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MATERIALIZATION OF “THE INVISIBLE NUCLEAR” IN U.S. NUCLEAR FICTION ON CHERNOBYL

У статті акцентуються літературні аспекти подвійності, пов’язані з концептом «невидимості» ядерної енергії, в письменницьких практиках США (від доби пізньої холодної війни до теперішнього часу), які охоплено посттравматичним досвідом постчорнобильського періоду. Статтю присвячено вивченню особливостей художнього осмислення невидимості ядерної енергії в художньому осмисленні катастрофи на атомній станції (вибух на Чорнобильській АЕС) та її наслідків у художніх творах письменників США, таких як «Chernobyl» (1987) Фредеріка Поля, «Radiant Girl» (2008) Андреа Вайт і «The Boy from Reactor 4» (2011) Ореста Стельмаха. У статті висловлено припущення, що трансформація концепту «невидимості» в нуклеарному дискурсі США обумовлена переосмисленням Чорнобильської катастрофи, яке допомагає визначити культурні та соціальні параметри ядерної енергії як концепту з метою подальшого впливу на суспільне визнання нуклеарних технологій. Також у статті навмисно підкреслено літературні аспекти осмислення концепту «ядерної енергії», що виходять з необхідності диференціації нарративу «ядерної війни» і нарративу «ядерної енергії», які мають різну політику: якщо ядерна війна розглядається (за Дерріда) як «абсолютно фікційний» компонент нуклеарного дискурсу, то ядерна енергія, зазвичай співвідноситься з ініціативою «мирний атом» і є предметом дискусій щодо матеріалізації невидимого.

Ключові слова: нуклеарна література, нуклеарний нарратив, нуклеарна критика, матеріалізація, невидиме, подвійність.

В статье акцентируются литературные аспекты двойственности, связанные с концептом «невидимости», соотносимым с ядерной энергией, в писательских практиках США (от времени позднего периода холодной войны до настоящего времени), охватываемые посттравматическим опытом постчорнобильского периода. Статья посвящена изучению художественного воплощения невидимости ядерной энергии при художественном осмыслении катастрофы на атомной станции (взрыв на Чернобыльской АЭС) и ее последствий в художественных произведениях писателей США, таких как «Chernobyl» (1987) Фредерика Поля, «Radiant Girl» (2008) Андреа Уайт и «The Boy from Reactor 4» (2011) Ореста Стельмаха. В статье предположено, что трансформация концепта «невидимости» в нуклеарном дискурсе США обусловлена переосмыслением Чернобыльской катастрофы, которое помогает определить культурные и социальные параметры ядерной энергии как концепта с целью дальнейшего влияния на общественное признание нуклеарных технологий. Также в данной статье намеренно подчеркнуты литературные аспекты осмысления концепта «ядерной энергии», исходящие из необходимости дифференциации нарратива «ядерной войны» и нарратива «ядерной энергии», которые имеют различную политику: если ядерная война рассматривается (по Деррида) как «абсолютно фиктивный» компонент нуклеарного дискурса, то ядерная энергия обычно соотносится с инициативой «мирный атом» и является предметом дискуссий о материализации невидимого.

Ключевые слова: нуклеарная литература, нуклеарный нарратив, нуклеарная критика, материализация, невидимое, двойственность.

Since the early 1980-ies literary critics started to speak about a new perspective, new methods, new toolkit, new concepts which are related to nuclear-themed texts, which soon resulted into shaping nuclear criticism as a literary theory field, studying the nuclear energy issues in literature, while providing the approaches, methods and tools to researching the literary dimensions of “nuclear” fiction as well as creating/breaking stereotypes about the nuclear energy and nuclear energy related nuclear, including nuclear weapon, nuclear energy plant explosions, nuclear tests, nuclear wastes management etc. and contributes to shaping “nuclear narrative” (see Derrida [3], Ellis [4], Shewry [13], Foertsch [5], Brown [2]). While being on the edge of science and humanities, since then nuclear narrative has tended to be shaped by the geopolitical moods and environmental issues which together define the approaches how nuclear energy related issues can be accepted, considered and represented in a text, with a further remapping the cooperation between literature in general and the nuclear issues at any stage of nuclear studies developments and nuclear policy’s preferences.

