

## THE TECHNOLOGICAL HAZARD – A FACTOR FOR MODELING THE INDUSTRIAL CULTURAL LANDSCAPE IN OCNA MUREȘ

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**ABSTRACT.** – **The Technological Hazard – A Factor for Modeling the Industrial Cultural Landscape in Ocna Mureș.** It is well known that an exploitable resource is a potential factor of social attraction and economic development. Thus, concretely the salt resource present in the underground of Ocna Mureș facilitated its exploitation from the first moments of discovery and the construction of a specific industry with the technological evolution at global level and finding out the various possibilities of processing and capitalization. At the same time, it brings into question the transformations that have taken place within the local cultural landscape, in a fortuitous and irreversible way with the chained manifestation of a complex of unforeseen factors in the form of hazards. Therefore, the study in question presents technological hazard as an opportunity for the emergence and development of new cultural elements designed to open up other possibilities for capitalization.

**Keywords:** *Ocna Mureș, hazard, resource, anthropo-saline lakes, industrial cultural landscape.*

### 1. TECHNOLOGICAL HAZARD – CULTURAL LANDSCAPE. GENERAL ASPECTS

According to the general understanding “cultural landscapes were formed as a result of human interference with the natural environment” (K. Boron, 2007, p. 135), during various historical periods, distinguished by particular

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characteristics. Each of them also reveals the progress through the quantitative and qualitative dimension of the cultural elements introduced in the landscape. Thus the cultural landscapes “are involved through accents of rhythmicity in a complex and vast plan related to either a historical scale, corroborated with a scale of human life” (F. Taillefer, quoted by I. Dincă, 2005, p. 74), or “by a scale derived from the intimate-genetic, evolutionary command of the conglomerate of cyber relations in which the parts of the landscape are included or even itself, subordinated to another matrix - the time” (Letter from the Quebec Landscape Council, quoted by I. Dincă, 2005, p. 74).

Thus, time is truly the element, often imperceptibly, that provides the framework for the development of the cultural landscape, the complexity of the latter being closely related to its size. It is obvious, however, that “man, as a superior, social being, has proved to embody the main factor of transformation of the natural landscape since its inception, by introducing new and new changes, temporary or permanent, in all components of the system” (Camelia-ina Gavra, 2013, p. 46).

The various processes “shaped the cultural landscape, in which the mutual connections between the natural elements of the environment were changed as a result of human activity” (Wolski, quoted by K. Boron, 2007, p. 135). However, the modeling of the cultural landscape does not belong exclusively to the social component, as some phenomena such as natural or anthropogenic hazards can contribute decisively in this regard. The hazard itself is not limited to accidental, unpredictable manifestations but also involves changing the usual course of evolution of the cultural landscape, opening a new corridor of opportunity.

A conclusive example in support of the statement is the fortuitous evolution of the cultural landscape in Ocna Mureș, irreparably transformed by a natural hazard (floods) which implicitly triggered a technological hazard. Thus, “the phenomena of collapse and subsidence on the surface of the salt massif are the result of a very complicated hydrogeological and physico-geological process, which took place in close connection with the development of salt mining in the locality” (P. Marosi, 1959, p. 92).

The exploitation of the mentioned resource involved, since the incipient period of manifestation of the activity, the introduction in the landscape of the various characteristic elements, outlining a special character, imprinted by the industrial function of exploitation. Thus, the mentioned hazard, if we exclude the inconveniences of the need to change the method of exploitation, can be seen as a factor of diversification of socio-economically exploitable cultural elements. Overall, the process of evolution at the local level is natural to follow the general trends, consequently to highlight any opportunity, in order to increase local well-being.

## 2. OCNA MUREȘ. PHYSICAL-GEOGRAPHICAL CHARACTERISTICS

The local topography highlights the location of Ocna Mureș in a hilly and meadow area in the northeastern part of Alba County, on the left bank of the middle course of Mureș River. The homogeneity of the conformation of the local surface derives from a small set of landforms. Among them are the slightly fragmented hills and valleys, and the Mureș Corridor on the side, accompanied by the plethora of microforms (meadow segments, pronounced river terraces, etc.) built during the specific erosion.

The analysis of the graphical representation of the study area thus highlights the slight increase in altitude from the northern part that coincides with the meadow area, to the hilly surface with the maximum altitude in Gurguleu Peak (524 m) in the eastern area, followed by the Bantei Hills and the Nejoapa Peak.

The latitudinal and altitudinal geographical position implicitly imprints the general characteristics of the continental temperate climate, “the average multiannual temperature being 9.2 degrees C, while the precipitations amount to an average of 520 mm/year. The average values of temperature and precipitation betray the influence of the foehnization processes specific to the Mureș Corridor, located in the East part of the Apuseni Mountains” (V. Arghiuș, Al. Ozunu, 2005, p. 185).

