ECONOMIC AND MATERIAL ASPECTS OF THE LATE MEDIEVAL BRIDGES FROM TRANSYLVANIA: THE WRITTEN SOURCES

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In the medieval period river crossing points influenced the establishment of constant traffic channels and, from a geographical perspective, helped to define any given road system. From a historical point of view, their analysis and understanding is essential to any attempt at the landscape reconstruction of the medieval road network or of the regional and local spatial structures of the settlement and estate systems. Moreover, an examination of the written evidence concerning the medieval water crossings from Transylvania represents the starting point for future interdisciplinary research focusing on their field survey. The need for archival analysis is augmented by the fact that archaeology had almost no contribution to the understanding of this type of elements throughout the Carpathian Basin.[1] One reason would be that, until recently, unlike in other European territories[2], within the borders of the former Hungarian Kingdom bridges – and water crossings in general – did not arouse scientific interest as a "fashionable" or spectacular study topic.[3]

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[1] For a short overview of the archaeology of medieval bridges from Hungary, see Magdolna Szilágyi, *On the Road: The History and Archaeology of Communication Networks in East-Central Europe* (Budapest: Archaeolingua, 2014), 188–191.

[2] See for example Giovanni Coppola, *Ponti medievali in legno* (Roma–Bari: Laterza, 1996); Alan Cooper, *Bridges, Law and Power in medieval England (700–1400)* (Woodbridge: Boydel, 2006); Danièle James-Raoul and Claude Thomasset, eds., *Les ponts au Moyen Âge* (Paris: PUPS, 2006).

[3] For recent results, see: Róbert Kertész et al., "Tisza-hidak a török hódoltság korából radiokarbon és dendrokronológiai vizsgálatok tükrében," in János Gömöri, ed., *Az erdő és a fa régészete és néprajza* (Sopron: MTA VEAB, 2007): 145–178; Gyöngyi Kovács, "A Magyarországi oszmán-török régészet új eredményei: áttekintés a Dráva kutatások kapcsán," in Elek Benkő, Gyöngyi Kovács, eds., *A Középkor és a kora újkor régészete Magyarországon*, vol. II (Budapest: Akadémiai Kiadó, 2010): 764, Fig. 9, 765, Fig. 10; Gyöngyi Kovács, Márton Rózsás, "A Barcsi török vár és környéke (1999–2009)," in *A Középkor és a kora újkor régészete*, 632, Fig. 15, 642; Attila Tóth, "Adatok a kora újkori közép-Duna-medencei hajók régészetéhez," in *A középkori és a kora újkor régészete,* 871–884.

From this point of view, the Transylvanian situation is no exception for both Roman period[4] and medieval research frames.[5]

Apart from their obvious connection to the development of a particular medieval landscape related to traffic and movement, the study of water crossings can reveal valuable data on the volume of transport and on the internal commerce of a certain region.[6] At the same time, their construction, upkeep and general administration are closely connected to the central or local authorities and to their actual owners and lessors, in terms of investments, income and profit generation. These administrative and economic contexts have determined the archival recording of data on the medieval engineered river crossing points.

The present article will focus on bridges, the elements most visible in the written documents of late medieval Transylvania. The various economic and material data retrieved in connection to these road features enables one to comment on aspects such as geographical positioning, relative typology, traffic efficiency, engineering or upkeep activities and expenses.

Source availability and medieval terminology

Data concerning the economic and material characteristics of the recorded bridges from Transylvania were collated and summarized in a concise repertory (Tab. 1).[7] This represents the starting point of the current analysis. The present scientific discussion is meant to evaluate the regional contexts of these features, while using relevant examples, rather than offer a detailed analysis of every single situation in which a fixed river crossing construction was recorded. The catalogue is essential for indicating the stage of research of the archival holdings and the general source availability (Fig. 1)[8], in terms of their preservation.

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[4] Up to date, one can highlight only scant archaeological and topographical research connected to the Roman structures from *Porolissum* (across the Citera Stream), Dej (over the Someș), Cluj-Napoca (crossing the Small Someș) or Turda (over Arieș): Dorin Ursuț, Dan Isac, "La route romaine de Cășei–Dej et le pont romain de Dej," in Dumitru Protase, Dan Brudașcu, eds., *Napoca – 1880 de ani de la începutul vieții urbane* (Cluj-Napoca: 1999): 189–193; Florin Fodorean, *Drumurile din Dacia Romană* (Cluj-Napoca: Napoca Star, 2006), 327–328; Dorin Ursuț, "Podul roman de pe valea Someșului la Cluj-Napoca," in Sorin Németi et al., eds., *Dacia Felix. Studia Michaeli Bărbulescu oblate* (Cluj-Napoca: Tribuna, 2007): 385–389; Dorin Ursuț, *Podurile romane din județul Cluj* (Cluj-Napoca: Napoca Star, 2008), 111–114; Nicolae Gudea et al., "Moigrad-*Porolissum*. Pometul Moigradului și al Jacului, *Ursoieș*," in *Cronica Cercetărilor arheologice din România. Campania 2008/Valahica* XXI, (Târgoviște: 2009): 153.

[5] The only data that can be brought forth on the research of bridge structures is generally connected to excavations conducted on the fortified perimeters of castles and town fortifications. However, the approach of the scholarly literature, if present at all, is limited; for example: Adrian A. Rusu, *Castelarea carpatică. Fortificații și cetăți din Transilvania și teritoriile învecinate (sec. XIII-XIV)* (Cluj-Napoca: Mega, 2005), 180.

[6] David F. Harrison, "Bridges and Economic Development, 1300–1800," *Economic History Review*, New Series XLV/2 (1992): 241.

[7] The table lists all the bridge locations retrieved up to this point and it is prone to change through the subsequent addition of new entries.

[8] Partly discussed in: Oana Toda, "Evidence on the Engineering and Upkeep of Roads in Late Medieval Transylvania," *Annales Universitatis Apulensis. Series Historica* 17/II (2013): 183–189.

