SPATIUM
No. 43, June 2020, pp. 59-65

UDC 7.071.1 Бејн М.
Original scientific paper
DOI: https://doi.org/10.2298/SPAT2043059K

MARK BAIN'S WORK AS A TECHNOLOGICAL SYNTHESIS OF ARCHITECTURE, MUSIC AND THE (IN)ANIMATE NATURE

Svetlana Kalaba[1], Music School "Dr Vojislav Vučković", Belgrade, Serbia

The subject of research in this paper is Mark Bain's work, perceived as a synthesis of architecture, music, technology and the (in)animate nature. Its basic thesis is that Bain sees his works of art as a set of agents that have the function of mediating social relationships within the surrounding world, and that sound vibration is treated as a means by which architectural constructions become animate beings, enabling the coherence of art and the animate – the living world. The study analyzes the theoretical and interdisciplinary research of Bain's work, viewed through the prism of anthropological theory and both philosophical and theoretical perspectives of art. It investigates an innovative concept which introduces novelties into architecture and music, applying a specific interdisciplinary approach. The contribution of the study is that it determines the special aesthetics of Bain's work, which constitutes a new vision of the world and knowledge of the future. The unity of knowledge belonging to different realms is presented through the creation of an innovative research concept and a specific worldview, characterized by a problem-solving approach to the relationship between the animate and inanimate nature.

Key words: **Mark Bain, architecture, infrasonic sound, oscillators, sound vibration.**

INTRODUCTION

Mark Bain (1966, Seattle) is a contemporary American experimental artist and a researcher in the field of audio-visual arts and technologies. He studied at Massachusetts Institute of Technology and the Rijksakademie in the Netherlands, and he currently lives and works in both the United States of America and the Netherlands. Together with his brother, John Bain, he is a member of the band *Mutant Data Orchestra* and a co-founder of the company *Simulux*, which deals with audio-visual research (Veen, 1998).

In his work, Bain creates a synthesis of architecture, music, technology, and the (in)animate nature, and hence an innovative concept aimed at presenting a new vision of reality through a problem-solving approach to life and the inanimate environment.

Connections between music, architecture and technology can be established in the following ways: 1) by using mechanical and electrodynamic oscillators to create sound vibrations and cause a change in the kinetic state of architectural objects (which had previously been perceived in their static context); 2) by mapping and recording an inaudible sound already existing in building materials and architectural constructions through the use of geo-sensors; 3) by applying sound synthesizers to architectural objects to achieve more complex wavelengths; and 4) by interpolating the existing sound of the ambience and the sound vibration through a transducer (*ibid*.). In such ways, architecture is revived, and it vibrates, moves, sounds and expands its boundaries, because the function of architecture is expanded into the domain of musical instruments, for the production of sound. As a result of such transformation in the position of architecture, a sub-sonic sound appears, which further interacts with the animate and inanimate worlds (materials, people and the entire environment). Bain creates sound within the boundary field of music and acoustics, and within the context of Cage's theory, his work belongs to the field of experimental music, because the resulting sound, processed over a certain period of time, cannot be foreseen or planned (Nyman, 1999: 1), since it is performed on different architectural objects and in various places. Cage transposes the sound of ambience into music, in fact, life itself in his theory of silence becomes a field of

[1] Kondina 6, 11000 Belgrade, Serbia
lanasv17@yahoo.com

art (Cage, 1961). If we apply Cage's theory, the ambient sound which Bain experiments with, in the context of the sound already existing in different materials, can be seen as a form of experimental art. He also introduces a novelty into a contemporary music by the sound vibrations (trembling) from architectural constructions and the application of inaudible sound. From a behavioural aspect, Bain researches the influence of low-frequency sound on people in a psychological and physiological context, by analyzing sub-sonic sound within the domain of the interaction between music, acoustics and psychology. Bain investigates the effects that infrasonic sound leaves on the material itself and the structure of buildings, bridges and architectural objects (*ibid*.), by incorporating knowledge from material science and acoustics. Material science plays a very important role here, because specific materials (wood, iron) produce interesting effects from sounds, which resemble those produced by classical instruments.