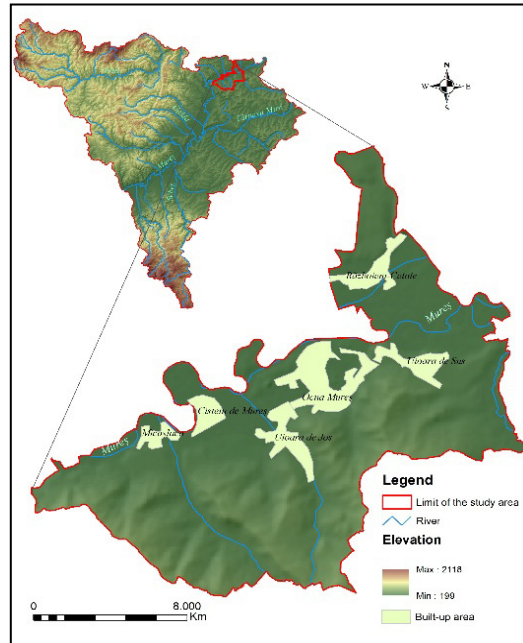


Fig. 1. Ocna Mureș City Map

Closely related to the environmental conditions described above, the soils have evolved in a relatively narrow range, starting with the alluvial ones, with a high degree of fertility in the Mureș meadow. “On the right bank of the river there are regosols (young soils, formed on loose deposits - sands, loess, clays, marls, etc.), the actual built-up area of the city lies on brown clay soils, and the hills on the left bank of the river are made of slate (compacted clay rock that divides itself into sheets)” (Roxana Aybuke Capar, 2017, p. 9).

At the same time, the field analysis of the environment highlights the existence of various spontaneous biogeographic elements, appropriate to the morphology and local climatic conditions. The flora is dominated by shrub species – blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), dog rose (*Rosa canina*) – and deciduous trees such as oak (*Quercus robur*), and walnut (*Juglans regia*). At higher altitudes there are mixture of pine conifers (*Pinus sylvestris*). Locally the meadow vegetation indicates the excess moisture of the soil.

The mentioned vegetal complex is implicitly the primary factor in the development of a specific fauna of the meadow, steppe and forest-steppe areas dominated by insects, birds and mammals adapted to the conditions.

### **3. THE TECHNOLOGICAL HAZARD – A MODELING FACTOR OF THE INDUSTRIAL CULTURAL LANDSCAPE**

The considerable salt reserve, as an exploitable resource, has consistently played the role of attracting the social component, ensuring the economic sustainability of the area. “The resources of the underground have left their mark on this area since antiquity. The most important resource, exploited in Ocna Mureș, is the gem salt of very good quality, with a high purity and a NaCl content of about 89%; this is explained by the fact that when the salt deposit settled, the sedimentation happened to be done in several layers” (Al. Vigh, 2013, p. 27).

As a consequence of the fact that “the saliferous deposit is located in the middle corridor of Mureș River, in the sector included in the meadow terrace, at the absolute altitude of approximately 255 m” (V. Arghiuș, Al. Ozunu, 2005, p. 185), operation in the galleries was permanently subject to a double inconvenience, the considerable infiltrations from the groundwater and the possibility of flooding. In this sense, over time, various improvement works have been carried out to combat these inconveniences. Some are still visible in the form of dams and groundwater drainage channels.

The extraordinary magnitude of the 1913 floods materialized by flooding the galleries of the salt mine. Thus, a natural hazard triggered the production of a technological one, the penetration of Mureş water into the mine causing the inevitable dissolution of the salt walls and the collapse of the ceiling and finally the formation of specific anthroposaline lakes, as accidental cultural elements.

In this case it can be stated that the emergence of new cultural elements is due to a complex of factors of natural and anthropogenic origin, the technological hazard being the one that ultimately led to their construction. “In other words, the hazard signifies the causal conjuncture and the manifestation’s spatio-temporal circumstances of the phenomenon and not the phenomenon itself, it represents the unpredictable but necessary chronotope of a causal network, likely to generate nonlinear energy discharges that objectify an extreme phenomenon and the causal matrix from which the phenomenon derives” (Mac, Petrea quoted by I. A. Irimuş, 2006, p. 223).

Although there is the opinion that the technological hazard “offers the possibility of a certain control in terms of the crisis, as well as the recovery after the accident” (Mihaela Licurici *et al*, 2013, p. 35), in this case the desired rehabilitation was not possible anymore. Adopting the way of exploiting the local resource with the help of wells meant expanding the range of specific cultural elements introduced within the cultural landscape. “In order to master and control the processes that take place in each category of landscape, it is necessary to know, through study, its current state, the need and the real possibility of improving its productivity and to be favorable for human existence and then the establishment of a permanent control system over the main processes that take place in the natural environment under consideration” (D. Teaci, 1983, p. 28).