First, several specifications have to be made regarding the types of written documents and their spatial and chronological distribution throughout Transylvania. The oldest sources to record bridges fall into the category of pragmatic literacy which consists of a wide range of official charters addressing judicial matters (denounces, enquiries, sentences, testaments),[9] granting or overruling rights (property, tax revenues, exemptions)[10], and enforcing laws and orders issued by the central and regional authorities.[11] When it comes to the location of bridges, the most valuable texts are those enclosed in perambulations or boundary delimitations. Essentially, these are "cadastral" descriptions that record various natural and man-made landscape features. Bridges, though not as frequent as other elements, such as boundary marks, road tracks, houses, or streams, hills, and land use, sometimes occur and their location in the field can be retraced with a relatively high degree of accuracy. In such instances medieval toponymy and its modern and contemporary forms of survival play an important role in a landscape reconstruction. However, in the absence of documentary entries, several settlement names are the sole indicators of the existence of former medieval bridges, because they preserve the Hungarian term for this type of feature – "híd".[12] For the most part, this is the only method through which the earliest bridges of the late thirteenth and early fourteenth centuries were recorded.

At the end of the medieval period the sources multiply, both in quantity and typology. It was the economic development of the Saxon towns that determined an active implication of their administration in the organization and control of the surrounding road system.[13] Therefore, the preserved account registers and town protocols show an increasing involvement in the building and upkeep of roads and bridges. The richest

[9] Chendu, 1325: Zsigmond Jakó, ed., *Codex diplomaticus Transsylvaniae. Diplomata, epistolae et alia instrumenta litteraria res Transsylvanas illustrantia/Erdélyi okmánytár. Oklevelek, levelek és más írásos emlékek Erdély történetéhez* (hereafter EO), vol. II (Budapest: Magyar Országos Levéltár, 1997), d. 517, 196; Cluj-Mănăștur–Florești, 1417: Elemér Mályusz, Iván Borsa, eds., *Zsigmondkori oklevéltár* [hereafter ZsOkl], vol. VI (Budapest: A Magyar Országos Levéltár, 1999), d. 1266, 357; Pruniș, 1525: Zsigmond Jakó, ed., *A kolozsmonostori konvent jegyzőkönyvei* [hereafter KmJkv], vol. II (Budapest: Akadémiai Kiadó, 1990), d. 4129, 467–468.

[10] Vinţu de Jos–Vurpăr, 1289: Franz Zimmermann et al., eds., *Urkundenbuch zur Geschichte der Deutschen in Siebenbürgen* [hereafter Ub], vol. I (Hermannstadt: Ausschuss des Vereins für siebenbürgische Landeskunde, 1892), d. 227, 161; and 1393: Ub III, d. 1308, 56–57; Vama Marga, 1439: Georgius Fejér, ed., *Codex Diplomaticus Hungariae ecclesiasticus ac civilis* [hereafter CD], vol. XI (Buda: 1840), d. 162, 316–319; Bonţida, 1576: Arhiva Naţională a României (Documente Medievale), online database, http://cautare.arhivamedievala.ro [hereafter ANR], CJ-F-00320–1–2–1b–1–2, accessed June 5, 2017.

[11] Andrea Kiss, *Floods and Long-Term Water-Level Changes in Medieval Hungary*, PhD diss. (Central European University Budapest, 2011), cat. 9.5.10.3; ANR, CJ-F-00320–1–2–1b–1–2, accessed June 5, 2017.

[12] Apahida, Bonţida, Măierişte (HU: Hídvég), Derşida, *Fahíd*, Gherla (*Gherlahida*), Hida, Hăghig, Păgida, Podeni, Valchid (for archival reference see the entries in Tab. 1).

[13] An analysis of the efficiency of these administrative measures combined with the necessities of the construction sites in Saxon towns was carried out by Irina Băldescu, *Transilvania medievală. Topografie şi norme juridice ale cetăţilor Sibiu, Bistriţa, Braşov, Cluj* (Bucureşti: Simetria, 2012), 26–28.

sources come from Sibiu and Braşov, though the archives of the two major centers from northern Transylvania, Bistriţa and Cluj, also yield useful information. The situation is different on a chronological scale since the archives of Cluj mainly preserved documents dated to the second half of the sixteenth century. These can be incorporated into the present discussion, if one understands at least part of the recorded features as built prior to this time frame,[14] and the written sources most often retain a preexisting situation.[15]

In a couple of examples the accuracy of the data extracted from the account registers of the urban settlements is confirmed (and explained) by narrative sources – the travel journals and reports of the sixteenth century.[16] Only a handful of these texts ad valuable new information to the juridical and administrative archives.[17]

One aspect revealed by the above-listed sources is connected to the medieval terminology employed for bridges. The generally present appellative in the written sources to designate bridges is the Latin *pons*. *Parvus pons*[18] or the Hungarian *palló*[19] are rarely used to designate footbridges and small crossings. The Hungarian *híd* is usually part of a composed noun which refers to specific toponymy. It usually accompanies other nouns[20] or is followed by an adjective[21], often generating customized names for certain bridges or for their location. Some of these denominations were transmitted in the form of modern settlement names, especially through the Hungarian variants, and still preserve data on the direct association of bridges and certain water bodies

[14] This was the case of *Nagÿ hÿd* – "great bridge", standing in front of the northern town gate, facing the Someş – *platea pontis*. The name of the street (most likely *extra muros* at the time), was recorded as early as 1362 with its Latin name, proving the existence of a fixed river crossing at the middle of the fourteenth century: Ştefan Pascu et al., eds., *Documenta Romaniae Historica. Seria C. Transilvania* [hereafter DRH C], vol. XII (Bucureşti: Editura Academiei Române, 1985), d. 96, 71–72. Others were probably in place the latest by the second half of the following century. For the latest research on the town's early topography see: Radu Lupescu, "Kolozsvár korai történetének buktatói," *Erdélyi Múzeum* LXVII/3–4 (2005): 25–77; Adrian A. Rusu, "De la cetate la oraş: cazul Clujului medieval," in Ionuţ Costea et al., eds., *Oraşe şi orăşeni/Városok és városlakók* (Cluj-Napoca: Argonaut, 2006), 322.