The presence of sound vibrations and frequency resonance (by the performance of mechanical and electrodynamic oscillators) indicates the interpolation of mechanics and acoustics. The influence of seismology is evident in the application of sound vibrations and tectonic movements of the ground, as well as the study of the effects of trembling, which can occur during the interpretation of a work of art. Mechanics and seismology, through oscillation and resonance, make a fruitful dialogue with architecture (which hence enters into the musical sphere), after which they go beyond their boundaries through mapping the influence sound vibrations have on humans in psychological terms. Bain links these disciplines into a concept of research and understanding of the world surrounding us. His goal is to investigate and problem-solve the relationship between everyday objects, a work of art and the entire environment by means of sound vibration, and Bain's installations become agents (mediators) in establishing these relations.

The aim of this paper is to gain an insight into the signifying theory within Bain's work, through the synthesis of multiple arts and sciences, that is, to examine Bain's work from an interdisciplinary and theoretical point of view, systemized through the theory of anthropology as well as various philosophical and theoretical perspectives of art. The purpose of this paper is to investigate an innovative concept which introduces novelties into architecture and music, as well as to examine a less researched part of Bain's concept and therefore to expand an unexplored sphere of research and contribute to the scientific flows in the theory of art.

The contribution of this paper can be perceived within the constitution of a particular aesthetic of Bain's work which, through the translation of the animate nature towards the inanimate and correlating man with his environment, creates a new vision of the world, the future and a new type of transcendental knowledge. In this context of new knowledge, architecture is viewed here as an interdisciplinary and unlimited field, creatively unified with other sciences and fields of art – music, acoustics, material science, seismology, psychology, physiology and sociology.

The work of art – an object – becomes a work of process, in constant motion toward an animate nature (animate architecture) connecting in such manner with man, who becomes aware of his body (physical and psychological) and existence as part of the entire world. Within the wider scheme of things, there is an interrelation of all sciences and arts with a human being and his or her existence, aimed at his constant progress and well-being.

The contribution related to Gell's anthropological theory (Gell, 1998) refers to the interdisciplinary approach through which a work of art becomes an animate being. While Gell employs anthropology and sociology, the influence of additional different sciences is found in the elaboration of Bain's work (mechanics, acoustics and seismology), which all make a complex connection to architecture and music. Regarding Cage's paradigm of silence and his theory (Cage, 1961), according to which art is seen as a part of everyday life, the contribution of Bain's aesthetics is the introduction of the inaudible sound which already exists in materials, and sound produced by the oscillations of architectural objects.

AN ANTHROPOLOGICAL APPROACH TO ART: THE INANIMATE NATURE AS ANIMATE NATURE

Bain believes that architectural objects, such as the houses we live in, the schools that we attend, and the buildings of institutions where we spend our working lives, can actually be perceived as living beings (Veen, 1998). The sound vibrations of architectural constructions provide their connection with the living environment/animate nature, because by oscillation, architecture moves and produces sounds, all of which means that Bain constitutes his installations as agents that serve as mediators of social relations within the context of the world of nature itself.

The thought of connecting the notions of the animate and inanimate world through sound can be observed at the micro and macro levels: 1) within architecture itself and 2) in relation to architecture's interaction with humans. By using technology and oscillators, the architecture in Bain's work produces sound and movements, enabling Bain to see it as an animate (living) being. The second level of connecting the animate and inanimate nature implies that architecture, which oscillates acoustically, has an influence on humans and a way of communicating with them. Sound is a condition for putting this concept into practice, together with oscillation and movement, which are common elements of both animate and inanimate materials, by which a dynamic architectural shape is created. Roland Barthes speaks of changes taking place in art when a work of art as an object, in the form of a "material creation", is transposed into a text, which is a "methodological area" which is "a process of demonstration, it speaks according to certain rules (or contrary to some rules)" (Bart, 1986: 182). The work of art is distinguished in the area of the signified, which encapsulates it, whereas the text is marked by the "infinity of the signifier"; it is in constant motion and runs through several works of art, with the appearance of the "infinite signifier" (*ibid*., 183). If we apply Bain's concept, architecture moves from having a static nature as a work of art, an object, towards being a process, a living entity which is open and in constant motion and communicates with the surrounding environment and with human psychological and physical existence, where sound vibrations are visible.

The infinity of the signifier occurs through an ever-changing implementation of the *Live Room* concept, because Bain performs it using various architectural constructions (buildings, houses, bridges, laboratories, and so on) and in different countries.

