

The informational phenomenon of trees and biomorphism (following the EDEN project)

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ABSTRACT

The article analyzes the phenomenon of information exchange of trees and shows the productive role of nature in urban revitalization. Based on the EDEN Project, the potential of mental maps of the city, taking into account natural objects, was revealed. The specificity and significant sociocultural influence on the human worldview of the historically composed mytho-archetypes of the tree, their sacred and artistic images, aspects of dendrology under the auspices of biomorphic urbanism as an innovative philosophy of our days are determined. The fact of the existence of cognitive-communicative functions of nature determines the further transformation of the human worldview from the perception of nature as an eternal object of subjugation to the modern perception of it as an equal anthropomorphic subject. The topic is especially relevant in the field of post-war urban development. It is shown that the restoration of European cities, destroyed during the Second World War, took place in the unity of the revitalization of urban architecture and living nature, and harmonious development today is possible precisely thanks to such unity. The statistics of the destruction of natural objects during the period of the current Russian-Ukrainian war are presented. An overview of the facts of restoration, preservation and multiplication of natural zones in the de-occupied cities and villages of Ukraine – a symbol of the invincible spirit of Ukrainians – was made.

KEYWORDS

EDEN project, biomorphism, tree information matrix, mental maps, sacred, mythological, religious tree images, urban revitalization, Ukrainian context

*Even if I knew that
tomorrow the world
would go to pieces,
I would still plant
my apple tree*

Martin Luther

Introduction

Every year, it becomes clear that we are going to a dead end in many areas of human life. The anthropological crisis, the ecological crisis, the COVID pandemic, the Russian-Ukrainian war, which is essentially a terrible genocide which Russia is perpetrating against our country every minute – these are real “Black Swans”, using Nassim Taleb’s metaphor. Current events that we are witnessing are changing civilization, culture and generally questioning the future full existence of humanity. In these circumstances, research strategies aimed at cognition of the world, preservation of humanity nature – the common source of all living things on the planet – are especially valuable. Powerful examples can be the international project EDEN (Kisseleva, 2020), which has been ongoing for more than a year under the leadership of Sorbonne professor Olga Kisseleva, and the project “Cities live and die like trees” by the same author (Desjardins, 2021). These projects are dedicated to the “green citizens” of the planet and the problems of the survival of cities in the controversy with living and artificial nature.

We would like to note an impressive fact: through a number of interdisciplinary studies, scientists from different countries have convincingly proven that trees are something much more than silent witnesses of human life and the lungs of our cities. In the collaboration of researchers, it was possible to establish the existence of planetary communication of trees, and this radically changes the attitude of humanity to nature and the world as a whole! In particular, ecologist Suzanne Simard investigated the phenomenon of “communication” of trees based on their underground connective mycelium (mushroom threads) (Simard, 2020), biologist Monica Galliano (2022) and forestry specialist Peter Wohlleben also substantiated the anthropomorphic approach to trees as communicating phenomena of nature (Wohlleben, 2021).

Obviously, the topic is worthy of philosophical consideration. Therefore, in the article, the literal and metaphorical meaning of the tree in the everyday life of people, in art, mythological and religious narratives will be analyzed, and also the prospects of revitalization of post-war cities with the help of living nature will be outlined, which is currently acutely relevant.

Methods of research

The methodological prism of the research of the given problems is obviously an interdisciplinary approach. From a socio-philosophical point of view, we consider the problem as an integral part of the interaction between a person and society. A humane attitude towards nature as a



living co-participant of social life, as well as a certain socialization of the informational phenomena of nature itself expand the prospects for the development of micro and macro societies of mankind, and carry the charge of worldview human evolution. Philosophical-anthropological, cognitive, and cultural strategies methodologically lead to the change of the anthropocentric understanding of the world to a nature-centric one, in which people, figuratively speaking, are a part of the kingdom of nature, and not its kings-transformers. In order to understand such a transformation of the worldview, it is worth using the assets of psychology, existential philosophy, K. Jaspers's idea of the limit situation, which leads to radical existential and axiological reassessments. Retrospective and comparative methods, thanks to which it is possible to conduct historical descriptions and parallels in the analysis of biomorphism and the philosophy of the city, also deserve some attention.

Results and discussion

Perhaps throughout the history of civilization and culture, people have covertly felt that a tree is something larger and deeper than just a plant. There are many reasons why the image of a tree is found in mythology, sacred texts, in the collective unconscious, in literature and visual arts. However, the scientific substantiation of the sociality of trees makes us think in a special way about *Homo sapiens*, who are becoming *Homo urbanus* in the era of intensive urbanization. How correct is their communication with other living beings on Earth and, in particular, with trees in urban areas? Is the ontological superiority of a Human Being over the surrounding nature so obvious? Our present shows a deep existential crisis in human history: people are struggling to survive in a world of their own making.

