„BABEȘ-BOLYAI" UNIVERSITY
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DOCTORAL THESIS

Ph.D. Advisor:
Acad. Prof. Dr. POP Ioan-Aurel

Ph.D. Candidate:
CHIRA Alexandra-Oana

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THE HYDROGRAPHY OF MEDIEVAL TRANSYLVANIA: 13TH-15TH CENTURIES

-DOCTORAL THESIS-

Abstract

Ph.D. Advisor:
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Contents

Key words: water, Middle Ages, pond, river, limnology, potamology, hydronym, mill, miller, fishing, river transport, agriculture, hydrographical improvement, diet, transaction, fish, conflicts, economy, water history, Transylvania;

The present doctoral dissertation focuses on identifying and analysing the main aspects regarding water, water usage, as well as the social and economic perspectives, for the territory of Transylvania in the Middle Ages, starting with the 13th century until the 15th century without excluding the few sources form the beginning 11th and 12th century. This endeavour implied reassessing medieval charters dated in the aforementioned time span from an environmental and water history perspective. In order to do this, the first step was to evaluate current research results produced by international historiography and set the limits in which this information could apply to the territory of interest. The analysis of charters resulted in the creation of a dictionary containing the medieval water names, along with the current hydronym and a short description for localising the water.

Regarded from the perspective of previous research endeavours and the quantity of their results the present thesis belongs to the field of water history, which is becoming more and more popular. In the same time, it will constitute one of the few works of Romanian historiography that focuses specifically on such subjects. Previous research, as well as sources for which the allocated time did not permit assessment imposed a series of limits. The structure of the doctoral dissertation comprises of six chapters. A general introduction precedes them and general conclusions end the doctoral dissertation. It also contains four annexes, one being the aforementioned dictionary, and the other three containing transcriptions of previously unpublished charters.

The general introduction comprises of the motivation for the chosen subject, a description of the methods applied and a short discussion of the main historiographical works used. The main motivation for choosing this subject resides in the interest given for such subjects during the bachelor, and masters dissertations, that highlighted a need for an introductory monographic study regarding the water history of Transylvania. As already mentioned, the main aim was to provide a general outline of the role played by this geographical element in the social and economic development of the region. In this respect, it was only natural to draw specific objectives orientated on those parts of human life that

implied the usage of water, on the economic aspects concerning water in the given period, the main occupations that used water, as well as the viability of future research regarding water.

The results of previous research in the field are discussed in two separate sections, one regarding international historiography, and one regarding the Romanian and Transylvanian historiography. From this perspective, an attempt was made to highlight the discrepancy between the number of researches regarding the European and Transylvanian territories. For the latter there are not many studies concerning water history. Romanian historiography on the subject is reduced to three works regarding water aspects (Marcu Botzan, *Apele în viața poporului român*, București, 1984; Constantin C. Giurescu, *Istoria pescuitului și a pisciculturii în România,* București, 1964; Emil Lazea, „Economia piscicolă și dreptul de pescuit în Transilvania în secolele XI-XIV*",* in *SMIM,* nr.6, 1973, p. 19-43), as well as some published papers regarding milling. These are enriched by the more recent studies form Hungarian historiography. On the other hand, international historiography offers very diverse material on the subject of waters in history. Despite this, very few refer to general themes. They are focused more on general and local aspects that do not always apply to the territory of Transylvania.

Given previous researches in the field, returning to and reassessing primary sources was determinative for the elaboration of this dissertation. Due to this fact, documentary emissions form the first half of the Middle Ages, up until the 15th century were gradually analysed. Because of the time limitation imposed, only a few samples of 15th century charters could be assessed. Chronicles and judicial sources of the 16th century were used to complete the information. The subject imposed the use of historical cartographical material – mainly the topographic mappings done in the 18th and 19th centuries by the Hapsburg Empire. Usage of these instruments was facilitated through the platform created by the National Archives of Hungary.