[15] Several catalog entries with later date refer to dilapidated bridges associated with town gates which needed repair. This is generally the case for most of the features found on the outskirts of Cluj. The majority of bridges were clearly associated with the main regional and long distance roads intensely used since the fourteenth century, therefore, can be considered for an earlier dating: "Căi de comunicaţie nord-transilvănene şi direcţiile de trafic ale Clujului medieval", *Analele Banatului*, Serie Nouă, Arheologie-Istorie XXIII (2015): 253–275.

[16] Holban Maria et al., eds., *Călători străini despre Ţările române* [hereafter CS], vol. II (Bucureşti: Editura Ştiinţifică, 1970), 432.

[17] CS III, 158, 671.

[18] 1526: *Quellen zur Geschichte der Stadt Kronstadt in Siebenbürgen. Rechnungen aus dem Archiv der Stadt Kronstadt* [hereafter QKron], vol. I, (Kronstadt: Römer & Kamner, 1886), 380.

[19] 1406: Károly Szabó et al., eds., *Székely oklevéltár* [hereafter SzOkl], vol. I (Kolozsvár – Budapest: Magyar Történelmi Társulat, 1872), d. 87, 100–101.

[20] *Halyogos híd*, 1574: Zsolt Bogdándi, Emőke Gálfi, eds., *Az erdélyi káptalan jegyzőkönyvei 1222–1599* [hereafter ErdJkv] (Kolozsvár: Erdélyi Múzeum Egyesület, 2006), d. 226, 92–94; *pons Dragnahyda*, 1451: ANR CJ-F-00546–2–86, accessed on June 5, 2017.

[21] *Pons Tiliarum* at Gherdeal, 1302: ANR SB-F-00011–1–393, accessed June 5, 2017.

(Hida, HU: *Hydalmas*[22]), on the presence of bridges inside the settlement (Podeni, HU: *Hídastelek/Hydusteluk*[23]), the initial ownership (Apahida, HU: *Apathyda*, LAT: *Pons abbatis*[24]; Păgida, HU: *Apahyda*[25]; Bonțida (?), HU: *Bonchyda*[26]), the relation to the road system (Măieriște, HU: *Hydueg*[27]), or on the construction material (deserted settlement, HU: *Fahyd*[28]).[29] Other names found only in documents provide data on the dimensions (*longus*, *parvus*, *nagÿ*), material (*pons lignis/ligneus*, *pons lapideum*, *keo hyd*), building technique (*pons czwg/pensilis* – "drawbridge", IT: *ponte sublicio* – "bridge on piles", *arx? et pons* – "arch and bridge", arched/gothic bridge?), state of preservation (*aqua diluerat pontis*) or age of the structure (*novus pons*, *pons antiqus*). These particular toponyms will be analyzed in the following, along with juridical and accounting data, for the retrieval of the economic and material characteristics of bridges.

Bridges, tolls and the economic geography of medieval Transylvania

Before turning to a detailed discussion on the physical characteristics of river crossings it is important to point out their role in the economic geography of the transportation system as this was the primary context to determine the recording of a significant part of the preserved sources.

Since, the characteristics of the Transylvanian toll collection system were objectives of past studies here they shall not be analyzed in detail.[30] However, the importance of river crossing points in the framework of the regional development of the transportation system requires a discussion, as it determined the context and motivations for their construction and use.

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[22] "Bridge on the Almaș",1333: EO II, d. 1067, 387-388.

[23] "Village/plot with bridge/s", 1291: EO I, d. 478, 287.

[24] "Abbot's bridge", !1296: EO I, d. 549, 311-312; 1326: EO II, d. 569, 211-213.

[25] "Abbot's bridge", 1343: EO III, d. 157, 82-83.

[26] "Boncz's bridge", 1321: EO II, d. 409, 162-163.

[27] 1351: DRH C X, d. 83, 84-88; meaning that the settlement was located at the end of a bridge (Szilágyi, *On the Road*, 187).

[28] "Timber bridge", 1321: EO II, d. 399, 160.

[29] For examples found elsewhere in Hungary: Szilágyi, *On the Road*, 186-187.

[30] For the Hungarian Kingdom during the Árpád dynasty, see: Boglárka Weisz, *A király ketteje és az ispán harmada. Vámok és vámszedés Magyarországon a középkor első felében* (Budapest: MTA BTK Történettudományi Intézet, 2013). On the judicial matters connected to roads and the toll system of northern Transylvania: Oana Toda, "Legal and Administrative Aspects of the North Transylvanian Road System in the Middle Ages," in Martyn Rady, Alexandru Simon, eds., *Government and Law in Medieval Moldavia, Transylvania and Wallachia* (London: UCL–SSEES, 2013), 55–64; idem, "Abuse of Power, Corruption, and Anticorruption in the Functioning of the Road System of Medieval Transylvania," *Annales Universitatis Apulensis. Series Historica* 20/II (2016), 41-60. From the earlier works see: Otto Mittelstrass, *Beiträge zur Siedlungsgeschichte Siebenbürgens im Mittelalter* (München: Verlag R. Oldenbourg, 1961), 48–50; György Györffy, *Az Árpád-kori Magyarország történeti földrajza*, vol. I–IV, (Budapest: Akadémiai Kiadó, 1966–1998); David Prodan, *Iobăgia în Transilvania în secolul al XVI-lea*, vol. I (București: Editura Academiei, 1967); Petre Iambor, "Drumuri și vămi ale sării din Transilvania în perioada feudalismului timpuriu," *Acta Musei Napocensis* 19 (1982): 75–85.