After the disaster at Chernobyl NPP the key statement of nuclear criticism – about the “fabulously textual” character of any nuclear event – went through correlation with a real event and a real area of its implementation. Chernobyl nuclear plant explosion demonstrated that “fabulously textual” image of the nuclear refers not only to the past (the Atomic bomb literature) and the future (the apocalyptic fiction) but “the nuclear” refers to the present. Chernobyl nuclear explosion against its Cold War political and ecological background made a real shift of “nuclear narrative” focus – by making the nuclear an accepted practice and while making a gap between the potentials of nuclear energy and the apocalyptic moods in the public imagination [2; 15].

While radiation is a physical phenomenon that exists independently on how it is detected or politicized, nuclearity is a “technopolitical phenomenon that emerges from political and cultural configurations of technical and scientific things, from the social relations where knowledge is produced” [6]. Portelli in his *What Cultural Objects Say About Nuclear Accidents and Their Way of Depicting a Controversial Industry* (2017) researches radiation as a cultural object which is regarded as a product of social representations [12, p. 143]. Due to his ideas, the Chernobyl nuclear power plant explosion together with social transformations caused a representational crisis, where is a cultural object, which is both a product of social reality and an agent involved in creating societal representations and structuring the society [12, p. 144].

The lack of nuclear awareness about the nature of nuclear energy, the level of secrecy at the nuclear power plant initially shaped the total adoration and excitement, concerning the process of nuclear technology as a representation of magic unknown forces, depicted by the writers in their novels under study here:

*‘Although I had recently learned that science, not magic, ran the station, the process still didn’t make sense to me. Papa had explained that the individual rods in a nuclear reactor’s core contained atoms of nuclear fuel. As the fuel nuclei split, they produced energy. This heat energy boiled water to create steam. The steam turned generators to produce electricity. But this explanation failed to answer my basic question: **How could something invisible turn on my lights?**’* [16, p. 34].

The paradoxical situation, describing the near-by Chernobyl territory, as *‘as horrible as it is radiant’* [12, p. 145] represents the controversial character of nuclear technology giving birth to the beautiful ‘invisible’:

*‘It’s calm all around me. These places suggest pleasure... But I’m at Chernobyl! How can I reflect this improbable situation? Only through scientific artifice.... What’s in front of me, what I’m drawing is not the truth! I don’t see the disaster... **How can I draw the invisible?**’* [8, p. 163].

*‘My throat was parched, and the milk looked delicious. Regretfully, I put my cool glass down on the floor. I knew if I drank it that I would be **drinking radionuclides**. I still wasn’t exactly sure what these **invisible particles** were, but I had all the proof I needed that they were bad for me’* [16, p. 167]. Such public readiness to fight with radiation – the invisible enemy – on one hand, formed by the Chernobyl social reality, and on the other hand, it itself experienced the pivotal impact of social reality on those, who intentionally or accidentally were involved in the post-Chernobyl space.

The role of fiction is not limited in depicting the image of a single subject, problem or event, but raising a new – literary – image, which can be an embodiment of typical features,

principles through abstraction, generalization, idealization, materialization in the text body. That is considered to be the main point in any writer's efforts to create his/her own fictional philosophical and aesthetic reality through cognition, comprehension, transformation and artistic interpretation. Both 'the invisible' and the 'material' can be represented in a interconnected way mean that it is senseless to study the theoretical and practical approaches to distinguishing the goodness and the bad in fictional works.

The materialization of the nuclear is based on Tartu semiotician's theory of the duality of the discreteness of semiotic spaces and their verbal representations, where Lotman's semiotic universe is one of levels, strata, and hierarchies based on the foundation of dualisms which begin with the axiom that *'against the background of nonculture, culture appears as a system of signs'* [9, p. 211]. Such duality is regarded as a specific phenomenon of human nature, which expresses not a feature or substance, but a contradiction, arising from the specifics of human existence [10, p. 249], because this duality is the essence of a human's existential contradiction.

Nuclear fiction – in our focus, fictional works on the nuclear energy related issues (mainly, nuclear technologies, nuclear power industry, nuclear power plant explosion and its aftermath, nuclear waste management etc) – supports the idea of such duality through the process of materialization where the issue of evaluating the good and the bad (or the debatable) about nuclear energy is reflected on the literary imaginary of a nuclear power plant. In Chernobyl fiction under study here we have the duality as a literary dimension of a nuclear power plant – even before and after the nuclear explosion.