The limits imposed by the research were underlined in respect to multiple aspects. On the one hand, the limited amount of time allocated determined the quantity of documentary material that could be assessed. On the other hand, a series of geographical information and notions were necessary (like those coming from hydrography, limnology and potamology). In these subjects, the author did not undergo a formal education program. Finally yet importantly,

a series of limits in connexion with the quantity, quality and verity of the documentary information.

The first chapter gathers the necessary information for understanding waters in their geographical and historical context. Thus, the first two parts are dedicated to defining and describing standing waters and water streams from the perspective of physical geography. The two subchapters are complementary. Each one is centred on a certain type of water. It was considered important to present the classification of each water type, as well as their main characteristics, how they are formed and how they disappear. Standing waters are classified into ponds, lakes, marshes, swamps, bogs etc. They are usually defined as the association between the water basin and the water that fills it. Similarly, water streams are defined as the association between the canal and the water that flows through it. The latter are divided into rivers, creeks, rivulet etc. Both water types can be permanent, temporal sand semi-permanent.

Apart from the aforementioned fact, information regarding the other physical components of the environment that influence waters was included. It was observed that the soil types form Transylvania and climate changes modified the structure of waters and their development. Thus, one can say that the area under discussion is predisposed to sedimentary formations. As effect, standing waters from this region do not generally have a long life span. On the other hand, the underground water network is very rich in resources, making rivers a stable environmental element. Despite these facts, both ponds and water streams are strongly influenced by soil and climate. Especially in the case of ponds, their development is accelerated towards extinction or new ones can be created.

In order to give uniformity and constancy to the geographical presentation, the respective fields that deal directly with the research of ponds and water streams were shortly described. Limnology deals directly with intercontinental ponds, whereas potamology addresses the latter. Both sciences are unified under hydrology, which deals with researching waters as whole. It is interesting that all of these geographical subdomains have a deep connection with other research fields, like biology, chemistry etc. Because of this, waters and their evolution are regarded in connection with their history, and can become an auxiliary instrument in what concerns historical research.

The third part of the present chapter aims to presenting the connections created between environment, economy and society. This is necessary because, in time, man has tried to

discover more and more uses for water, especially in order to make daily life easier. Agriculture and fishing have proven themselves to be intertwined directly with water sources and the availability of such sources. The two parts show a direct link between water-agriculture and fish farming – transport.

The application of the hydraulic engine lead to the creation of mechanical instruments that, unfortunately, cannot be found on the territory of Transylvania. On the other hand, creating artificial ponds for fishing can be easily noticed in the documentary sources of Transylvania. Moreover, the use of such resources lead to environmental changes that have led to changes in their structure, or even to the disappearance of some ponds. Even if most of the identified links refer to the European continent as a whole, they are essential when confronted with Transylvanian sources. In this way, a series of parallels and similarities can be identified.

The last part of the present chapter is dedicated to mills and milling in the historical context of the epoch. It was decided that a general presentation regarding this subject is necessary because milling is the most frequent occupation illustrated in the primary sources that mention water usage. The section begins with a presentation of how the hydraulic mechanism was discovered and its distribution from Antiquity to the middle ages. Historiography of the given subject has agreed that the main reason from milling not becoming popular until the medieval period was slavery. Once it was abolished, it was cheaper to find more efficient ways of grinding, than to remunerate people to do it. Another aspect refers to the types of mills, or, more exactly, to the types of products they could grind. The main types are the Greek and the Vitruvian mill – that were used in direct connection to environmental conditions and the available volumetric water flow. The latter was more efficient, being dependent on a steady water flow rather than its speed and volumetric flow. As effect, it is considered that this mill type was the most used in Europe.

The hydraulic engine was mainly used for grinding, than for the preparation of paper and oak pounder used in tannery. All of these usages can be identified for the territory of Transylvania. On the other hand, other usages – like mechanic water saws, for example – cannot be identified. These have been kept in sketches and never knew a large diffusion, being a product of local interest towards the possible applications of the hydraulic engine.