Alfred Gell, in his anthropological theory of art, like Bain, says that works of art can be perceived as persons, living beings, and states that anthropological theories are "recognized" as theories of social relations (Gell, 1998). Although he does not analyze art within the context of meaning and symbols, he observes notions such as intelligence, causality, result and transformation within the field of symbolic communication, defining art as a "system of action, designed to change the world, rather than encode symbolic propositions about it" (*ibid*., 6). Unlike a semantic approach which observes objects as a type of text, perceiving art within the context of "action" is determined by an anthropological prism, because one practical role of a work of art is perceived in the social process, which means that the theory is based on the fact that "the nature of the art object is a function of the social-relational matrix in which it is embedded" (*ibid*., 7). In the context of anthropology, art is "the theoretical study of social relations in the vicinity of objects mediating social agency ... and in relevant theoretical respects, artistic objects are equivalent to persons, or more precisely, social agents" (*ibid*.). Pallasmaa, like Gell and Bain, perceives a work of art as a person one can unconsciously talk to, for example, feelings can emerge when faced with a work of art (Pallasmaa, 2005: 66).

Gell nominates objects which are equivalent to persons as social agents, and to analyze them it is necessary to research the biographies and life phases of the agents (Gell, 1998). Buildings in Bain's work are equivalent to living beings, and the life phases of the social agents can be presented as follows: 1) the static phase of a building, that is an object; 2) the action of augmenting the existing invisible sound in material and sound vibration of a sound-inducing material; 3) architecture being enlivened under the influence of sound, when the work of art is perceived as a person. A social agent, that is the work of art, is referred to by Gell as an index which is "seen as the outcome, and/or the instrument of 'social agency'" (*ibid*., 16). The sound is a social agent, and it is interesting that Bain delineates sound as a form of agent, but only in relation to another sign: "I use sound as a reflecting agent to define the materials and elements of structure and space" (Bain and Pascual, 2017), that is, the *sound* as a *sign* is viewed in relation to another sign (materials, and structure) and used to define them.

Bain, like Gell, looks at buildings (social agents) as animate persons with a specific way of breathing, inhaling and exhaling, with the process becoming particularly noticeable when doors are being closed, especially if they are being slammed (Veen, 1998). During the action of a door opening or closing, the sound is a signifier of the breathing of the building, as well as of the micro-movements and sound vibration of the material. "To get the life out of a building is an art… He (Bain) looks at a building and finds the soul" (*ibid*.). Bain applies a special method which can confirm such a conclusion, by researching sound interacting with architecture, structures, light and materials used in an object's construction (*ibid*). Unlike Bain, Pallasmaa sees the movement of opening/closing a door within a sociological and temporal context as a "handshake of the building", because by means of a tactile sensation, the door connects time and different generations of people who have opened the door in the past (Pallasmaa, 2005: 56). By touching a door, one is shaking hands with all the previous generations who have been in contact with the door (*ibid*.), which means that architecture serves as a bridge connecting inanimate and animate beings through different temporal dimensions. Architecture simultaneously shows the past and present, demonstrating thus the transiency of time: "Buildings and cities are instruments and museums of time" (*ibid*., 52).

Gell defines art as a system of action designed to change the world, which, applied to Bain's work, can be interpreted as the action of sound vibrations, which changes the view on architecture and music, and on a wider scale – changes the world by a problem-solving approach to the animate and inanimate environment (Gell, 1998). Machines and sounds are the mediums and means by which the invisible and inaccessible become visible and noticeable. Veen explains that Bain "enlarges the things that are already present, and he breathes life into it (the building) by using kind of ninja stars, you can throw them into the wall" (Veen, 1998). The star becomes an integral part of the building as a form of the artist's intervention and continues to change its visual aspect by releasing acid and rust, which leave their marks on the building and achieve the infinity of the signifier of the building, which changes over time under the influence of external factors, such as temperature, humidity, weather and seasonal changes (*ibid*.). Bain claims that by introducing some form of energy into the building, it behaves like a radiator or a loudspeaker in a certain context.

> "The surfaces are rattling and vibrating…What you hear is the movement of the building. Most of it (sound) is subsonic though, and it has this heaviness that relates to the heaviness of the architecture. I like this massiveness of the sound" (Bain and Bosma, 1999).