After February 24, 2022, when a cruel war, which is purposefully destroying all living things in one country and threatening the entire world, started in the center of Europe, E. Fromm's ideas about the anatomy of human destructiveness sound especially acute. But even in the atmosphere of military alarm, during the wail of air sirens, along with rescuing residents and restoring buildings, Ukrainian activists are planting new trees, flowers, and clearing parks. Thus, biophilia as "passionate love for life and for all living things", proclaimed by Erich Fromm, today opposes necrophilia, giving strength and hope for the salvation of the world.

In the context of discovering the communication of trees, it is worth emphasizing the unique meaning of the relationship between a human being and nature: trees do not just stand, but stand against social chaos! Recognizing them as interlocutors and helpers, communicating with them, we can existentially harmonize our worldview, perceive the cosmic undertones of existence in a new way. After all, chronic uncertainty and anxiety, which have become our constant companions, have exacerbated the need for something stable, orderly and strong. It is not for nothing that the already mentioned Nassim Taleb's popular "Black Swan" metaphor is followed by the concept of "antifragility" – a statement about the human ability to learn constructive lessons from uncertainty and adversity. A tree, if it is not severely damaged, always reflects the victory of life over death, a higher order and cosmic expediency. It is appropriate to mention that the Greek concept *κόσμος* is translated as order. Despite the climatic problems, trees are in constant measure and balance.

The change of seasons, flowering, the ability to bear fruit and shed leaves – in any case – is the observance of cosmic temporythms and harmony, which people so often forget about. Discovering the communicative ability of trees actually makes them our fellow citizens and, in a certain sense, teachers. Being optimistic, the ideal of the noosphere, proclaimed by V. I. Vernadsky, must necessarily include the intellectual integration of trees, innovative, humane communication with trees as Persons.

Turning to the Project, it should also be noted that Paris, Rome, Brussels and Milan, which were not chosen by chance, are included in the research paradigm. They are urban pulsars of European culture and politics, attractors of social flows, autonomous social actors. The study of tree culture historically formed in these cities and the prospects of urban transformations based on tree-like structures will be able to be applied to other large-scale urban spaces of the planet. The global communication of trees, evoking an analogy with the global Network, calls not only for the communicative unity of people, but also for such a human community, where the will for humane interaction of all living things is embodied, and not for totalitarian power over people and nature.



Fig. 1 The forest is the territory of art (Olga Kisseleva) From Olga Kisseleva's private photo archive)

In our opinion, certain research directions, presented below, can be quite fruitful for scientific research in the context of philosophical and cultural understanding of the informational component of the life of trees.

Mental maps and urban life story. Parisian psychogeographers, led by Guy Debord and Ivan Shcheglov, at one time vividly presented the ranking of urban space based on mental preferences. Surprisingly, in the work and creativity of the SI' group, little attention was paid to the objects of urban living nature. And this is understandable, taking into account that mental mapping usually involves mobility, active movement through streets. In the mental maps of our contemporaries, trees also often remain unnoticed, giving way to more exotic objects. However, the appeal to the mental role of trees is long overdue. In the era of acceleration, superficiality of life and the dominance of snack culture, it is important to understand that when it comes to mental "hooks" related

to trees, the context of drift builds a different dynamic, a different relationship with time: slowing down, stopping, contemplating, touching... It is especially interesting to study this aspect in Italy, where the Cittaslow ("slow cities") movement was born – an attempt to return a person to the depth of the moment, to the slow experience of being.

A tree is a full-fledged Genius loci, like other artifacts that preserve the memory of generations and life stories of townspeople. Visualizing mental maps taking into account communication with trees, creating a life story archive about trees in the lives of generations of city dwellers is the most interesting vector of field research,

which allows to revive the connection between times. The results will probably reveal the specifics of the identity of people, trees, cities and something common to all who live on the planet near "green citizens". Thus, trees are returned to the highest values only by their presence and beauty. And to hear a tree, to understand and feel its "language", the subtlest impulses of messages – means to experience a unique practice of interaction with an unknown other world, which is actually, primarily, eternally and fractally present in our universe. A specific aspect of research in this vein can be a description of the experiences and impressions of people who first "heard" a tree.