Apart from settlements, the bridges, ferry crossings and fords were roughly the only fixed points of a road network. They appeared in areas with obstacles that were difficult to cross and required engineered structures – mainly active riverbeds but also in marshlands, on steep slopes, over ravines or coulees. The funding for these building activities and subsequent upkeep was the initial motivation and practicality in the emergence of the toll taxation system. Moreover, this was the main building activity connected to medieval roads and the traffic tolls developed as a customary tax contribution to the expenses needed for keeping the roads functional and safe. The existence of medieval bridges was by far the most frequent and direct proof of road upkeep, and bridge tolls (*tributum/telonium pontis*, *redditus pontis*) evolved as a primary and main component of road tolls (*tributum viae*).[31]

For the longest time, the royal decrees[32] used bridges (and, in general, all types of river crossings) as one of the rightful motivations for toll exaction.[33] It was in comparison to them that the illegal levying of taxes was condemned[34], suggesting that it was not legitimized through the presence of a road construction or its further upkeep, nor by the customary law. This was all part of the official policy of countering toll proliferation, a widely spread phenomenon that already manifested by the end of the thirteen century and that can also be identified in Transylvania.[35]

Not all the traffic toll stations from this region were positioned at bridges or near other types of river crossings. Out of the legal ones, some were located at crossroads, others were connected to strategic fortified sites and the political borders of the voivodeship (customs), or were associated to salt trade and the toll donations that derived from it.[36] Sometimes, they had no visible pragmatism but in fact directed and controlled traffic towards certain trade centers.[37]

According to the present state of research, among the catalogued bridge locations from late medieval Transylvania, only a small number (12 to be precise) were directly associated to traffic taxation by the contemporary documents. These were the bridges at Măierişte (Crasna River), Var (most likely on the Almaş River), Gherla, Bonţida, Apahida (all three across the Small Someş), Vinţu de Jos – Vurpăr (on the Mureş River), Vama Marga (on Bistriţa River or a tributary), Chendu (Târnava Mică River), Şercaia, Măieruş-Belin and Hăghig (all three on the Olt River), and bridges in the Bran – Rucăr (across mountain streams and steep slopes) and Braşov – Timişul de Jos areas (along

[31] Weisz, *A király ketteje és az ispán harmada*, 13.

[32] On a presentation of the legal atmosphere produced by these documents in connection to the road system in Transylvania, see Toda, "Abuse of Power," 42-49.

[33] 1351: János M. Bak et al., eds., *The Laws of the Medieval Kingdom of Hungary/ Decreta Regni Mediaevalis Hungariae* [hereafter DRMH], vol. 2 (Salt Lake City: 1992), art. VIII, 10; 1435: ibid., art. XX, 75–76.

[34] The illegal use of roads (bypassing the control points and not following the designated official routes) fell into the category of wrongdoings: Toda, "Abuse of Power," 53-56.

[35] Ibid.

[36] For the situation in the northern part of the province, see: Toda, "Legal and Administrative Aspects," 61-62.

[37] Ibid., 62.

and probably across the Timiș River, mountain streams and slopes).[38] One must assume that, in fact more were associated to toll stations but, until the identification of objective evidence, the observations will be limited to the known ones.[39]

The above discussed constructions were ranked the highest in the hierarchy of bridges. For the medieval times their importance can be connected to that of roads, in the sense that their relevance grew depending on that of the route they were placed on. A bridge acquired more significance if the characteristics of the water body on which it was constructed were taken into account – its width and flow rate, seasonal water-level changes, the terrain around it, drainage etc. The harsher the natural conditions, the harder it was to build and maintain such a structure and the more useful it was in easing traffic. All the above listed bridge tolls were connected to the most important watercourses of Transylvania (the largest rivers in some of the most populated and economically active areas) or to nearby crossing points.[40]

Several other bridge locations were also vital on a provincial scale[41] but a considerable number were connected to smaller settlements and water bodies, as revealed by perambulations. An important part was included in the regional and local transportation networks overseen by the Saxon urban centers (Cluj, Sibiu, Brașov) and the remainder were under lay and ecclesiastical control. The differences in ownership and administration were all the results of royal donation of lands and privileges.

These owners and lessors had to bear the costs of road upkeep and were in return exerting their right to levy taxes or control the road segments (especially if these were considered private ones).[42] In fact the toll taxes represented an important revenue for nobles[43] and they sometimes provoked juridical battles over property rights (Beclean, Marga), accusations of wrongful taxation (Hăghig), and were the object of lease contracts (Măieriște, Var).[44]

Starting with the late thirteenth century, evidence exists that local German

[38] For details see Tab. 1 and Fig. 1.

[39] Here, one can add several ferry and ford crossings that were part of the most important trade routes: Reteag – Urișor (Great Someș River), Cluj-Mănăștur, Cluj (Small Someș River), Oarda, Hădăreni, Cuci (Mureș River), and Micăsasa (Târnava Mare River).

[40] Vama Marga in the crossing area from Hațeg to Banat (CD XI, d. 162, 316-319) and the mountain bridges found on two of the most important roads connecting Brașov to Wallachia (QKron II, 323).

[41] For instance the bridges around Cluj, oriented towards Baciu, Chinteni, Mănăștur and Feleacu, were all located on some of the most important regional routes recorded by documents with terms that place them at the top of the road hierarchy (*via magna*/*regalis*/*publica*/*libera*); see "Căi de comunicație nord-transilvănene și direcțiile de trafic ale Clujului medieval," *Analele Banatului*, Serie Nouă, Arheologie-Istorie XXIII (2015), 256, Tab.1, 263-274. In the fifteenth and sixteenth centuries the bridges at Avrămești, Laslea and Hoghilag were connected to the main road on the Târnava Mare River, and the road system on the Hârtibaciu Valley integrated the crossings at Agnita, Vărd, Hosman, Cornățel and Cașolt. For all these geographic references see Tab. 1 and Fig. 1.