The second and third chapter were conceived as being complementary with one another. They regard the history of standing waters (Chapter II) and of water streams (Chapter III).

Both chapters start with the European perspective, slowly building towards the case of Transylvania. This structure was chosen due to the novelty of assessing this type of subjects by Romanian historiography.

Contexts in which water can be found in the medieval everyday life were the first to be assessed. Agriculture can be seen as being the first sector in which waters can be observed. Ponds became reservoirs for a general water reserve. Moreover, as showed by agricultural treaties kept form the end of the middle ages and the beginning of modernity, nutrients gathered in sedimentary accumulations on the basins of standing waters were used for enriching the soil. The ponds had to be emptied, the formations were collected, and the refiled with water. It is easily seen that this system was similar to the *allodium.*

The perspective regarding river is even more complex. They played a crucial role in the evolution of dietary habits. Scattered on the whole territory of the continent, they represented for a long time the main fish source. It was only after their fauna was affected, and population increased, that the need for fish determined a turn towards marine fish. Even after this, rivers maintained their importance. Waterways became a faster trade root that land and were more and more often used for transport, influencing the development of trade.

In order to capitalise better on the network created by water, it was very early intervened on the course of the rivers. Various areas of Europe are relevant in this aspect – like England, of the territory occupied by Vienna. There spaces underwent large hydrographic works for changing watercourses or creating channels for a better access to water.

Both water types, as mentioned above, were essential, as it was previous mentioned, for milling. Rivers were needed to propel the hydraulic engine, whereas ponds were necessary to regulate the water quantity that reached the wheel.

The exploitation of waters for fish and sediments, lead to structural modifications of the fora and fauna. As effect, some waters have disappeared, and others were formed. In some cases, the changes determined by events exterior to rivers can be identified using modern research methods, and the results used for historical study.

For each water type it was attempted to identify them in the field using documentary sources available for the research of Medieval Transylvania. It was thus noted that terrain descriptions given by the medieval charters corroborated with historical maps, have most of the time eased the process. In some cases the hydronyms mentioned in one form or another

could be determined. Identifications of rivers with the present day configuration was easy in most cases, as rivers are in general more stable geographical elements. Moreover, some of the river names have not change except in what concerns their spelling, or the names have been translated from Latin or Hungarian into Romania, or they bear the name of a settlement they flow through.. The case of ponds is particular. Their life span is shorter than that of rivers. Some of the ponds, like those used for fishing or milling were artificially created and destroyed once they served their purpose. A list of hydronyms extracted from charters was composed. In some cases, the documentary water names could not be identified with a current one. The reasons for this is that in some cases the medieval terrain descriptions were too evasive, and in others they were not represented on the maps used. It is considered, based on the unfolding of the research, that assessment of more documentary material, could reduce the number of unidentified rivers (that presently stands at about 130 hydronyms) drastically.

Apart from discussing hydronyms and their evolution, a short inquiry into medieval terminology regarding waters was made. It could, in this way, be noted that the term *piscina, -ae* was the most commonly used for ponds. Apart from this one, the term *lacus, -us* was used form larger types of standing waters, as well as *palus, -udis* as a synonym for *piscina, -ae*. In the case of ponds, it is rather difficult to classify the used terminology in respect to dimensions or other characteristics.

The terms *rivulus, -i* and *fluvium, -i* are usually used to refer to water streams in general, weather large or small. Larger rivers were often referred to just by using a hydronym. For small rivers, the use of the term *aqua, -ae* with an additional text explaining through which territory it floats is used. The fact that the charter mentions a water stream can, in some cases be extracted from the hydronym when its derived from Hungarian, by the use of particles such as *–viz* and *–patak*, with various spellings. These names can sometimes create confusions, such as the case of *Sospatak*, which is the name of both a river and a settlement. Despite this situation, most of the time the text of the charter clarifies these aspects.