Fig. 2 Mental map made by Kyiv students showing their favorite parks (From the author's private photo archive)

Mythological archetypes of trees. There is a myth of a tree in the epic of any people. At the same time, the well-known image of the World Tree is a polysemantic cultural symbol that combines many other meanings. In views of the Neoplatonists, the general world process is presented as the life of a huge tree that embraces everything that exists. The legendary Bodhi tree in the Uruvelà grove, which, according to legend, contributed to Gautama Buddha's enlightenment, is still a revered place of pilgrimage today. Biblical trees set the matrix of the Christian worldview, ethical categories: "And the Lord God grew out every kind of tree of the ground, beautiful to look at and good for food, and the tree of life in the middle of

paradise, and the tree of knowledge of good and evil" (Ogiyenko, 1962), a symbolic tree, a tree as an astrological object, a tree as a doctor – all these dimensions of the meanings of a tree are interesting as triggers of national identity, which, at the same time, can be used to find common human attitudes, are something like Propp's maps, which prove the unity of the plots of the fairy tales of the peoples of the world. A tree is the embodiment of the underground, earthly and heavenly, the trinity of the elements of earth, water and air. Julius Caesar's tree in Belgium, Newton's apple tree ("gravity tree") in the Woolsthorpe estate, Anne Frank's tree in Amsterdam appear as full participants in the destinies of prominent

figures. Probably, even the oldest trees on the planet can “tell” a lot: the iconic Parisian Robinia, which survived all the Bourbons and Napoleons, Heldreich’s Pine in the Italian Pollino National Park, or the Linden Theodosius of Pechersky with a thousand-year history on the territory of the Kyiv-Pechersk Lavra. As a result, the description of tree phenomena in the historical mental space of the investigated cities, the creation of narratives of their messages will provide a unique comparative cultural material.



Fig. 3. Old Tjikko pine in Sweden is one of the oldest trees on the planet (9562 years old) (source: <https://locals.md/2015/stareyshee-derevo-v-mire-vozrastom-poryadka-9-5-tyis-let-nahoditsya-v-shvetsii/>)

Artistic discourse. Artistic discourse. The study of the communicative specificity of trees is harmoniously complemented by their artistic embodiment in the art space of cities. Almost all types of art present the image of a tree. Taddeo Gaddi’s “Tree of Life” in Florence in the Baroncelli Chapel, juniper as a symbol of chastity in Leo-

nardo da Vinci’s paintings, Oak of Mamre on icons and frescoes depicting the Holy Trinity, Frida Kahlo’s “Roots”, a dry tree in Salvador Dali’s “The Persistence of Memory” are masterpieces of painting. A modern example from the field of plastic arts is the performance “Astana Ballet”, in the center of which is the dance part of Turanga, the sacred tree, the embodiment of the female principle, love and peace. Turning to the art of sculpture and urban planning, it is worth noting the rare dendrites of the sculptor Michel de Broin in Montreal: urban stairs in the form of twisted tree branches, built by analogy with the pathways of neural nerve impulses in the human brain (*de Broin, 2022*). Such an artifact gives reason to talk about the anthropocentrism of trees and the biomorphism of human beings, about their amazing unity at the level of organic structures. The same context is in O. Kisseleva’s Project, where blood arteries are compared to tree branches and the internal movements of fluids in a tree trunk, and then to the nodes and lines of urban planning (*Desjardins, 2021*).

In this context, an impressive artifact was the concert of the Barcelona Liceo Opera House, performed for trees after the period of lockdowns. Instead of ordinary spectators, all the seats in the audience hall were occupied by... ficuses and palm trees. The author of the idea, conceptual artist Eugenio Ampudia, said significant words after the premiere: “I think that all these plants are somehow aware with their whole being, their cells, their photosynthesis, that they have been to this concert” (*Dianov, 2020*). Thus, even with a cursory look at art performances about trees, interesting examples of their humanization, which in turn humanizes people, can be found. Final exhibitions, almanacs, gala concerts in the perspective of artistic discourses of the image of the tree, presented by the masters of arts selected for the study of the cities, can be a successful perspective.

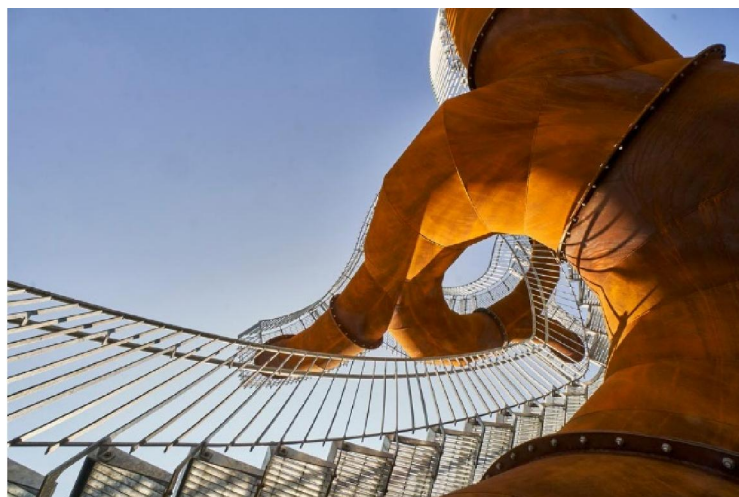


Fig. 4. Michel de Broen’s dendrites in Montreal (source: <http://art-and-houses.ru/2018/08/02/mishel-de-bruen-postroil-gigantskie-dendrity-v-monreale/>)