While depicting the pre-accident days, the writers in their novels almost on the first pages of their works emphasize the enormous power of the plant construction, which is supposed to be a separate city, representing the power of the Soviet achievements in nuclear science and technology and making the Soviet people proud of their being involved in producing the 'magic energy':

*'Chernobyl was **not merely a power plant**, it was nearly a city'* [11, p. 3].

*'...the bound book of aerial photographs taken during construction that showed **the immense power plant as it grew, layer by layer**'* [11, p. 3].

*'I believed the station was a **magical** factory that made energy out of nothing'* [16, p. 22].

The writers – Pohl, White, Stelmach – intend to explain the specific character of the city: it was built for supporting the functioning of the Chernobyl nuclear power plant, whose residents were sent there from all the Soviet republics by the Soviet government. This emphasis on the specificity of the city residents' pool is made, on one hand, to underline the significance of the nuclear power plant as an energy-production enterprise for the whole Soviet Union, and on the other hand, to highlight an easy possibility of the transformation from excitement to fear for those who are without roots, without a myth, without the background for further shaping the identity – those, who are easy to be manipulated. The writers emphasize the fact that all the city residents were connected to the Chernobyl nuclear power plant – *'...Virtually every adult resident worked at the station'* [16, p. 99]), which made its residents pride and thankful for living in this 'paradise' area – nearby the nuclear power plant:

*'Papa's job insured a good living for our family. Now that I was older, I understood in this sense the station truly was magical. We were all **deeply grateful to the government** for selecting our area as the site for the most up-to-date and modern power station that the Communist world had ever constructed. Since unlike conventional power plants, nuclear fission didn't create ugly clouds of black smoke, we assumed that our **paradise** would remain unspoiled'* [16, p. 22].

'The station's pay is ten times higher than anywhere else in all of the Ukraine' [16, p. 23]. *'The station is **our livelihood**'* [11, p. 97].

The writers highlight the unbelief and shock of people, who were so proud of their involvement in the energy production process and their trust to the government even after the Chernobyl accident happening:

*'His father's power station could not have blown up! It was **the very latest triumph of Soviet technology**, with all the safety features his father had been proud to display to him as they toured the giant plant. It was too **big and too magnificent to explode!**'* [11, p. 43].

*'But just as Papa **believed his beloved country** was the greatest in the world, he continued to insist that **his government would protect him**'* [16, p. 133].

Andrea White in her *Radiant Girl* describes a slow process of changing the image of the nuclear power plant in the protagonists' perception after the nuclear accident – the shift from the pride of 'the latest triumph of Soviet technology' to fear, uncertainty, distrust, doubt:

*'Before that night, I had been **suspicious** of the station. Now, living just forty miles away, I was certain that I had a right to be **afraid**'* [16, p. 108].

*'This night, I had grown tired of never speaking about the things that were most important to me as well as **hiding my fears**. "Boris died at the station," I said'* [16, p. 96].

*'It was the summer before the eighth grade. Although I had begun to **doubt** the wisdom of Papa's job at the station, I confess I never turned down a single one of the **many gifts paid for by his good wages**'* [16, p. 95].

*'I felt **conflicted**. I wanted to go, but no one seemed to realize that the station was **dangerous**. So I just shrugge'* [16, p. 113].

The writers show their readers a slow process of shifting the public perception of a nuclear power plant from excitement and pride through doubts and fears to hatred to the power plant which is the implication of the materialized 'invisible' in the Chernobyl context:

*'...the plant was in **mortal peril** and he could not do anything else'* [11, p. 31].

*'Papa sounded so self-satisfied that I just wanted to hurt him. "I **hate the station**." He hurried over and drew so near that I could see the stubble on his face. "What did you say?" "It could kill us all!" I cried. "Ungrateful girl!" Papa yelled'* [16, p. 121].

*'In my imagination, the station had become a dark fortress, an **evil emerald** city with a terrifying fireball on the throne commanding people to do its bidding and the consuming them* [14, p. 145].

But even after gaining the full understanding that the nuclear power plant is an implementation of 'the invisible nuclear', carrying death and ruining the previous hopes for 'paradise' life, the protagonists of the novels continue to support its functioning and regarding it as a source of their livelihood:

*'Papa's fist hit the table. "How can you fail to understand **the opportunity**?"* [16, p. 95].

*'My bedroom was not a granny or a teen room, just a nondescript, modern space. I had a brand-new desk, an oak bureau and a new bed fitted with soft sheets, **all paid for by my father's wages at the station**'* [16, p. 99].