The last section of the third chapter is dedicated to a quantitative analysis of the documentary material regarding the major rivers of Transylvania– Mureș, Someș, Târnava, Olt and Arieș. The assessment of these revers in particular is important due to the fact that together with their hydrographic basins they have determined the economic development of the main urban centres of Transylvania. The Arieș river is the only one that does not determine

a hydrographic basin, being included in the Somes one, but the river is known as a major part in what concerns the salt rout. Out of the aforementioned rivers, Mureș appears most frequently in the sources taken into consideration, being closely seconded by Someș. The situation is not surprising given the fact that the former is the largest and most important river of Romania, and the latter has probably the richest hydrographical resources. It is surprising that the river Olt is not frequently mentioned in these sources, although, speaking form a geographic point of view, it is one of the greatest rivers of the country.

A separate chapter, the fourth, was dedicated to mills and milling. This occupation was popular on the whole territory of Europe, and as effect, it was considerably developed on the territory of Transylvania, as the main occupation in which water was employed. For the named territory, it was observed that windmills could not be used, due to the lack of constant and strong winds. As effect, the hydraulic engine was the one wide-spread and the best developed. Unfortunately, because of the wooden base of most such constructions the period in which they could be used was limited. The situation makes it impossible to determine a realistic statistic of how widely they were spread, as well as it prevents the possibility to determine how many such constructions were actually in Transylvania. Despite this, it can be observed that in different time intervals, mills can be found on the entire territory in question, even more so in the areas in which water hat a greater volumetric flow. The place of the mill can be seen as an important point in what concerns mills. This is because they had to be localised around a water stream, but the territory had to permit the construction of a pond.

Assessing the right to a mill or a mill place was imposed by the role played in social and economic impact over society. The only premises previously known was that the right to a mill was divided over time through transaction and inheritance, in a linear transition from one to multiple owners. This idea had been proven false by the primary sources involve. Multiple and singular owners of a mill can be found simultaneously. Following these aspects, some conclusions can still be observed. Nobles, communities and the church owned mills. They could be trans actioned or inherited as a whole or as a part of the mill, thus resulting multiple owners, but the king also donate them to multiple nobles could, for example, thus creating another possibility for multiple ownership to come to be .Cases in which mills belonged to nobles and a parish church can be noted. No recorded case of a community having in possession just a part of a mill can be found.

The economic importance of mills cannot be negated in any European territory, practically being one of the pillars of medieval economy. The situation is similar to Transylvania where these buildings have led to conflicts and altercations concerning the ownership right. Other conflicts were centred on their localisation – which could and have led to the obstruction of one another or even the destruction of mills as revenge in order to produce damage to rivals. Values of transactions or damages can rarely be found. Based on the little data concerning this subject, it can be noted that the value of mills could be anywhere between 40 and 200 florins, with an average of 60-80 florins, depending on the production capacity and respective historical period.

The last section of the present chapter is dedicated to some particular cases. These cannot be globally assessed because of the lack of information. For example, there is only one source referring to the possibility of moving the actual construction form one location to another. Similarly, there is only one case identified regarding the obstruction of river transport due to the construction of mills. A situation that was frequent through Europe in the medieval period. Millers and other persons responsible with milling and mill construction, appear only in isolated cases.

The fifth chapter is focused on social and economic aspects regarding waters. Mills, which have been discussed in the previous chapter, have not been included in this section, as expected. A verity of aspects were assessed, out of which fishing a river transport constitute the largest and most detailed part. Hydrographical improvements, water consumption, the impact of pollution or periods of floods and droughts have not been neglected, but the sources are lacking in details concerning these aspects.

Agriculture, an important part of medieval society, is usually connected with water usage in order to improve harvests. If traces of such actions can be found for the largest part of Europe, the same cannot be said about Transylvania.