William McDonough and Michael Braungart point out that buildings can be viewed as animate (living) beings, unlike Le Corbusier (who sees buildings as machines), that is, by applying the laws of nature, they believe that buildings are like a "human leaf" or "trees, alive to their surroundings and inhabitants, and cities like forests, in which nature and design create a living, breathing habitat" (McDonough and Braungart, 2002). A "good design", according to McDonough and Braungart, implies the "possibility of developing healthy and creatively interactive relationships between human settlements and the natural world" (*ibid.*). This concept of architecture is modeled upon nature, using solar energy and wind power, with the "design of materials and building systems that eliminate the concept of waste" and the "diversity of design solutions" (*ibid.*) that would fit into the environment in a cultural and natural sense. McDonough accomplishes the concept of architecture as an animate being by means of "design principles inspired by nature's laws" (*ibid.*), while Bain applies the laws of mechanics, acoustics and technology, making architecture oscillate and create sound. Both of them believe that it is very important to study the environment, history, culture and specificities

of the climate in which architecture is found, in order to achieve better results.

Within the context of "reviving" architecture and its interconnected-ness with humans, Gell argues that works of art are not "self-sufficient agents, but only 'secondary' agents, in conjunction with certain specific (human) associates" (Gell, 1998: 17). "The primary" agents are beings with intention; they "initiate happenings through the acts of will for which they are morally responsible" (*ibid*., 21). Gell's anthropological theory of art can be exemplified by Bain's *Live Room*: *Transducing resonant architecture* (1998), which was performed at the *DEAF98 (Dutch Electronic Art Festival 98)*, where its installation included eight mechanical oscillators attached to the pillars of the floor across the exhibition space, which in turn acquired the property of being a musical instrument. By highlighting the audio segment of the architectural structures (inanimate nature) in the *Live Room* and their sound vibrations (due to the movements of the mechanical oscillators), the artist integrated them within an animate nature and created mediators (social agents, according to Gell) to establish a relationship between the animate and inanimate world. Sound vibrations and the movements of constructions connect humans and the building they live in, whereas, under the influence of wave forms, frequencies and vibration energies, people transform into "activated objects" that feel "the liveliness in themselves, others and the space within" (Goodman, 2010: 222). Such an attitude is also confirmed by Pallasmaa's statement that the meaning of architecture transcends the limits of architecture, as "it directs our consciousness back to the world and towards our own sense of self and being" (Pallasmaa, 2005: 11).

The composition *Live Room* employs four musicians in the lab, while the audience is free to stand, lie on the floor or move unrestrictedly through the exhibition space. According to Gell's theory, the musicians are primary social agents with intention, and they causally influence the audience through sound (Gell, 1998). On the other hand, an architectural object has the property of an agent (secondary), while Mark Bain is the primary agent because he "initiates happenings through the act of (his own) will" (*ibid*., 21). There is a dual role of sound within the context of the experience in two different senses, as well as the presentation of an audible and inaudible spectrum of sound. The music performed by the musicians is distinguished by the sense of hearing, while the conduction of low-frequencies, inaudible to the human ear, is noticeable only through the intervention of oscillators, the action of sound waves on materials, and the sound vibrations of the entire room that can be felt by the whole body. In his theory of silence Cage says that musicians do not have only ears, but other body parts as well, since music is not exclusively an audible art (Cage, 1961). In Bain's work, the audience has an opportunity to grasp sound not only through the sense of hearing, but also through the oscillating and movement of materials and objects, which can vary depending on where the listener is positioned in the room and his exposure to different materials that vibrate. In this way, architectural structures and materials have the function of secondary social agents, while the audience feels the effect of the room's sound vibration. By its presence and movements, the audience also has an influence on the room's sound vibrations and its resonance, therefore participating in the creation of the composition. In this context the members of the audience can be seen as primary agents affecting the work of art itself, by their actions.

Bain's idea was to erase the boundaries between the performer and audience, connecting the musicians, audience and architecture by means of a network of influences through socially primary and secondary agents. All of this, at the same time, presents an innovative view of a composition where music, architecture, various materials, seismology, new technologies, mechanics, acoustics and psychology merge into a superior unity. Relationships and correspondences are established between different sciences, arts and technologies, as well as the permeation of the aforementioned disciplines united into a superior whole, as a new worldview of the surrounding reality. The influence of mechanics and acoustics is achieved by testing oscillations, frequencies and resonances, and the use of mechanical oscillators. The knowledge of material science is applied in the consideration of sound propagation through the material, while the sound vibration and trembling of materials, constructions and the environment indicate a seismological context. The relationship between music and architecture in this work of art is achieved through the vibrating object, which emits the sound and thus acquires the function of a musical instrument.