Biomorphic urbanism. Dendrology of the smart city era. One of the research prisms can be biomorphic urbanism. Introduced by I.V. Goethe's term "morphology" as the science of forms nowadays is increasingly supplemented with the prefix "bio", which indicates a new model of the formation, construction and arrangement of the environment, primarily in "smart" cities. The basis of this approach is environmental friendliness and the introduction of objects of living nature, as well as their images into the spheres of urban infrastructure, culture, architecture and other visual means of urban representation. Vivid examples are the biomorphic gardens in the Tianjin Eco-city, the vertical park in The Hague in the Communication Center City of the future, the "high gardens" project in Brussels by Vincent Callebaut Architectures. Trees occupy a central place in the organization of such build-

ings, performing ecological, bioethical and decorative functions. Theoretically, biomorphism becomes a source of new sense-making along with bionics, synergy and gene-cultural co-evolution. The smart-city visual anthropology of the takes on harmonious, nature-inspired forms. For modern cities as drivers and at the same time victims of environmental problems, and in particular global climate change, preserving and increasing trees is extremely necessary for further survival.

An equally important aspect of the topic is dendrology – the field of theoretical description and practical preservation of tree types and species. Every country, every city has collected its own dendrological experience, which should become a logical addition to the study of the phenomenon of tree communication.



Fig. 5. The Sino-Singapore Tianjin Eco-city. The priority of trees (source: <https://styleinsider.com.ua/2021/02/singapore-tengah-eco-town/>)

Ukrainian context. The topic of smart trees is extremely relevant for Ukraine and its cities. The territory of the country is distinguished by the richest chernozem soil, samples of which, as an ideal, are stored in the International Bureau of Weights and Measures. On such generous land, numerous gardens and forests grew long ago, and large agricultural lands were organized. It is not by chance that Ukraine is periodically called the granary of Europe, and its capital, Kyiv, is the main European garden city. The ancient beliefs of Ukrainians reflected a special mythopoetic mentality and spirituality, which in the years of the Ukrainian Renaissance-Baroque was embodied in a unique "heart" philosophical vision of the world, cordocentrism. The meanings and images of the World Tree and the Bird guarding it have long been encrypted on towels, in cryptographic signs and symbols. In the old plain Ukrainian carols, it is sung that the Tree of Life stands in the middle of the sea, and three birds sitting on it speak about how to create the whole world. According to ancient pagan beliefs, Vladyka Perun himself had a permanent attribute in the form of a sacred oak tree.

Creating a bridge to urban modernity, it is necessary to note the great attention of Ukrainian citizens to the preservation and propagation of trees. Periodically, construction riots break out in cities when new buildings are planned based on cutting down trees, and the courts of-

ten uphold the people's right to the status quo of natural areas.



Fig. 6. Tree-shaped embroidery on a Ukrainian towel (source: <https://etnoxata.com.ua/ru/statti-ru/ru-traditsiji/ru-osnovnye-traditsionnye-simvoly-i-sistemy-znakov-v-vyshivkah-ukrainskih-rushnikov/>)

Now, when armed Russian aggression is taking place on the territory of Ukraine, the attention of environmentalists is focused on the possibilities of direct protection of trees, gardens and parks. 1/3 of the 4 million hectares of national parks and nature reserves have been damaged. Explosions, the movement of military transport, fires, mines became a humanitarian disaster for both people and nature. Parks and gardens of the Azov-Black Sea coast, the Askania-Nova biosphere reserve, Babyn Yar, Pushcha-Vodytsia near Kyiv, Irpin, Gostomel, Bucha were hit by rockets. Along with the terrible human losses, 900 natural objects of Ukraine are fundamentally damaged and need to be restored.

Even in wartime conditions, the Ukrainian government and civil society pay great attention to the problem of trees and green areas, which deserves a separate study. Memory Parks have already been established in Kyiv, Odesa and 8 other cities of the country. The Ukrainian nature protection organization UNCG, with the help of the GBIF scientific platform, consolidates the basis of scientific research of natural complexes in Ukraine, organizes humanitarian aid actions for national reserves. In the spring of 2022, at the height of the military events, the "Parks. Handbook of Improvement" was published, in which, in addition to valuable practical information, biomorphic patterns from Ukrainian plants are successfully used.

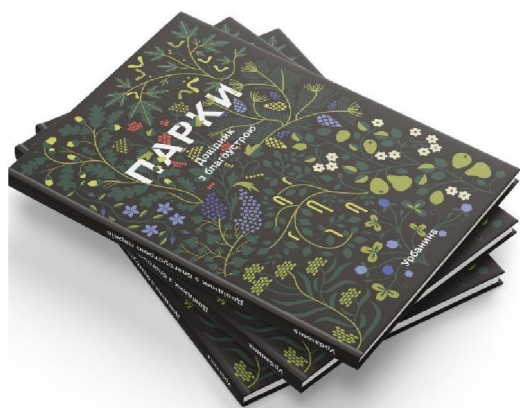


Fig. 7. Handbook on improving Ukrainian parks
(source: <https://www.urbanyna.com/parky>)

All the above directions of research are also relevant in the Ukrainian context.

