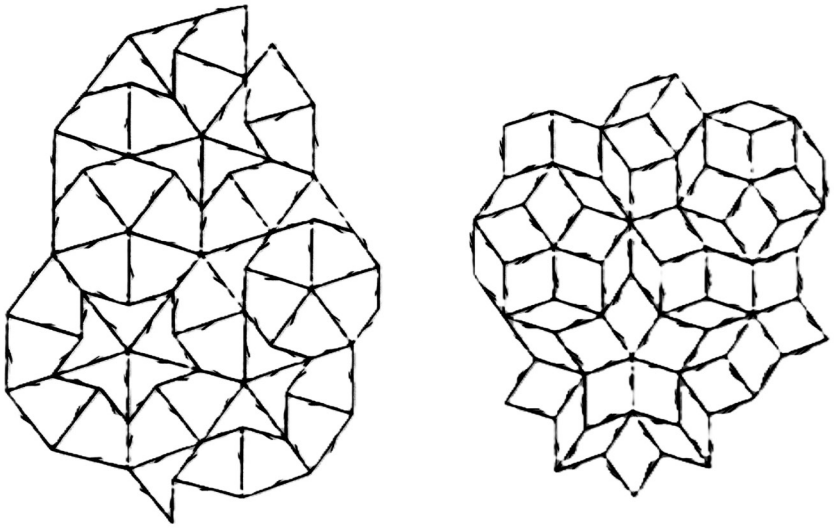
Singularities, gravity and building matter vs design practice:

Architecture is about working with gravity and mass. Carnality in architecture manifests itself in how we experience the tectonic weight of a building – the massive concrete providing a sense of shelter and grounding versus the lightness of glass creating a sense of suspension. The translation of this theory involves manipulating space to evoke a physical sensation of compression, stretching, and scale in the body, for example, a transition from a narrow, low corridor to a vast, illuminated hall.

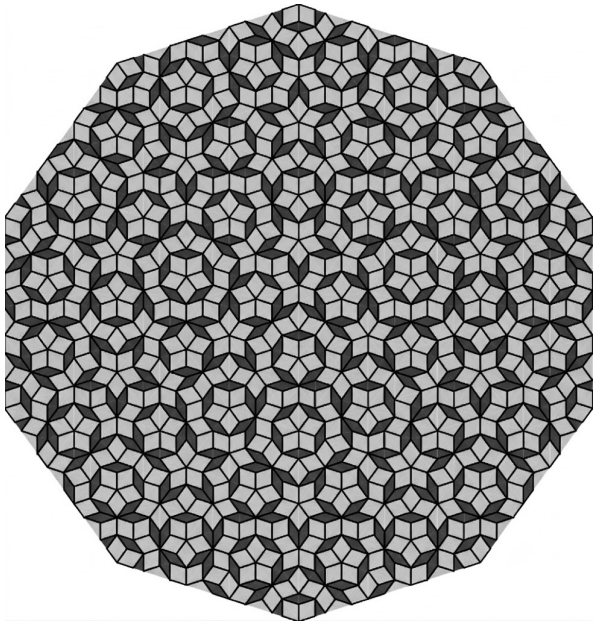
Table 2. Roger Penrose's areas of inspiration in the context of the carnality of architecture, own research

Penrose's Area of Inspiration	Translation to architecture carnality
Aperiodic tilings	Textures and materials with a unique rhythm, engaging touch and sight
Non-algorithmic consciousness	Priority given to sensual details (acoustics, light and shade, material temperature) over pure form
Impossible geometry / illusions	Dynamic use of perspective, forcing the labyrinth and body to be alert
Gravity and space-time	Clearly displaying weight, structural stresses, and material scale

[17] *Ibidem*, p. 31.