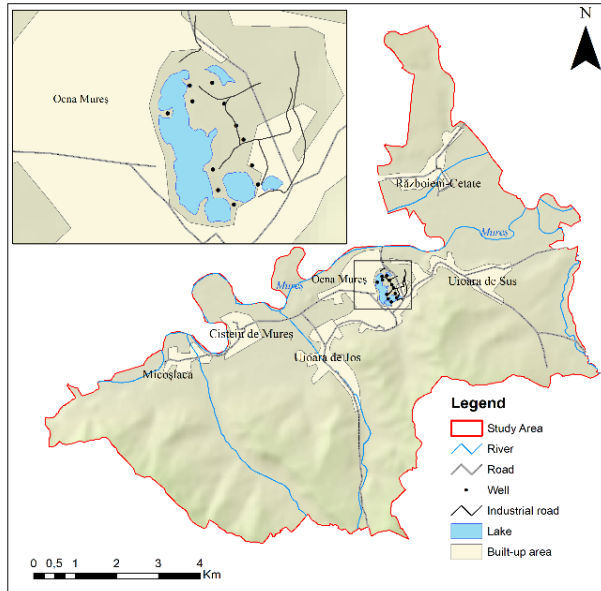
Consequently, it is important to analyze the new cultural elements in the environment and to identify their role as a whole.

#### **4. THE INDUSTRIAL CULTURAL LANDSCAPE IN OCNA MUREŞ**

The industrial cultural landscape of Ocna Mureş is distinguished by specific elements. According to the classification criteria proposed by Glink C., Meyer H-H., Schottke Maja (2007), regarding the territorial form, elements belonging to three categories were identified (fig. 2).

1. *Point-shaped elements* that are represented in the landscape by the operating wells;
2. *Line-shaped elements* are highlighted by the railway but also by industrial access roads;

3. *Area-shaped elements* are visible within the landscape in the form of a sodium commodity plant, anthroposaline lakes, a railway station (especially for freight), as well as tailings dumps resulting from the exploitation and processing of salt.



**Fig. 2.** Relevant elements of the industrial cultural landscape

### 1. *Point-shaped elements*

Being “the first salt deposit in the country where the new method of salt exploitation was applied in solution with the help of wells” (I. A. Irimuş, 2006, p. 223) involved the emergence of distinctive categories of specific cultural elements in the shape of a point, the most evident ones being the salt exploitation wells, six spread over in the first extraction field, eight in the second field and seven in the third field. Although most are no longer functional, they are still preserved in the landscape, indicating the predominance of its technological character.

Considering that “the Ocna Mureş field has inexhaustible reserves for the exploitation with wells (23 billion tons), on both the south and north parts of the current exploitation, in the perimeter of Războieni locality” (M. Alexe, 2007, p. 22), it can be argued that cultural elements of this type can maintain their presence in the landscape for a period of time imposed by the continuity of exploitation.



**Fig. 3.** The salt exploitation wells

## *2. Line-shaped elements*

They are indicated by the presence of industrial roads and railways, used for a similar purpose. The first ones were built in the form of a technological transport network, in order to facilitate the transport related to the industrial process, obviously connected to the usual road transport network. The technological roads are distinguished from the latter ones by the fact that they are mostly paved.

The railway that connects Ocna Mureş and Războieni, as the main railway junction located in the immediate vicinity of the city, reveals exclusively an industrial function, serving the transport of goods. Closely related to this, it is the existence of the bridge over the Mureş River built exclusively for this purpose.



**Fig. 4.** The bridge over the Mureş River

### *3. Area-shaped elements*

The existence of salt in abundance has favored the emergence and development of an industry focused on the use of this raw material. Thus, the Sodium Plant was built in a relatively large perimeter within the urban area.

Closely related to industrial activity, tailings dumps are also identified as industrial elements in the form of an area, largely fixed by vegetation.

The relatively small building of the station is also part of the category of industrial elements.



**Fig. 5.** Building of the station

Another cultural element present is “the salt lake complex, materialized on the massif salt deposit Ocna Mureș, located on the left side of Mureș, about 10 km downstream from its confluence with Arieș, totaling an area of almost 18 ha” (M. Alexe, 2007, p. 100). According to the trends recorded over time, a “development of aquatic areas is expected, especially to the east, as the west has reached the limit of the salt massif” (M. Alexe, 2007, p. 113).

## **5. CONCLUSIONS**

Concluding the brief analysis of the industrial elements that outline the industrial cultural landscape of Ocna Mureș, we can conclude that “it is a space shaped throughout the history of human activity, depicting the influences of civilization and natural elements” (B. Uojciech, B. Tadeusz, 2007, p. 125), being the eloquent expression of the way in which the chain of natural and technological hazards can shape the cultural landscape, opening new opportunities for evolution.



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