At the same time, it is worth noting the special role of the tree metaphor directly in philosophy – for example, in postmodern philosophy. G. Deleuze and F. Guattari, in search of gestalts of the modern world, radically opposed the tree and the rhizome. The tree was shown as an outdated linear form of thinking and aesthetics based on mimesis, and the rhizome – as an actual, fragmented and rootless form: a symbol of the lifestyle of the current person, the "ironic schizophrenic" type of the era of capitalism. According to philosophers, a rhizome is capable of "uprooting" a tree-like structure.

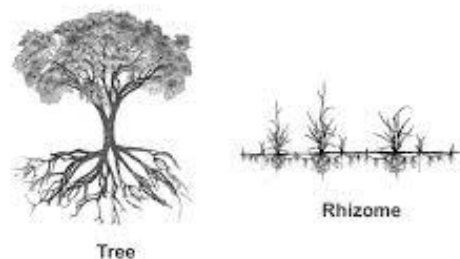


Fig. 8. Tree root system and rhizome

Without denying the rhizomatic nature of the modern worldview, especially in the context of the anthropological crisis and the growth of mosaic culture, we still hope that the "death" of a tree will not happen. Trees as phenomena of nature and as archetypal images of the cosmic natural order, as Personalities – will survive together with Humanity, and will also be able to tell the world about all this in their "language".

Biomorphism: trees are development navigator. "Cities are born, live and die like trees..." The name and content of the Project evoke an analogy with O. Spengler's "Twilight of Europe", where culture appears as a being of a higher order, as a living organism, going through anthropological stages of development from childhood to old age, degeneration and death. One of the reasons for the degradation of culture, according to the philosopher, is the transition to power of the uncreative majority. Isn't that what happens in cities, when urban planning is sometimes in the hands of not quite professional or overly self-serving developers? Then the culture of the city, its "soul", comfort and atmosphere can collapse, like a tree dies because of drought or the hand of a woodcutter.

Resistance to such processes requires not only the activity of civil society, the creative class, but also the proposals of scientists. Interdisciplinary groups of specialists propose to implement the ideas of natural tree structure in the development of urban space. This is an exceptionally productive idea, if realizing that the birth of natural cities happened in many ways similar to the development of a tree: from an established center to the branching of streets. The introduction of artificial technologies and radical redevelopment solutions without taking into account the synergy of natural spatial processes can deform the city and have a destructive effect on people. This happened, for example, with Boulevard périphérique de Paris, which separated the usual roads of internal migration of Parisians and became a "smog factory" for 156,000 people living along the 35-kilometer route. A tree is the roots, trunk, branches and crown. Accordingly, the city is the underground locations ("roots"), the center (usually, the historically oldest space, the "trunk"), the streets are the "branches" or "arteries" through which the vital "juices" move, and the towers, domes, skyscrapers are the "crown" of the city, looking up into the sky. It is no accident that in many architectural utopias, the cities of the future appeared in the form of a tree. In modern Singapore, as is known, a similar idea was successfully materialized in Gardens by the Bay: giant Super-trees are

unique engineering structures combined with high technologies in harmony with living nature.



Fig. 9. Singapore (source: <https://www.gardensbythebay.com.sg/>)

However, it is not only about the structural compliance of urban locations with natural tree objects, but also about the direct influence of trees on the worldview of the citizens. The appearance of trees on the territory of former industrial zones or urban wastelands, on purely man-made surfaces radically changes urban migrations, mental and physical health of people. The “choreography” of the crowd is complemented by the fluidity and plasticity of the movement of passers-by, even at the level of walking manner, posture, and communication, and harmonizes relationships with time and space.

Looking at the cities from a bird's eye view, the fact becomes indisputable, as noted by the head of the Project, Professor O. Kisseleva, that city blocks, and most likely, fractals are visually very similar to the bark of trees and cracked earth (*Desjardins, 2021*). It should be noted that the idea of a fractal also belongs to the city and trees, the human body and the universe. For example, the human lungs and circulatory system are fractal, as are the crowns and leaves of trees. We can speak in general about the fractal anthropic space of the city, as its locations are built up and broken into a matryoshka pattern (repeated structures), translating transgression and the principle of *mise en abyme*. At the same time, the city in its three-dimensional expansion, growth down-up-wide, still has some mysterious border that allows it to preserve its identity. Isn't it the same way of growing near a tree? Even without the hands of the gardener, the tree grows three-dimensionally, but at a certain stage it stops, reaching some sort of balance. In addition, many cities have an annular multilayered structure, but even a tree trunk in cross-section shows its age rings. In this analogy, one can probably see the paradigm of synergy, the ability of living systems to self-organization, self-similarity.