Bain's approach, in the context of a different worldview, is complementary to Gell's definition of art, as a "system of action, intended to change the world" (Gell, 1998: 6). Gell claims that art is "a theoretical study of social relations surrounding objects" and that "artistic objects are equivalent to persons" (*ibid*., 6). In his work, Bain uses a problem-solving approach to the relation between the animate and inanimate world and presents a somewhat eccentric worldview. By adopting the concept of the synthesis of music, architecture and technology, that is, introducing sound vibrations, architectural objects are treated as living beings which establish a relationship with the entire environment because they themselves begin to vibrate and are subject to the influence of the sound. The ultimate outcome of all the frequencies and sound vibrations (as well as the unity of science and art) is a human body where all the sensations and sonic and vibrating effects are manifested in a psychological and physiological sense. Merleau-Ponty states that a human perceives the structure with all his senses and totality of being: "I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once" (Merleau-Ponty cited in Pallasmaa, 2014: 231). Bain says that sub-sonic and infrasonic sound is inaudible and can only be experienced as a "sonic wind" (Bain and Bosma, 1999), that is, through the vibrating and physical prism that simultaneously cause changes in the human body. The relationship between Bain's artwork, which is always a specific impersonation, and a human being, can be perceived in both positive and negative contexts. Under the influence of an infrasonic sound, one can have a headache, and feel confused, anxious, tense and nauseous, while some of the sound frequencies can affect

organ functions (such as bowel movements, for example). Other than a negative experience of anxiety, low-frequency sound, that is below 10 Hz, can also contribute to spiritual and soothing experiences, which was particularly practiced in the 1960s, with the aim of entering into a light hypnotic "alpha state" – with neural oscillations in a frequency ranging from 8 to 12Hz (*ibid*.). Like Bain, Pallasmaa also states the spiritual influence of architecture in relation to humans, claiming that settlements (cities) and buildings enable the understanding of human existence: "Significant architecture makes us experience ourselves as complete embodied and spiritual beings" (Pallasmaa, 2005: 11). Architecture includes mental and physical structures, an "integrated material, embodied and spiritual sense" (*ibid*., 12). Bain claims that there is a correspondence between architectural constructions and the human body in both the building frequency and body frequency, so that certain sonic amplitudes which can cause a sense of pain or anxiety can also cause the demolition of buildings or cracks in the walls (Bain and Bosma, 1999).

Bain has an investigative and experimental attitude towards art: "All of my sound work is highly experimental, like tests. I take sort of a systematic approach to it, setting up complex systems that have a life of their own" (*ibid*.). Such aesthetics are evident in *Live Room*: where "machines are connected to architecture" and there is an action of "playing the building as an instrument", while "architecture is also a complex system of parts and materials", so that it can be concluded that there is a 'cooperation' within that structure (*ibid*.).

In the sound recording of his compositions, Bain uses special low-frequency sensors that have applications in geology for recording earthquakes and other seismic events (Bain and Bosma, 1999). It is interesting that Bain records sound propagation within the material itself, rather than merely in the air (*ibid*.), which results in a comparative reading of sound and a mapping of the structure of the material, as well as in their mutual reaction, because the propagation of low-frequency sound waves through material creates vibration in the material that is manifested in the artistic text through three levels: 1) sound signifier/marker, 2) material signifier/marker, 3) interaction of the sound and material causing seismic changes noticeable by, and manifested in, the audience. In this case we can conclude that sound waves are secondary social agents.

ARCHITECTURE, SOUND AND THE BODY

Pallasmaa states that the human body has a central position in both architecture and the world (Pallasmaa, 2005), and similar to this statement, Merleau-Ponty centralizes the human body in the world of existential experience (Merleau-Ponty cited in Pallasmaa, 2005: 40): "Our own body is in the world just as the heart is in the organism: it keeps the visible constantly alive, it breathes life into it and sustains it inwardly, and with it - it forms a system" (*ibid., 40*). In Bain's work, inanimate nature becomes a living nature by means of sound vibrations and the vacillations of structures, which can be read on a physical human body and which enable communication with architectural constructions. If we apply Merleau-Ponty's aforementioned concept onto Bain's work, we can say that, in fact, man makes architecture animate, by being at the "heart" of architecture and the entire work of art, and only in symbiosis with him can an organism can be created (*ibid*.). Pallasmaa presents the interconnectedness of a city and a human body as follows: "The city and my body supplement and define each other. I dwell in the city and the city dwells in me" (*ibid*., 40). In the context of Bain's work, the body communicates with the city through architecture and sound vibrations, in a way that the sound permeates the body, thus creating a unity with residential constructions and bridges, that Bain asserts, vibrate.