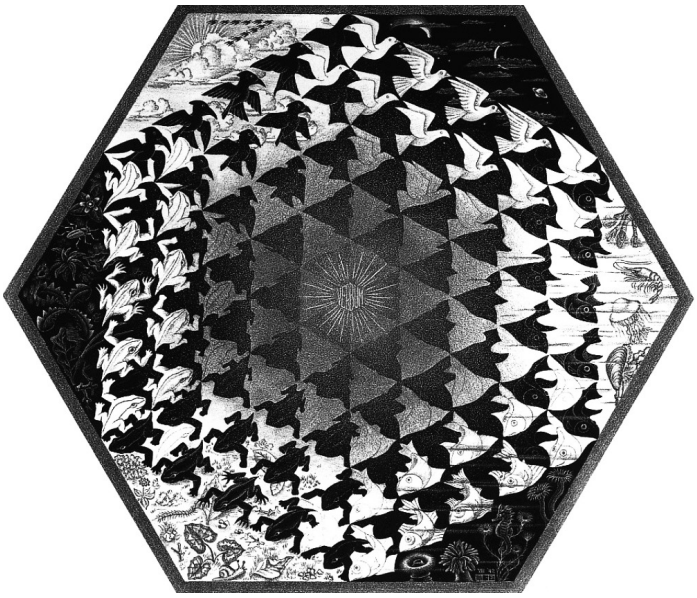
Ill. 4. Two examples of coverings consisting of two pairs of tiles, each of which covers the plane only aperiodically (Penrose tiles)[18]



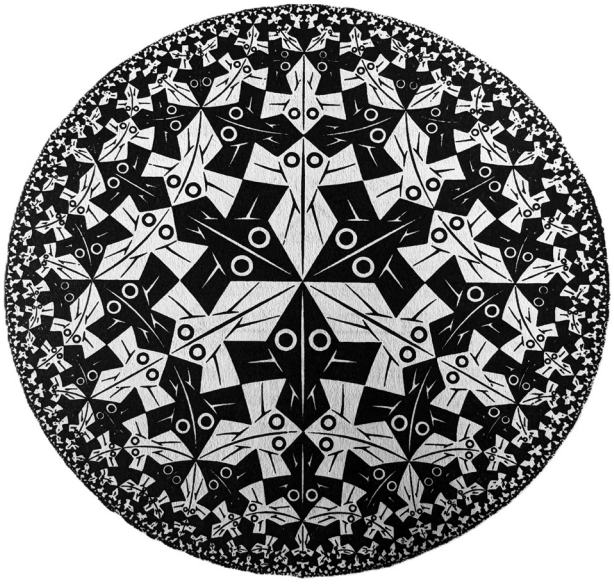
Ill. 5. Penrose tiling, coverings consisting of two pairs of tiles[19]

[18] R. Penrose, *Nowy umysł cesarza. O komputerach, umyśle i prawach fizyki*, Wydawnictwo Naukowe PWN, Warszawa 1995, p. 161, (cit. in: H.S.M. Coxeter et al. (eds.), *M.C. Escher: Art. And Science*, North–Holland, 1986).

[19] J. Bellissard, *op. cit.*, p. 26.



Ill. 6. Object illusions, Verbum, M.C. Escher[20]



Ill. 7. M.C. Escher's notion of Łobaczewski space, all black and white fish should be considered congruent (M.C. Escher / Cordon Art – Baarn – Holland)[21]

[20] M.C. Escher, *Grafiki*, Taschen, Warszawa 2005, p. 33.

[21] R. Penrose, *Nowy umysł cesarza. O komputerach, umyśle i prawach fizyki*, Wydawnictwo Naukowe PWN, Warszawa 1995, p. 182.



Ill. 8. Sphere Surface with fishes, M.C. Escher's imagination[22]

4. SUMMARY

Although Sir Roger Penrose's exploration of objective reality based on mathematical laws demonstrates a different approach to reality from that of Martin Heidegger and Gaston Bachelard, who described the world as devoid of objective meaning, in which humans create themselves through their choices, the study of reality addresses the same problem: *the singularity and irreducibility of human consciousness*. Analyzing their relationship reveals both a fundamental methodological conflict and the extraordinary places where quantum physics unexpectedly provides meaning for phenomenologists.

Main common point– opposition to mechanism:

Both Penrose and the phenomenologists vehemently reject the view that the human mind is simply a complex computer, the so-called strong artificial intelligence, the computational theory of mind:

- *Roger Penrose:* Uses Gödel's mathematical incompleteness theorem to demonstrate that the human mind can perceive mathematical truths that no algorithm can ever achieve. Our thinking is incomputable[23].
- *Phenomenology:* Consciousness is not a sequence of operations on data. Consciousness is intentional – it is always awareness of something, directed at the world, full of

[22] M.C. Escher, *Grafiki*, Taschen, Warszawa 2005, p. 34.

[23] R. Penrose, *Nowy umysł cesarza. O komputerach, umyśle i prawach fizyki*, Wydawnictwo Naukowe PWN, Warszawa 1995, pp. 127, 458.