But cities, like trees, are not eternal, they are mortal... Jane Jacobs in her bestseller “The Life and Death of American Cities” pointed out the origins of this half a century ago: all the same, careless abstract urban planning without taking into account the will of citizens and natural processes. On the contrary, addressing living nature, careful and thoughtful observance of its synergistic and structural laws can improve the urban landscape so much that the city person, *Homo Urbanus*, will feel completely organic in the urban environment (*Jacobs, 2011*).

Such an approach can be extremely relevant in the case of revival and reconstruction of cities once destroyed by war or natural disasters. Unfortunately, nowadays, as a result of armed aggression against Ukraine, many cities and their natural areas have been damaged. Entire villages, suburbs of Kyiv, Mariupol, certain districts

of Kharkiv, etc., were wiped off the face of the earth. For Europe, it will be a matter of honor to help Ukraine in the revival of these places. We know from history that a city can rise from the ruins and live a new life! Warsaw, Coventry, Dresden, Gdańsk... But even in peacetime there must be monitoring of the growth and development of cities in order to preserve the balance of artificial and living nature. In this context, let us make a brief overview of the problems of cities that are relevant in this context.

Brussels. One of the most beautiful cities in Europe, Brussels experienced a special period in its history, which was called “Brusselization”. Not yet fully restored after the Second World War, in the 1950s, it was in the grip of chaotic urban planning, which resulted in the demolition of historical buildings, the intensive construction of massive new buildings for the purpose of hosting world exhibitions, and the result was the alienation of citizens from their homes, the distortion of mobility flows and the growth of antisocial manifestations. It is not for nothing that in one of their fantasy novels “Brüssel”, the authors Peters and Skutein reflect this situation, ending the plot with the destruction of the city from a natural cataclysm. Only the return to the balance of artificial and living nature became the basis of revitalization and effective transformation of the city.

Rome. Even in ancient times, the legendary Rome became famous for the construction of aqueducts, which can be perceived as an analogy of the movement of liquids along blood vessels or along the trunk and branches of a tree. Water arteries have become one of the foundations of the steady growth of the “Eternal City” over its almost three-thousand-year history. In addition, the villas and palaces of wealthy townspeople were distinguished by their enfilade locations, which were the forerunners of fractal structures. And the fruit trees of the Mediterranean, lush meadows and diverse animal life formed a fairly comfortable infrastructure even in ancient times and had a positive effect on the length of life of the Romans. However, the long-term accumulation of demand for wood periodically led to significant deforestation, which resulted in the formation and expansion of swamps. This, in turn, radically undermined agriculture and the economy and, among other reasons, determined the crisis of the empire.

In contrast to the past one, modern Rome is distinguished by a harmonious combination of historical and natural objects, unique landscape views that provide rich opportunities for flaring. Traditions of resting on the grass, flowerpots on balconies, fountains in the form of iris flowers, forest complexes of the pontiffs, Villa Borghese, Villa Doria Pamphili, Villa Ada with rare species of trees and other plants – just a small list of the phenomena of the living nature of Rome that is managed to be preserved, improved and which is pleasant to study as an example of a careful attitude to nature.

Paris. The history, nature, architecture, innovations of Paris are an endless treasury of experience and theoretical research. It is obvious that the periods of transformation of the city cannot be considered outside of the activities of Baron Osman, who for 17 years reshaped Paris and, despite the then and even current criticism of the reforms, created a city that is still one of the main decorations of Europe. And today, the solar principle of architecture can be seen in Paris: almost all squares are built like a solar disk with rays, for example, 12 streets diverge from the square Etoile. The repetition of similar constructions returns to the matrix of fractals, to the axial

principle of the world system, and to the analogy with the structure of a tree. It should be added that, like the Roman architects, Napoleon III, Baron Osman and the architect Adolphe Afran not only transformed the streets, but also provided the townspeople with light, water, sewerage and gas supply. After all, a city can develop harmoniously only on the basis of full-fledged life support, from water and light to the possibilities of ventilation of premises. In other cases, as vividly described in "Perfumer" by P. Syuskind, even the obsessive suffocating smell of the fish market can cause antisocial moods.

In today's Paris, we can see the unflinching attention of city planners to nature, preservation and multiplication of green areas, which create a special comfort for the citizens. Paris became famous, in particular, for the tradition of many hours of public relaxation in the Luxembourg Gardens, in the Tuileries, Montsouris and other parks, in the Boulogne and Vincennes forests, in numerous public squares. In some areas, the combination of smart city principles and natural elements is brilliantly shown, which requires a separate scientific review. However, every year, the problem of city garbage pollution, which not only spoils the appearance of Paris, but also poses a threat to the health of citizens and the development of plants within the city, is becoming more and more obvious. An urgent task is also the aspect of how cities are littered with the products of life support of citizens, how it harms people and nature, what innovative ways of combating the problem have been tested in other cities and countries of the world.