Within the context of the human body, Shaun Gallagher defines a body schema as a "system of motor and postural functions that operate below the level of self-referential intentionality, although such functions can enter into and support intentional activity" (Gallagher and Cole, 1995: 371). Gallagher deals with boundaries between the environment and the human body, within the context of which he argues that: "The body *schema* functions in an integrated way with its environment, even to the extent that it frequently incorporates into itself certain objects" (Gallagher, 2005: 37). Through their senses (of hearing, sight and touch) the audience feel sound vibrations produced by the architecture in Bain's work, while simultaneously being exposed to the visual and spatial experience of the architecture which surrounds their bodies. In such a way, certain constitutive elements of architecture (the sound of structures and oscillations of materials) are taken as parts of the human body, because these sensations are interpolated in one's body. Pallasmaa sees this concept of interactions through the mutual permeation of man and space: "As we enter a space, the space enters us, and the experience is essentially an exchange and fusion of the object and the subject" (Pallasmaa, 2014: 232).

McLuhan speaks of the term "acoustic space" as a dynamic term that "encapsulates time as a dynamic of constant flux" (MacLuhan cited in Cavell, 2002: 22), as opposed to the static of visual space. He distinguishes visual space and spatiality, which has a dynamic character and is "extended into 'oral' through the concept of acoustic space" (Cavell, 2002: 26). The dynamics of acoustic space are enabled by the concept of resonance, which "conceptualizes the break in the uniformity and continuity of space *as visualised*" (Cavell, 2002: 23). McLuhan then adds that the resonance is "a sign, in other words, of the discontinuity of acoustic space, of the fact that it produces meaning through gaps (including the gaps between elements of the dialogue)" (McLuhan cited in Cavell, 2002:23). Bain's acoustic space is solid material and his pioneering creativity is reflected through the recording of sound using a different medium (different acoustic space) to traditional art, in which the acoustic space of air is the medium of sound propagation. In contrast, in Bain's work solid materials (such as wood or steel) from buildings or bridges become a sonorous environment reflected on the human body. Resonance, as a "discontinuity of acoustic space" (*ibid*., 23), according to Bain's research, can cause extreme seismological effects and discontinuity, such as cracks in a building, or even its destruction.

Richard Cavell points out that McLuhan, influenced by Lewis's notion of a *sensuous nature of space*, constitutes a wider picture of acoustic space in the 'audio-tactile' direction (Cavell, 2002: 22). The sound is no longer intended for

one sense – hearing, but is experienced by the whole body and through psychic sensations caused by low-frequency sound, through which Bain expands the field of sound reception, as well as the normally accepted term "musical instruments", because traditional instruments are replaced by architectural objects. Bain connects 'good design' with an immaterial prism, the questions of feeling and the "research of space and structures". He explains that "Essentially, what I try to do is design an invisible entity, sculpting form in space using sound as the 'clay' or medium" (Bain and Pasqual, 2017), whereby the sound is constituted within a sculptural context, as a form of artefact.

McLuhan views space in a sociological context, defining it as "the geographical site of action and the social possibilities for engaging in action" (McLuhan cited in Cavell, 2002: 30) and as a "cultural dominant of contemporary society" (*ibid*., 24). For every performance, Bain adapts to its location, and to its social and historical discourse, which he studies before the performance. We can therefore talk about specific geo-aesthetics, because his works of art differ depending on the location and characteristics of the actual buildings, bridges and other facilities.

Similar to McLuhan's observation regarding the audio-tactile determinant of the acoustic space, Pallasmaa also speaks of the importance of the tactile which has somehow been neglected in the past in relation to sight, so he emphasizes that all senses (like vision) are actually "extensions" of the tactile sense (Pallasmaa, 2005: 10). In this regard, Pallasmaa makes a reference to the anthropologist Ashley Montagu, who claims that skin is the most sensitive and the oldest organ of the human body and the "first medium of communication and our most efficient protector", as the "mother of all senses" (*ibid*., 11). Pallasmaa explains the "sensual nature of architecture and interiors" and "the embedded senses of sight, sound, smell, taste, touch and a sense of movement he describes as skeleton and muscle" (Pallasmaa, 2011: 40), and emphasizes that architecture is perceived by the totality of human senses, not just one sense. In Bain's performances, the audience has the opportunity to get to know the architecture by means of various senses – that is sight, hearing, touch and also at the level of their entire body, because low-frequency sound can also affect the work of one's internal organs.