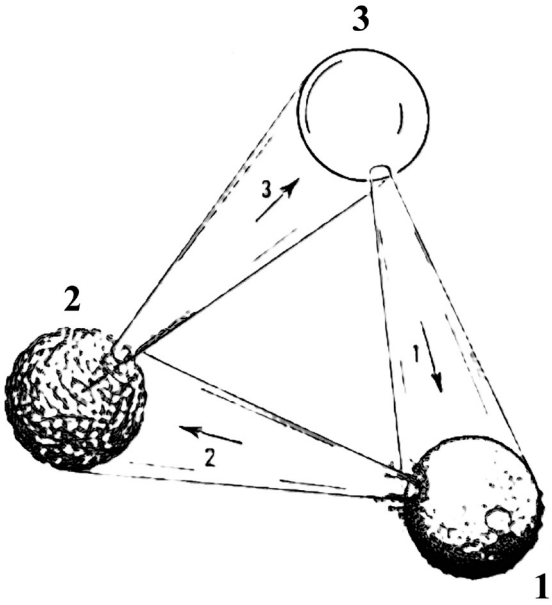
meanings, emotions, and sensory qualities, or so-called *qualia*. A computer calculates symbols without understanding them.

Where Penrose and Phenomenology converge:

Penrose attempts to build a physical bridge to the same castle phenomenologists have long inhabited. Phenomenologists describe the architecture and interiority of consciousness from the inside; for them, the bridge makes space meaningful. Penrose seeks foundations in the quantum structure of space-time. Penrose's concept is deeply philosophical, and bridges to phenomenology emerge:

- *The collapse of the subject – object divide*: in classical physics, the observer stands outside. In quantum mechanics, the measurement act is bound to the system. Phenomenology has, from the outset, held that there is no *pure object* without a subject who experiences it[24].
- *Subjective time vs. physical time:* Phenomenologists (Heidegger) have studied how consciousness creates a continuity of time (past – present – future). Penrose seeks a physical equivalent of this process – he believes that quantum *jumps* are physical cycles that create fluid *moments* of consciousness.

The Penrose Model – Three Worlds and Quantum Physics:



Ill. 9. Penrose's Three Worlds Model: 1 – Physical World, 2 – Mental World / World of Consciousness, 3 – World of Mathematical Ideas. For Penrose, consciousness is born at the interface between these spheres. The objective reduction of the quantum state, the process of quantum gravity occurring, among others, in the microtubules of neurons, gives rise to moments of conscious experience, a sense of being[25]

[24] R. Penrose, *Droga do rzeczywistości*, Proszyński i S-ka, Warszawa 2020, p. 17.
[25] *Ibidem*, pp. 17–18.

To understand how Penrose's philosophy differs from phenomenology, he explains the Three Worlds model:

1. Physical World (matter, energy, particles)
2. Mental World / World of Consciousness (our subjective experiences)
3. World of Mathematical Ideas (objective, eternal mathematical truths).[26]

Conclusions from the interpretations:

Table 3. Conclusions from the interpretations – the carnality of architecture – the philosophy of Roger Penrose vs. the philosophy of Martin Heidegger and Gaston Bachelard, own research

	Philosophy of Roger Penrose	Phenomenology of Martin Heidegger, Gaston Bachelard
Direction of analysis	Objective (from the outside in): Searches for a consciousness-generating mechanism in the structure of the universe and biological physics	Subjective (from within): Examines pure experience from within, discarding assumptions about physics during the analysis
Carnality	The body is a physical medium, the key is the specific protein microstructure (microtubules) that allows for the quantum state	The body is the Lived Body. We are not physical robots equipped with minds; our cognition is rooted in movement and the senses
The Origin of the World	The physical and mathematical worlds exist objectively; consciousness is an advanced element of them.	The world as we know it emerges and takes on meaning only through consciousness (*Dasein*)

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[26] *Ibidem*, pp. 17–18.

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Author's Note

Agata Gąsowska, PhD, Architect, **Civil Engineer**

Graduated from the Faculty of Architecture at Silesian University of Technology and the Faculty of Civil Engineering at Opole University of Technology. She has construction qualifications to design and manage construction works without restriction in the architectural specialty and the civil-engineering specialty. Founder of her own architectural studio. She has been affiliated with the Department of Housing and Public Architecture Design, Faculty of Architecture, Silesian University of Technology, Gliwice, since 2019.

gasowska.agata@gmail.com