Milan. One of the most famous global cities in the world, Milan is closely connected with nature. The very structure of the city shows a familiar solar principle: the Centro Storico with the Fashion Quarter, its oldest district, is surrounded clockwise by other quarters. And even the tram line repeats the same structure: a ring of the center with branches to other districts. All of Milan's current 9 zones, when viewed from above, resemble the rings of a tree trunk and create a harmonious combination of the old and new city. Milan's irrigation systems are more than a thousand years old, and since the 18th century, gardens and parks have been carefully arranged in the city and suburbs. The famous flowering trees in Eleonora Duse square, the 7th zone with the large-scale Petrarca village courtyard surrounded by trees and flowers, the huge well-kept parks of Indro Montanelli, Parco Sempione, Europe's largest natural agricultural park Sud Milano and many other landscape attractions create atmospheric egregor of the city.

Milan went through periods of destruction: the wars under Barbarossa, urban decline during the plague, the destruction of entire neighborhoods and suburbs by carpet bombing in the Second World War. As a means of restoration, the Monte Stella hill, built on the territory most destroyed by the war, which now houses one of the city's most beautiful parks of 370,000 hectares, attracts attention. Milan also presents the most creative programs of urban gentrification, such as the station in zone 9 on the site of the desolation of depressed neighborhoods. At the same time, the contrast between rich villas and abandoned industrial zones, which still require revitalization, is preserved in the city. Districts with an antisocial public, the "seeds" of crime, expect a radical transformation not without the use of green spaces.

A bright innovation of Milan in the combination of high technologies and nature was the residential complex Vertical Forest, which can be a separate area of research.

Karlsruhe. The history of trees and the history of Karlsruhe are interconnected. Legend has it that Charles III William (18th century) once fell asleep under a tree, and he allegedly had a dream about a surprisingly calm and beautiful city, which the king decided to build after waking up, calling it "Karl's Silence" (Ruhe – silence).

The historical development of the city is connected with the evolution of its green areas, forests, gardens, and trees. After all, peace and quiet are best realized in the bosom of nature. It is also possible to note the solar principle in architecture: as many as 32 "rays" of streets depart from the baroque palace in the center, which contributed to the emergence of the metaphor of Karlsruhe as the "fan city".

The city suffered a lot during the First and Second World Wars and was rebuilt taking into account the historical radial planning. The large-scale gardens in the center became a unique asset: the Karlsruhe Botanical Gardens and the Palace Park. Studying the revitalization of Karlsruhe, aspects of its artificial environment in combination with successful dendrology is a logical addition to ideas about cities and trees.

Kyiv. It is impossible to talk about Kyiv today without the tragedy of the war that Ukraine, its cities and villages are going through. More than 300 residential buildings, dozens of schools, kindergartens, infrastructure facilities were destroyed in the capital itself. According to official data, more than 300 Kyivans died, and hundreds of wounded remain in hospitals. Cultural monuments and natural areas suffered. The suburbs of Kyiv, their once safe luxurious forests, gardens and fields are littered with landmines and shrapnel. Corpses are rotting in the ground on the outskirts of Kyiv and in the surrounding forest locations. This threatens a special ecological disaster, as well as the hastily buried mass graves of thousands of victims of aggression. Visiting green areas is now strictly prohibited, only sappers work there. In addition, fires are permanently burning around Kyiv, the smoke of which reaches the city quarters. Periodically, forests burn in the Chernobyl zone, which is located only 90 km from Kyiv. All those who remained in the city are experiencing daily enormous stress. The townspeople who left for evacuation are also in a difficult state of mind, worrying about their relatives, their homes and, in general, their country. Many refugees are also tormented by the "survivor's complex".

The study of Kyiv problems should be inseparable from the life stories of Kyiv residents and forced resettlers. Since the war is still going on, it is difficult to talk about a clear program for the revitalization of Ukrainian cities, but it is still necessary. First of all, all wars end sooner or later, and secondly, it is precisely the focus on a peaceful future that is necessary today for the further rise of fortitude and optimism, which Ukrainians possess in abundance. It should be noted that Kyiv was extensively destroyed during the Second World War, and the experience of rebuilding the city taking into account the natural zones of that time can become useful material for current research.