[42] On the private or public character of roads: Szilágyi, *On the Road*, 96-101; Toda, "Legal and Administrative Aspects," 59-60.

[43] Often listed in estate inventories along with mills, fishponds, pastures, and woodlands.

[44] See Tab. 1.

communities were involved in bridge repair and toll management alongside the central authorities.[45] By the fifteenth and during the sixteenth centuries the Saxon central administration gained great political influence and freely administered the border bridges with Wallachia. On the same note, it influenced the state officials' decisions of building new strategic river crossings inside Transylvania and repairing roads at the borders of the voivodeship.[46]

This phenomenon was mostly motivated by economic reasons and it seems that among all the road and bridge administrators the Saxon communities were the most involved in road management (Fig. 1). They ascended to an economic position that enabled them to control traffic, all in accordance to their trade interests. As a consequence, the administrative system they developed evolved drastically towards the end of the medieval period.

For example, in 1568, the local population in Șercaia was granted the permission to build a bridge across the Olt River and exert a passage toll.[47] Moreover, at least half a century earlier, in 1533, they were already involved in building corduroy roads and bridges (*pontibus strata*) in heavy and wet woodlands (*pontibus in nemore*) in order to secure the functioning of the Brașov – Făgăraș road.[48] The same type of jobs were associated with the communities from Codlea (1520)[49] and Râșnov (1521).[50]

Strategic economic bridges, central authorities and local landowners

The bridges, where tolls were levied stand at the top of the economic hierarchy of engineered river crossings and were connected to the monopoly of traffic or to the strict oversight and organization of trade transport. Their owners were generally of higher noble status or privileged communities and often benefited from royal and voivodal support in the administration of the toll points.

The special context of four bridges located in points that were central to the efficient transportation of salt towards the western territories of the Hungarian Kingdom[51]

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[45] Vințu de Jos, 1289 (Ub I, d. 227, 161) and 1393 (Ub III, d. 1308, 56–57).

[46] Ub VI, d. 3966, 554–555; see also: Mária Pakucs-Willcocks, *Sibiu – Hermannstadt. Oriental Trade in Sixteenth Century Transylvania* (Köln – Weimar – Wien: Böhlau Verlag, 2007), 30–31.

[47] 1568: ANR BV-F-00001–1–509, accessed on June 5, 2017.

[48] QKron III, 323.

[49] QKron I, 272.

[50] Ibid., 356.

[51] For the context of salt transportation see: Alexandru Doboși, "Exploatarea ocnelor de sare din Transilvania in evul mediu (secolele XIV-XVI)," *Studii și cercetări de istorie medie* II, 1 (1951): 125–166; Petre Iambor, "Drumuri și vămi ale sării," 75–85; Cornelia Măluțan, "Drumurile sării în Transilvania de nord-vest," *Acta Musei Porolissensis* VIII (1984): 249–255; Gheorghe Anghel and Viorica Suciu, "Mărturii ale practicării plutăritului în Transilvania din antichitate, evul mediu și perioada modernă. Rolul orașului Alba Iulia în istoria plutăritului," *Apulum* XL (2004): 367–386; Zsolt Simon, "Mineritul de sare în Evul Mediu în Transilvania și Maramureș," in Valeriu Cavruc, Andrea Chiricescu, eds., *Sarea, Timpul și Omul* (Sfântu Gheorghe: Angustia, 2006): 92–96. The latest contribution concerning the situation prior to the fourteenth century in Beatrix F. Romhányi, "Church and Salt. The Participation of the Church in the Salt Trade (Eleventh–Thirteenth Centuries)" (paper presented at

(Vinţu de Jos, Bonţida, Var, and Vama Marga) reclaims our attention. Their importance was connected to the proximity of the main salt mines, salt chambers or salt routes from Transylvania. In each case, the owners and administrators benefitted at some point during the medieval period from consistent financial and material support, through direct involvement from the central authority or through a special connection to the *comites* of the salt chamber acting on the king's request.

In a chronological order, the first situation revealed by documents is that of the water and bridge toll from Vinţu de Jos and Vurpăr (Alba County). The communities of royal *hospites* were settled on the two banks of the Mureş River, one across the other, downstream from Alba Iulia. They jointly collected the toll for the royal salt hauled by water and also built and repaired the bridge which crossed the Mureş River in their area. They were part of a long line of German settlers associated with salt exploitation. Yet, unlike, for example, the salt cutters from Ocna Dej (Solnoc County) they were not involved in mining activities but were overseeing the shipments.[52]

In 1248 they were already granted ample privileges by voivode Lawrence. These rights were comparable to the ones received by the Saxons in Sibiu and by the cannons in Alba Iulia.[53] Apparently, the document made the first reference to a river crossing in that location. Even though, the phrasing is not explicit, it seems that they were allowed to freely cross the river from both sides, between the above discussed two estates.[54]

By the end of the thirteenth century the bridge was functional as the charter issued in 1289 by King Ladislas IV clearly mentions it. The king granted the cannons of Alba Iulia the right over two thirds of the water salt toll levied in Vinţu de Jos and an exemption from paying the bridge toll in that same location when travelling to and from their lands.[55]

The advantages gained through this strategic positioning on the main navigation channel of Transylvania[56] as well as on one of the most important land routes were also revealed in a charter from 1393 issued by King Sigismund.[57] The monarch removed

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the international conference *Monastic Life, Art and Technology in 11th – 16th Centuries*, "1 Decembrie 1918" University, Alba Iulia, Romania, October 16–18, 2014; to be published in *Annales Universitatis Apulensis. Series Historica, Special Issue*, 2015). The late medieval evolution of the salt trade system in István Draskòczy, "Só a középkori Magyarországon," in András Kubinyi, József Laszlovszky, Péter Szabó, eds., *Gazdaság és gazdálkodás a középkori Magyarországon: gazdaságtörténet, anyagi kultúra, régészet* (Budapest: Martin Opitz, 2008): 150–154; Idem, "Belkereskedelem és sókamarák a 15. század második felében," in Boglárka Weisz, ed., *Pénz, posztó, piac. Gazdaságtörténeti tanulmányok a magyar középkorról* (Budapest: MTA BTK Történettudományi Intézet, 2016): 201–215.