*'How could I have been so stupid? Papa wasn't an overzealous patriot. He **worked at the station to pay for the Moped and jewelry he thought I liked so much**'* [16, p. 139].

Juraku Kohta tries to explain such shifts in the public perception of nuclear energy – 'The sequential regulatory actions have made operators and manufacturers impoverished by never-ending review process while public trust has not been effectively recovered in proportion to their efforts. It could be interpreted that regulation fulfills the public will to punish nuclear industry instead of legal prosecution process' [7, p. 162].

So, the materialization of the invisible in the image of 'a nuclear power plant', represented in the novels, makes the leitmotif of incomprehensibility and mystery of 'the invisible' more visual and material. It is the nuclear power plant that controls the observance of certain behavior norms, which be identified as a regular link between the almost universally prevalent perceptions of "supernatural" forces that cause disease, and social norms, governing the behavior. Such ideas effectively function as a mechanism of social control and a way to maintain social order. So, the nuclear power plant is regarded in the novels under study as a materialization of the "invisible enemy" after the accident. But its primary image of 'the manifestation of the triumph of nuclear technology' is still strong, which explains the dual nature of a nuclear power plant, regarded as a subject for controversial 'dual' image of technological achievements.

Conclusion

Within the hot debates about the positive and negative societal consequences of discovering radiation, its good and bad influence on humanity coincide with the long-term debates about the role of technology and technical innovations in the society, which result in launching the issues of norms, values, moral and ethical aspects of scientific knowledge for the benefit as well as for the destruction of humanity. The nuclear related issues have gone through the multisided and multidisciplinary debates, swinging between 'the good' and 'the bad' and balancing as 'the debatable' within the Nuclear Anthropocene with the dominating perception of 'the nuclear' as

the 'invisible', related to the loss of the value of life, neglecting the moral values within nuclear technology's policy in the late Cold War age.

The focus on studying the implication of 'the nuclear' in its cultural and social representations of the nuclear energy gives rise to the socio-cultural and social-technical shifts in reconsidering the perception of the nuclear energy issues, related to the debates about the 'Atom for Peace' policy within the late Cold War discourse. The nuclear narrative, shaped by the Cold War policy, went through some changes after the well-known statement by Derrida about 'fabulously textual' component as a dominating one in charactering the nuclear discourse in general [3, p. 20]. But the Chernobyl nuclear power plant explosion encouraged the separation of 'nuclear war' narrative and 'nuclear energy' narrative, which have the different policies of their implications as well as the different messages in the nuclear discourse: when a nuclear war as well as nuclear weapons are narrated as an absolutely 'textual' [3, p. 21], while nuclear energy and nuclear power are still 'the debatable' [1].

The emphasis on studying the literary implications of 'the nuclear' in US novel (by Pohl, White, Stelmach), depicting the Chernobyl nuclear power plant accident, its premises and aftermath, helps not only to distinguish the transformations of 'the nuclear invisible' in the US writing practices under analysis here but also to highlight the ethical aspects of nuclear energy related issues and nuclear energy policy in the post-traumatic society of the late Cold War, which define the cultural and social parameters of the perception of nuclear energy as a concept for further impact on public acceptance of the nuclear technology. The given novels under analysis here confirm the long-term debates about the materialization of the nuclear – the literary image of 'a nuclear power plant', represented in these novels, makes the leitmotif of incomprehensibility and mystery of 'the invisible radioation' visual and material.

According to Lotman's semiotic theory of the duality of the discreteness of semiotic spaces and their verbal representations, the duality is regarded as a specific phenomenon of human nature, which expresses not a feature or substance, but a contradiction, arising from the specifics of human existence. The materialization of the nuclear invisible in the image of the Chernobyl nuclear power plant is characterized by the duality which reflects the issue of evaluating 'the visible' and 'the invisible' about nuclear energy. The novels under analysis here emphasize the duality as a literary dimension of a nuclear power plant – even before and after the nuclear explosion, described in the given writing practices. The Chernobyl nuclear power accident, as it is represented in the novels, reshapes the cultural agents of the nuclear culture and changed to the public perception of 'the nuclear': from excitement to fear and uncertainty, embodied into radiation as a symbolic representation of the controversial character of nuclear technology giving birth to the beautiful 'invisible nuclear'.