Today, Kyiv has 127 parks and 500 squares. This is a huge landscape potential for the post-war rehabilitation of people and the efforts of the creative class, as well as for attracting foreign investments and the work of domestic

and foreign specialists. After the demining of the territories adjacent to the city, their careful monitoring and revitalization, people's and nature's return to the life is necessary. Before the war, in just one year of 2020, 80 new green recreation areas were created in the capital, parks were arranged, and thousands of flowers and trees were planted. Cleanliness, thoughtful landscape, fountains, benches, lanterns – all these details of natural locations can have a beneficial effect on the psyche and general health of people. In 2021, an innovative project of grandiose transformation of the Kyiv hydropark was created – one of the oldest arboretums in Eastern Europe, combined with the water area of the Dnipro.

It is necessary to study the previous experience of the coexistence of artificial and living nature, create an updated map of green spaces, a catalog of rare trees and plants, continue to transform the infrastructure and nature of another "eternal city", the capital of Kyivan Rus and independent Ukraine.

Conclusions

Having considered the interdisciplinary aspects of the phenomenon of the information matrix of trees, we have come to the conclusion that this issue is able or even designed to transform the human worldview in relation to themselves, the world, and nature. Human beings, who for centuries perceived themselves as the pinnacles of evolution, find themselves in front of the fact that nature is much deeper and more intellectual than it was believed. So *Homo sapiens* is only a part of the natural universe, one of the communication links in the discourse of earthly existence; they should humanely reckon with intelligent "green citizens of the planet".

Based on the EDEN project, dedicated to the study of the phenomenon of trees and related issues of urban space, we are convinced that the idea of the "personality" of trees demonstrates the existential unity of the metaphorical, sacred and everyday perception of the tree, provides an understanding of the tree as a model of the orderliness of the world in contrast chaos in which humanity has been since the anthropological crisis.

In order to understand the meaning of the information matrix of trees, we invented such scientific and research prisms as the inclusion of natural objects in mental maps, the analysis of mythological and religious images of the tree and its display in artifacts. The logical continuation of scientific research was the examination of the issue of biomorphism as an embodiment of E. Fromm's idea of biophilia within the framework of urban space, and a comparative view of the structure of a tree and the structure of a city provides innovative horizons for urban planning.

Having analyzed the history of the revitalization of some of the world's leading cities after the Second World War, we saw that the recovery and development of a re-

cently destroyed city necessarily includes the revitalization and further development of green areas. As shown in the article, this topic acquires special importance in the Ukrainian context: even during the period of Russian aggression, Ukraine, losing hundreds of kilometers of protected locations, experiencing huge human and natural losses, meticulously revives trees, forests, parks, gardens, and flowers. This becomes another vivid symbol of the indomitable spirit of Ukrainians, their will to life and to Victory.

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Інформаційний феномен дерев та біоморфізм (слідами проекту EDEN)

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В статті аналізується феномен інформаційного взаємообміну дерев та показано продуктивну роль природи у міській ревіталізації. Відштовхуючись від Проекту EDEN (2020), розкрито потенціал ментальних мап міста з урахуванням природних об'єктів. Визначено специфіку та значний соціокультурний вплив на людський світогляд історично складених міфо-архетипів дерева, їхніх сакральних та художніх образів, аспектів дендрології під егідою біоморфного урбанізму як інноваційної філософії наших днів. Факт існування когнітивно-комунікативних функцій природи детермінує подальшу трансформацію людського світогляду від сприйняття природи як споконвічного об'єкта підкорення – до сучасного сприйняття її як рівноправного антропоморфного суб'єкта. Особливої актуальності тема набуває у контексті післявоєнної міської розбудови. Показано, що відновлення європейських міст, зруйнованих за часів Другої світової війни, відбувалося у єдності ревіталізації міської архітектоники та живої природи, а гармонійний розвиток міст сьогодення уможлиблюється саме дякуючи подібній єдності. Наведено статистику руйнації природних об'єктів України за період нинішньої російсько-української війни. Зроблено огляд фактів відновлення, збереження та примноження природних зон у деокупованих містах і селах України, що виступає одним із символів непереможної сили духу українців.

Keywords: проект EDEN, біоморфізм, інформаційна матриця дерев, ментальні мапи, сакральні, міфологічні, релігійні образи дерева, ревіталізація міст, український контекст

ⁱThe Situationist International (SI) is a group of French psychogeographers who created a manifesto for the transformation of the urban space in Paris in the 1950s. Their proposals were based on the experience of “free drift” through city streets, on the basis of which any person subjectively ranks the space and overcomes the linear horizon of city blocks. In the book “Performance Society” by one of the leaders of the movement, Guy Debord, the principles of a kind of “innovation quest” were advocated, as a result of which the urban space turns out to be a collection of not geographical, but mental designations. This was primarily related to the emotions and behavior of the townspeople, their experiences, and the existence of an urban lifestyle. Having a considerable layer of utopian ideas, the SI group at the same time initiated a psychogeographical practice and laid existential foundations in research strategies for studying the phenomenon of the city

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