Short mentions regarding the impact of events, like floods, or hydrographical improvements – like water pipes, are indicative of the fact that the role of water in everyday life was not completely ignored. On the other hand, details are about them are lacking.

A similar situation can be observed when it comes to fishing and fish farming. The first part of the present dissertation made an introduction intro the importance of fishing in the medieval diet. Sources regarding Transylvania are indicative of the fact that fishers were

present in this territory, but also of the fact that this product was traded with adjacent territories. Of course, conflicts regarding fishing are present. Moreover, one can easily observe the importance that fish could have. The best-documented case is the one regarding the abbot Otto of Cluj-Mănăștur whose fishing pond was robbed by thieves. In the process, they ended beating up the keeper of the pond and stole almost all the fish producing great damage to the income of the abbot.

Unfortunately, sources do not mention quantities of fish in any context. In the same way, it is difficult to assess the species of fish that were consumed. Archaeozoological sources, as well as chronicles written after the 15th century, corroborated with the results of researches regarding other territories did manage to highlight some general aspects. Similarities in fish remains recovered from the European territory located west of the former Hungarian Kingdom are consistent with those from the territories immediately adjacent to Transylvania. In can be thus said that the chances of large discrepancies regarding fish species between Transylvania and the rest of the continent could not have been so grate as to create totally different configurations. Most fish were carp, Sturgeon, wels catfish and cod are the most frequent.

It is hard to define who could fish and where they could fish. The sporadic mentions of fishers in medieval sources are indicative of the fact that the craft of fishing was well established. The laws imposed upon fishing at the end of the show a minimum interest for the regulation of fish practices. Moreover, in the case of the Hungarian Kingdom a, tendency to regulate how much fish could be extracted and how often this could be done can be noted. It can be considered that similar practices could be found in Transylvania although there has yet to be found proof in this respect.

River transport was another major area of daily life in which waters were involved. Focused mainly on creating a link between Transylvania and the west of the Hungarian Kingdom in order to carry salt, it cannot be argued that other products were not transported in the same manner. Such transport ruts should not come as a surprise, as especially by the middle and late periods, water transport was extensively popular and connected with economic development. The main rivers that were used are Mureș and Someș which are in the same time the biggest rivers of Transylvania. Arieș river was used because it flows near the salt mine at Turda.

In what concerns the ships used of transportation, very few data is known. Most documents regarding river navigation use the term *navis, -is*. One charter mentions the *olch* and *kerp* ships. In their case, the fee that should be paid for transportation is mentioned. The last type of ship mentioned are called *carina, -ae.*

Apart from the above-mentioned fact, there are other aspects that regard water, but these cannot be profoundly assessed due to the lack of sources. In this aspect, the first major point is that of hydro technical improvements. It is well known that a river could overflow, under some climatic changes, were necessary in milling or that there were attempts to deviate the course of some rivers. It is almost impossible that such actions did not take place on the assessed territory. Still, these aspects are widely sporadic compared to other geographical regions. It seemed that they had the technology to deviate river courses and execute land drainages, where necessary. Water channels have also been noted. Starting with the 15th century, chancery formulae included the term *aqueductus, -um*.

Climate and its effects are also hard to reconstitute just based on medieval charters. On the other hand, the more recent climatology research have showed that by the end of the 15th century the Hungarian Kingdom was fighting droughts. In these conditions, it was attacked by the ottoman troops. Before there events it can be said that floods, considered miniature replicas of the Biblical Flood, had taken place and the threatened the life of the dwellers of the region. They tried to take measures in order to save supplies, by damming storage areas or avoided traveling.

Water consumption is even more seldom mentioned in medieval sources. In this aspect, it seems the territory of Transylvania was privileged. At the end of the 15th century, during the kings' visit in Sibiu, more payments were made to a person in charge of transporting water to three cooks. The water came from a local fountain. It can be assumed that it must have some sort of implications into meal preparation.