Such dual representation of a nuclear power plant clarifies its uniting and encouraging role in the society, which not only makes the nuclear power plant as a protagonist of the novels, but refers it as a connection between gods (related to those decision-makers in the nuclear energy production in the Chernobyl context) and the public, whose life is directed by the nuclear power plant. In addition, the nuclear power plant – before and after the Chernobyl accident – performed the regulatory functions in that area's community. It is the nuclear power plant that controls the observance of certain behavior norms, which be identified as a regular link between the almost universally prevalent perceptions of "supernatural" forces that cause disease, and social norms, governing the behavior for further social control and a way of maintaining the social order of the community.

While depicting the pre-accident days, the writers in their novels almost on the first pages of their works emphasize the enormous power of the Chernobyl nuclear power plant construction, which is supposed to be a separate city, representing the power of the Soviet achievements in nuclear science and technology and making the Soviet people proud of their being involved in producing the 'magic energy'. The writers – Pohl, White, Stelmach – intend to explain the specific character of the city: it was built for supporting the functioning of the Chernobyl nuclear power plant, whose residents were intentionally relocated there from all the Soviet republics. This emphasis on the specificity of the city residents' pool is made to underline the significance of the nuclear power plant as a Soviet energy-production enterprise as well as to stress an easy way for the transformation from excitement to fear for those who are without indigenous roots, without the background for identity formation.

The writers highlight the unbelief and shock of people, who were so proud of their involvement in the energy production process and their trust to the government after the Chernobyl accident happening. The novels depict an unexpected process of changing the image of the nuclear power plant in the protagonists' perception after the nuclear accident – a shift from the excitement and pride of 'the latest triumph of Soviet technology' through doubts, fears and uncertainty to hatred to the power plant which is the implication of the materialized the 'invisible nuclear'.

But even after gaining the full understanding that the nuclear power plant is an implementation of 'the invisible nuclear', carrying death and ruining the previous hopes for 'paradise' life, the protagonists of the novels continue to support its functioning and regarding it as a source of their livelihood. So, the nuclear power plant is regarded in the novels under study as a materialization of "the invisible" while the manifestation of the triumph of nuclear technology is rather dominating (before and after the accident), which explains the dual nature of a nuclear power plant, regarded both as visible materialized component of the invisible paradise. Even after gaining a visible appearance, the duality of 'the invisible nuclear', represented in the image of a plant, by becoming the materialization of the invisible nuclear", remains its dominating feature.

Thus, the novels by Pohl, White, Stelmach depict the duality as a characteristic feature of the literary implication of the Chernobyl nuclear power plant, regarded as the materialization of 'the nuclear invisible' against the background the demonization of the nuclear power in the late Cold War and beyond.

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Key words: *nuclear fiction, nuclear narrative, nuclear criticism, nuclear invisible, duality.*

The paper emphasizes the literary dimensions of duality, related to ‘the invisible nuclear’ in U.S. writing practices (from the late Cold War up to the present), covered by the post-Chernobyl Age, while highlighting the ethical aspects of nuclear energy related issues in the post-traumatic societies. The paper is focused on studying the literary implications of ‘the invisible nuclear’ in depicting a nuclear power plant disaster (the Chernobyl NPP explosion) and its aftermath in North American fictional works such as Frederik Pohl’s *Chernobyl* (1987), Andrea White’s *Radiant Girl* (2008), and Orest Stelmach’s *The Boy from Reactor 4* (2011). The paper intends to study the transformations of ‘the nuclear invisible’ in the U.S. nuclear fiction on Chernobyl disaster, which helps to define the cultural and social parameters of the unbiased perception of nuclear energy as a concept for further impact on public acceptance of the nuclear technology.

This paper intends to studying the implications of ‘the invisible nuclear’ in its cultural and social representations of the nuclear energy, giving rise to the socio-cultural and social-technical shifts in reconsidering the perception of the nuclear energy issues (related to nuclear power plants’ functioning). I highlight intentionally the literary dimensions of academia’s reflections on the nuclear related issues, coming from nuclear weapon industry and policy, because the contemporary nuclear discourse requires the strict separation of ‘nuclear war’ narrative and ‘nuclear energy’ narrative, which have the different policies of their implications as well as the different messages in the nuclear discourse: when a nuclear war as well as nuclear weapons are narrated as an absolute textual, nuclear energy and nuclear power, commonly represented in ‘atom for peace’ policy is still a subject of materialization which encourages the hot debates.

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