[52] 1290: EO I, d. 457, 280; 1291: EO I, d. 465, 282–283.

[53] Ub I, d. 84, 77 (these privileges included the navigation rights); reconfirmed repeatedly from 1265 (ibid., d. 110, 95–96) until 1421 (Ub IV, d. 1894, 144–146).

[54] Ibid.: *Transitum insuper Morisii eis liberum conferimus parte ex utraque.*

[55] Ub I, d. 227, 161 (*Et cum iidem canonici ex utraque parte Morisii possessiones habeant seu proventus, in pon[te Wynch inferiori nullum] tributum de rebus eorundem seu illorum, qui in curiis eorundem canonicorum resident, dare et persolvere teneantur*); reconfirmed in 1323 (Ub I, d. 407, 377).

[56] Still a station point in the transport of salt during the first half of the sixteenth century as observed by Hans Dernschwam in 1528 (CS I, 271) and by Georg Reicherstorffer before 1550 (CS I, 220).

[57] The order was reconfirmed in 1411 (Ub III, d. 1658, 507–509) and 1435 (Ub IV, d. 2215, 551–553).

the communities in Vinţu de Jos and Vurpăr from the authority of the voivode and placed them under the jurisdiction of the Saxon University. Moreover, the royal toll for using the bridge across the Mureş River was abolished since they were the ones to build, maintain and repair the construction at their own expense.[58] The content of this document lets one assume that they were only the administrators (toll collectors) as the toll seems to have remained in the king's property until its dissolution.

The direct financial gains, construction or repair funds involved in the administration of an important river crossing are not visible in the preserved documents related to the bridge from Vinţu de Jos. For other such built features, directly connected to the salt transportation and the main trade routes, the preserved evidence points at specific funds and measures aimed at ensuring the maintenance and construction work.

One such case is known about the bridge in Bonţida, found on the Small Someş River, in the County of Dăbâca. The medieval toponymy, evidence for the existence of a structure used for river crossing, was preserved in the settlement's name. It was recorded in 1321, when the village of *Bonchyda* along with its mills and toll (*tributo*) was donated by voivode Ladislas to *ispán* Nicholas.[59] Hence, a bridge and a toll collection point already existed. Even though, not necessarily connected to one another, their association would be a plausible assumption. By the middle of the fourteenth century this location became a mandatory traffic point for the commerce of Cluj with north-eastern Transylvania.[60] This places Bonţida not only on an important salt route (transiting the salt from the mines from Sic towards Dej or Zalău) but also in a focal point for the general functioning of the North Transylvanian trade.

The relevant data for the physical and financial aspects of the river crossing was only recorded in 1575, when voivode Christopher Báthori granted Wolfgang Bánfi the right to 100 forints worth of salt from the chamber in Sic in return for looking after the bridges across the Someş in Bonţida.[61] The sum was supposed to be an annual payment.[62] The plural form of the word "bridge" used in this document makes this the

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[58] Ub III, d. 1308, 56-57 (*Denique tributum pontis, quod in dicto fluvio Moros hucusque exigi fuit consuetum, praemissa auctoritate nostra cassantes deponendum duximus et destituendum ita tamen, ut praefati incolae de Alsowyncz et Borpergh ipsum pontem semper hactenusl) construere, aedificare et reformare teneantur eorum propriis laboribus, sumptibus et expensis*).

[59] EO II, d. 409, 162-163.

[60] 1361: DRH C XII, d. 62, 46-47.

[61] ANR, CJ-F-00320–1–2–1b–1–2, accessed June 6, 2017.

[62] This fund was established in a period, when the so-called "price revolution" was happening. For the Principality of Transylvania the quick-paced currency devaluation was due to wars and the tribute payments to the Ottoman Empire, which generated a continuous growth of the prices. As a consequence prices doubled over the sixteenth century. See Francisc Pap, "Circulaţia monetară în Transilvania în perioada 1526-1571," *Acta Musei Napocensis* XXIV-XXV (1988): 624; Livia Călian, "Tezaurul monetar din secolul al XVI-lea din mormântul nr. 16," in Dan Isac, ed., *Contribuţii arheologice la istoria oraşului Dej* (Cluj-Napoca: Mega, 2008): 87. Thus, this sum was probably worth less than half the amount given to the Zsombori and Drági nobles 80 years before (see below, the Var bridge). Moreover, the account registers and the contracts of the late fifteenth and sixteenth centuries generally operated with the money of account, not with the real currency found on the

first known record that would indicate the existence of more than one bridge in the area, and could actually suggest the presence of at least two river branches that had to be crossed.[63] One also finds out about the type of work that was done under the care of Bánfi Losonci, that is construction and repair. The built structure(s?) remained in use and a new record from 1607 sums up the decision of the Transylvanian Diet to grant salt from the chamber from Sic for the upkeep and repair expenses, stating that this particular bridge was used for the benefit of the salt mine.[64]

The bridge found on one of the estates of the Zsombori and Drági noble families, at Var[65], near Jibou, in a curve of the Someș River was in a similar situation at the end of the fifteenth century. The functioning of a toll station[66] in this location dates from 1492.[67] Several years later, in 1496, the bridge was recorded by a royal charter; the traffic tax and the river crossing were mentioned in the same document in 1505.[68]

Its precise association to a certain water body is difficult to establish since, the document from 1496[69] explicitly named the Someș River but the main salt road did not cross the Someș. On this estate the dry land transports had to cross a southern tributary – the Almaș River, then headed towards Zalău and passed by the Borza toll.[70] Thus, it can be hypothesized that this bridge actually secured the crossing of salt wagons south of the Someș water channel rather than ensured the crossing of the main river.[71]

The context of the archival record from 1496 is connected to the salt transportation from Ocna Dej through the land routes. It places this bridge at the center of a crisis

market. The market fluctuations of the period determined an uneven exchange rate between the two categories, meaning that the money of account had more value as the real currency depreciated. See Mária Pakucs, "Florini și dinari în registrele vamale ale Sibiului din secolul al XVI-lea: scurt demers metodologic," *Studii și materiale de istorie medie* XXI (2003): 279–285.