The last chapter of the present research was dedicated to a few case studies. As it was specified from the beginning, these have been chosen in a way that could follow up milling as well as ponds – the two elements most frequent in sources.

The first part of the sixth chapter refers to mills and milling in Transylvania. Using three case studies, an attempt was made to asses questions such as the right to have a mill and its implications, the impact caused by mill destruction and its implications, and the types of

mills used on the territory. The first case is placed at the end of the 14th and the beginning of the 15th century. The dispute is focused on a sixth of a mill used by the Sf. Nicolas of Cristian Church. It is illustrative of the way ownership over mills functioned. Rudolf Ruschin, a noble of the area, had given the Church the right to use the mentioned mill. This ended up stirring conflicts between his widow and eventual hires, the church ending up the one to suffer from the situation. Elements that can be observed in the unfolding of events are the transfer of ownership rights, as well as means of resolving these conflicts, based on existing evidence or the lack of them.

The second case is centred on a mill destroyed at the beginning of the 15th century. The corresponding charter is one of the very few that offer information about the economic importance of milling and the impact of their destruction. A mill located on Târnava River was robbed of its production and then destroyed together with its annexes. The conflict was resolved, compensations being paid to the noble that possessed the mill. The effect the latter hat to endure were far more grater – he had invested his money into the building of the mill, as well as his own work force. Moreover, effect in the environment could not be reverted.

The last case of the present section if focused on the furrier guild of Sibiu. They had an oak mill for producing tannin pounder necessary for the tannery process. Due to negligence, it was burned down in a fire. In order for them to continue production, they had asked the municipality for support. They received another milling location that bared the same characteristics as the first one.

After assessing the cases regarding milling, a second part was concentrated on ponds. In this aspect, two specific cases were chosen, one form the ending of the 15th century and another form the 16th century.

The first case regards the donation of ponds as reward for the serviced delivered but the furriers of Sibiu in fighting the Turks. It is specified that the members of the guild could fish in the pond for their own usage, as well as for trading purposes. This pond had previously been in the ownership of the Hospital of the Poor. They could no longer afford maintenance of the pond. The furriers had to pay a fee of one florin for the fish. This sum of money was to be given to the Hospital, and not to the municipality. In this aspect, it can be seen that the furriers have been compensated for their service and the hospital gained a constant income.

The last case regards a pond build on the landmark between Cluj and Someșeni. The dispute id illustrative for both the conflicts regarding the construction of the pond, the impact of these actions and in what concerns the ponds life span. The evolution of the conflict, in approximately a decade, is documented in nine charters, each bringing a new element to be discussed and assessed. Gaspar Gereoffy of Someșeni Started to build a pond for his mill on the border between his possession and the territory of Cluj. Under climatic influence, and because the pond created a partial obstruction of the river, the area began suffering from frequent floods. Moreover, once a colder winter came, and ice accumulated in the area, the river was obstructed as a whole. The dwellers of Cluj unsatisfied with the inefficient implication of the authorities decided to take matter into their own hands. They destroyed the pond by themselves, thus making the mill unusable. It was in this comment that the conflict finally ended with no compensation being paid by either side. Most probably by the time the pond was destroyed, the damage suffered by the dwellers of the area and those suffered by the noble Gaspar Gereoffy, were equitable. The pons was built for milling, but, as was the case of most millponds, it could most probably have been used for fishing too. The construction meant building a damn on the course of the river – one of the most often employed methods of the period – another detail that is rarely presented in Transylvanian sources. This case is the only one known up to this moment in which the life span of a pond can be determined.

The six chapters of the present dissertation are complementary to one another. The information analysed is structured as a monograph of the Transylvanian waters in the Middle Ages. It reaches major topics, trying in the same time to exemplify them. In the same time is also focused on concrete and isolated cases. Social, economic and environmental impact are the main focus of the thesis. The analysis of these subjects was oriented into defining the importance of waters in the medieval development of Transylvania.

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