In his work, Bain applies everyday life aesthetics, because the ambient sound he documents is already present in materials and structures, and recorded by special equipment, while the low frequency sound (below 20Hz) applied in his work as the result of a geo-sensor, is present in everyday life – in an industrial form like the sound of cars, trains, planes, and within nature itself as the sound of storms, wind, waterfalls, earthquakes and volcanoes. The aesthetics of everyday life also denote that objects for daily use (such as buildings, bridges, galleries or laboratories) become part of Bain's work in that he extinguishes the borders between art and life, that is, as Cage quotes in his theory, life is overturned into art and art blooms into life (Cage, 1961). Architecture vibrated by Bain creates an insight regarding its inclusion into everyday life, as it becomes part of humans and their lives, without ceasing to be a form of experimental art.

Before Bain, ambient sound was utilized by John Cage in his poetics and aesthetics of silence, in which silence is actually the sound of the environment, comprising sounds and noise generated by the audience, as well as during the performance of his artwork *4'33"* (1952) (*ibid*.). The silence in Cage's work is not an absence like negation or nothingness, but rather the absence of the traditional "sound" and the infinity of possibilities, that is the presence of an infinite signifier, because his work is always different in each performance, under the influence of different ambient contributors. To Cage, the sound of an ambience is stretching in the air, whereas Bain records sound in materials and structures and deals with silence in a different way, through an inaudible low frequency input. A comparative reading of both the visual and auditory is noticeable with both Bain and Cage: Cage's partiture *Tacet Edition* shows similarities to Rauschenberg's *White paintings* (1951), which were the inspiration for *4'33"*, while Bain connects visual-spatial elements of architecture to sound, with a special focus on the micro-levels and atomic structure of materials. Bain performed his work in the Barcelona Pavilion (the Mies van der Rohe) in Barcelona, and Brendan Joseph, using the example of the same artist (van der Rohe), explains the notion of the "architecture of silence" by linking it to the "architecture of glass" (Joseph, 1997). The silence of architecture is reflected in the transparency of walls made of glass, which draws a boundary line between the exterior and interior, hence the openness of the building in relation to the environment is achieved. The projects in questions are *Fansfort House* (1945-1951) and *Crown Hall ITT* (*ibid*.).

In his philosophy, Heidegger analyzes the "being-in-the-world" phenomenon, explaining that man already exists in the world, and is related to other humans, the environment and shared objects. By the very fact that he uses objects used by other people (such as tools, cutlery, etc.), he is simultaneously interrelated to other people and the world itself in the process defined by Heidegger as "being with" (2010: 111). If we apply Heidegger's theory to Bain's work, we will be able to draw a conclusion that humans, by using mutual objects (galleries, laboratories, buildings or bridges), enter into a dialectical communication and relationship with other people, the environment and the world in totality. Bain's concept of the sound vibration of objects felt by various human senses, provides an awareness of one's own presence in an architectural object, that is an awareness of "being-in-the world". The notion of the body in Heidegger's work does not refer to the object of the body, but a "living body" which is open to the world (Heidegger, 2001: 231). The audience in Bain's work becomes susceptible to all sensations generated by the sound vibrations and movements of the environment and the world itself.

Scientists at the University of Illinois at Urbana-Champaign, within an interdisciplinary group for autonomous material systems, have produced a self-healing polymer modeled upon biological systems. In the case of material damage, the polymer has a self-renewal property thanks to minute capsules containing a healing agent inserted into them (Patrick *et al*., 2016). In the future, such self-healing materials will promote Bain's concept of a building as an animate being, at the material level. Architectural objects

(such as buildings and bridges), if constructed from such materials, should they be subjected to physical damage, will regenerate and restore just like a living body, and will thus prolong their life.