[63] This is in fact the configuration of the water body in the second half of the eighteenth century (see *First Military Survey*, online database, http://mapire.eu/en/map/firstsurvey/?layers, accessed 20 June 2017).

[64] Rudolf Wolf, "Comerțul cu sare al Transilvaniei în secolele XVI-XVII," *Acta Musei Napocensis* 32, 2 (1995): 123.

[65] Either the toll or the bridge were alternatively recorded in the property of the Drági and Zsombori families, decedents of the Brassói nobles. Despite their various dissensions, which started as early as 1360, the two branches of the same family shared their ownership of the estates throughout the Middle Ages. Var was also part of the initial estate cluster of the fourteenth century. See Marius Diaconescu, *Structura nobilimii din Transilvania în epoca angevină* (Cluj-Napoca: Mega, 2013), 418–420.

[66] The donation charters of the fourteenth century make no reference to the existence of a toll: *Magyar Országos Levéltár. Diplomatikai Levéltár*, online database, https://archives.hungaricana.hu/hu/charters, [hereafter DL], 28577, 30296, accessed on June 20, 2017). Its existence prior to the end of the fifteenth century would not be unusual since the two branches owned toll collection points at least in two other locations: Zimbor (1360: DRH C XI, d. 512, 534–535) and Dragu (1379?: Ub II, d. 1113, 507–509; 1473: KmJkv I, d. 2072, 732–733).

[67] KmJkv II, d. 2806, 96.

[68] Ibid., d. 3345, 246.

[69] DL 65441, accessed on June 20, 2017.

[70] KmJkv I, d. 2037, 723.

[71] Kiss, "Floods," 320.

that halted the entire dry land transport towards the Great Hungarian Plain for several months, as the structure was at the time in ruin and thus, the wagons were unable to proceed westwards. The episode offers an example of the negative effects that bad weather, particularly floods, could have had on the medieval road system. The structure collapsed following an ice-flood which had occurred that winter. Nevertheless, this was not the only cause. The document includes information on the bridge's neglected state in the preceding year(s?). According to the charter, owner Peter Zsombori was responsible for the repair work. He failed to complete this task because the chamberlains from Dej did not pay the mandatory annual fee of 150 forints to cover repairs and were held responsible by the king.[72]

Several owners and lessors of the toll and/or bridge are known[73] but, even though they held the right to collect taxes, part of the cost of maintaining the bridge also fell on the salt chamber.[74] Later on, in 1505, Martin Drágі leased for 500 forints his part (half) of the Var, Borza and Lupoaia estates, along with half of the revenues from the bridge and toll from Var. The lessor was George Chehi, *camerario salium regalium partium Transsilvanarum*.[75] This shows that the officials of the salt chamber were personally involved in the administration of tolls and bridges, as a way of gaining incomes.

During the fifteenth and the sixteenth centuries the Transylvanian salt chambers were concerned with the maintenance of the road system and the safety of salt transport in areas beyond their immediate vicinity.[76] Their responsibilities covered wide regions as proven by the case of the Turda chamber that was overseeing the navigability of the Mureș River.[77] The same situation was characteristic for the chamber in Ocna Sibiu which had financial obligations towards the owners of the bridge located on the Marga

[72] Ibid., n. 1173: *Exposuit maiestati nostre fidelis Egregius Petrus de Sombor cum querela Qualiter ipse haberet quendam pontem in possessione sua [Ewr]mezeu vocata iuxta fluuium [Sa]mos vocatum prope est oppidum nostrum dees habitum et quem vniueris emptores et ductores Salium nostrorum in curribus incederent et prouisionem predecessorum nostrorum Regum felicis memorie Sales in valore centum et quinquaginta fluor. per vos prefato exponen[te] singulis annis dari deputauerimus vos tamen mandata nostra obaudientes Sales huiusmodi nostram racionem dicto exponen[te] dari facere non curassetis propter quod iam pons ipse per nimiam aquarum tumefaccionem et inundacionem glacierumque vehementem dissolucionem totaliter dir…us et dissolutus esset et vectores Salium nostrorum hoc impedimento obstan[te] a vectura Salium nostrorum cessasset exindeque non solum Maiestati nostre sed vniuersoque Regno nostro non paruum damnum secutum fuisset. Cum autem reformacio pontis pretacti propter causas promissas sit admod necessaria nec huiusmodi reformacio commode fieri sine speciali nostra promisione singulis annis possit… Volumus et mandamus fidelitatubus vestris presencium serie strictissime. vt a modo prescriptos Sales in valore Centum et quinquaginta fluor.*

[73] In 1534 the joint ownership of the toll ended as the Zsombori branch sold its half to the Drágі members for 1000 gold forints. This information is also relevant for the value of such a bridge toll (KmJkv II, d. 4480, 565).

[74] Given the various disputes between the Zsombori and Drágі families, one of the reasons behind the missing funds could have been a lack of coordination between the various owners and lessors of the toll, and the salt chamberlains of the Dej mine.

[75] KmJkv II, d. 3345, 246.

[76] As was the case at Bonțida and Var.