CONCLUSION

Bain's works are constituted as social agents, equivalent to living beings, that is, mediators in establishing complex social relations. Agents (architectural objects or ambient sounds) are also transformed into musical instruments and components of a work of art, that brings about a different worldview. Bain's creative work is an exploratory and critically innovative concept that implies a synthesis of architecture, music and technology and merging with other sciences: acoustics, material science, seismology and psychology, thus creating a specific aesthetic which connects animate and inanimate nature.

There is a certain paradox in relation to the sound in Bain's work (when inaudible transcends into audible) and it brings about an alternative way of "listening to the sound". Unlike previous sound recordings, Bain notices sound within materials, at the level of the tiniest particles. He involves the audience in his interpretations, particularly with regard to their reaction to the low-frequency sounds in the psychological and physiological contexts.

Through the analysis of Bain's work, one can also see the image of today's society in the form of the great advancement of science and technology which is implemented and visible in all segments of life. The equipment records the movements of particles at a micro level and the inaudible sound, as modern science tends to make the invisible and inaccessible visible and achievable, aiming for new levels of knowledge. As William Blake wrote in his poetry: "To see the world in a grain of sand..." (Blake, 2014: 85), such is to see the world in small patterns and understand and find the energy of the finest particles and make the inaudible heard; that means to understand the sound and the vibration of the entire world. The aesthetic in Bain's work actually strives to foresee future knowledge, the hidden cognition contained within superficial knowledge, that is knowledge beyond knowledge – through the connection, synthesis and unity of various sciences and arts.

REFERENCES

Bain, M., Bosma, J. (1999). Interview: Mark Bain. *Trembling structures - Mark Bain*, http://www.nettime.org/Lists-Archives/nettime-l-9908/msg00023.html, accessed 28th March, 2018.

Bain, M., Pascual, M. (2017). Interview. Mark Bain. *Listen to the Wall*, http://www.nettime.org/Lists-Archives/nettime-l-9908/msg00023.html, accessed 2nd April, 2018.

Bart, R. (1986). Od dela do teksta. In M. Beker (Ed.), *Suvremene književne teorije* (in Croatian). Zagreb: SNL, pp. 181-186.

Blake, W. (2014). *Pesme nevinosti i iskustva* (in Serbian). Beograd: Mali vrt.

Cage, J. (1961). *Silence*. Hanover: Wesleyan University Press.

Cavell, R. (2002.) *McLuhan in Space: A cultural Geography*. Toronto, Buffalo, London: Toronto University Press.

Gallagher, S. (2005). *How the Body shapes the Mind*. Oxford, New York: Oxford University Press.

Gallagher, S., Cole, J. (1995). Body schema and body image in a deafferented subject, *Journal of Mind and Behavior*, No. 16, pp. 369-390.

Gell, A. (1998). *Art and Agency. An Anthropological Theory*. Oxford: Clarendon Press.

Goodman, S. (2010). *Sonic Warfare: Sound, Affect, and the Ecology of Fear*. Cambridge Massachusetts, London, England: The MIT Press.

Heidegger, M. (2001). *Zollikon seminars: Protocols - Conversations - Letters*. Evanston: Northwestern UP.

Heidegger, M. (2010). *Being and Time*. Albany: State University of New York Press.

Joseph, B. (1997). John Cage and the Architecture of Silence, *October*, Vol. 81, pp. 80-104.

McDonough,W., Braungart, M. (2002). *Buildings Like Trees, Cities Like Forests*, https://mcdonough.com/writings/buildings-like-trees-cities-like-forests/, accessed 26th September, 2019.

Nyman, M. (1999). *Experimental music, Cage and Beyond*. Cambridge: University Press.

Pallasmaa, J. (2005). *The Eyes of the Skin. The Architecture and the Senses*. Chichester, West Sussex: John Wiley & Sons Ltd.

Pallasmaa, J. (2011). *An Architecture of Seven Senses. Toward a New Interior*. New York: Princeton Architectural Press.

Pallasmaa, J. (2014). Space, Place and Atmosphere. Emotion and peripheral perception in architectural experience, *Lebenswelt,* Vol. 4, No. 1, pp. 230-245.

Patrick, J.F., Robb, M.J., Sottos, N.R., Moore, S.R., White, S.R. (2016). Polymers with autonomous life-cycle control, *Nature*, No. 540, pp. 363-370.

Veen, van L. (1998). Mark Bain: *Architect Plus*, http://v2.nl/archive/people/mark-bain, accessed 26th March, 2018.

Received June 2019; accepted in revised form February 2020.