[77] The 1528 official report shows that the salt chamber was paying a nobleman from Alba County an

estate (at the border between Banat and Hațeg).[78] Based on a reconfirmation made by King Albert (1437–1439) of a donation initiated by his predecessor King Sigismund (1387–1437) the river crossing was under the administration of the Cândea family by the fourth decade of the fifteenth century. The original deed had been destroyed during the previous year in an Ottoman offensive.[79] The bridge was located on the main trade route to Banat, a former Roman road.[80] The Cândea noble family was already looking after the bridge and it is likely that they acquired the estate as a result of the debts that the previous landowner – Michael Postăvaru – had accumulated.[81]

The new owners repaired the structure and in return levied toll taxes and benefitted from an annual subsidy from the salt chamber. In 1439, the chamberlains from Ocna Sibiu were ordered to give the Hațeg nobles 5000 blocks of salt to cover the repair costs.[82] Their property rights and the obligations of the salt chamber were reconfirmed several times in the following three decades of the fifteenth century.[83] After a gap in the archival records on the structure and toll, it appears that during the sixteenth century a taxation point in the area was under the control of the central authority.[84] Apparently, the bridge and its toll station were regained by the Cândea at the beginning of the following century. The described context was generated by the privileged status and the entrepreneurial spirit of the noble family from Hațeg on one hand, and by the relative isolation of the salt mines in Ocna Sibiu from the main roads and waterways, on the other. This isolation, if compared to other mining locations and salt chambers, was decisive for the orientation of their shipments towards the south and the south-west. The situation was brilliantly planned out by the toll owners as they exerted a monopoly on the entire traffic towards the mountainous Banat and the bridge was a key element for their control.

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annual fee just to refrain from building a floating mill on the river channel which would obstruct the salt shipment (CS I, 289).

[78] CD XI, d. 162, 316–319 (*pontem in via Vaskapu vocata de partibus nostris Transilvanis versus Karansebes tendente existentem per quem conductores salium nostrum regalium sales nostros ad partes regni nostri Hungariae inducere consuevissent*).

[79] Ibid. (*concessioneque et donatione condam Serenissimi Principis Domini Sigismundi*).

[80] It was closed at the middle of the fourteenth century and mentioned as a paved road (Rusu, *Castelarea carpatică*, 335). Given this association the bridge was interpreted as a Roman relic reused during the medieval period. This conclusion is also based on the account of Carl Gooss, who highlighted the existence of stone bridge ruins in the area after the middle of the nineteenth century: "Chronik der archaeologischen Funde Siebenburgens," *Archiv des Vereins fur siebenburgische Landeskunde*, *Hermannstadt* XIII/III (1876): 291.

[81] The situation of the bridge was discussed in detail by Adrian A. Rusu: "Pons Augusti nel Medioevo," in Marius Porumb, ed., *Omaggio a Dinu Adamești*eanu (Cluj-Napoca: Clusium, 1996): 251.

[82] CD XI, d. 162, 317. The 1447 charter issued by John Hunyadi (Rusu, "Pons Augusti," 249) raised the annual quantity to one *tumen* of salt (10000 blocks). The document could refer to the heavier blocks (*sal currualis*) that were transported by this land route (for their weight, see: Simon, "Mineritul de sare," 93).

[83] Ibid.

[84] CS II, 329.

Engineering and upkeep: building techniques and materials

Medieval charters offer little data on the physical traits of engineered river crossings and what was recorded in perambulations was either the result of exceptional circumstances or simply coincidental.[85] However, the information included in account registers on the material resources used in construction and maintenance provide relevant details on the dimensions, structure, and building material used for medieval bridges and contribute significantly to the general discussion on the listed aspects.

The terms which express the *size* of these constructions are scarce in almost all types of written sources. The existence of smaller engineered crossings – footbridges – can be tracked down only in special cases. For example, one such element was recorded with the Hungarian term *palló* in the surroundings of Ineu and Cârța (Ciuc Seat).[86] The document also listed the Latin form of *pons*, while a local terminology was used for clarification. The annotation was generated by the topic of the document explicitly dealing with the necessary measures to be applied in the event of floods.

The Latin equivalent for *palló* is *postium*, which commonly refers to small-scale structures. It was used by Georg Werner in his report on the salt mines from the area of Dej but the exact construction that he described was the salt chamber's loading pier which rested upon piles, where the salt cargo was transferred onto the ships.[87] It was probably engineered in the same technical manner as a (foot)bridge.

Small-sized bridges were also found on the outskirts of Brașov (Bartolomeu[88] and Stupini[89]) or north-east of Cluj (around *Sz. György hegy*)[90], where these were positioned over small streams and springs. Footbridges were also associated with town gates and probably referred to the pedestrian access ways; such as the *parvus pons* near the *porta portice* (GE: *Purzengaessertor*) in Brașov.[91] This assumption is backed up by the fact that the gate's main bridge was frequently recorded in the same account registers with a different term, indicative of a drawbridge: *pons pensilis*.[92]

The larger structures were almost never defined as such in the analyzed sources, and the only known case of a bridge which was named *Nagÿ hÿd* is dated to the sixteenth century.[93] The respective bridge stretched over a branch of the Small Someș River, north of the town walls of Cluj, at the end of the *platea pontis*. As this was the main crossing

[85] EO II, d. 71, 56–57; András W. Kovács, ed., *A Wass család cegei levéltára* [hereafter WassLt] (Kolozsvár: Erdélyi Múzeum Egyesület, 2006), d. 84, 241–243; ErdJkv, d. 774, 292–284.

[86] 1406: SzOkl I, d. 87, 100–101 (*pontem vulgo palló*).

[87] 1552: CS II, 28, n. 110 (in the transcription as *posticum* – "backdoor"; which does not fit the context).

[88] 1545: QKron III, 286.

[89] 1523: QKron I, 533.

[90] 1578: Attila T. Szabó, *Erdélyi Történeti Helynévgyűjtése. 10/B Kolozs megye* [hereafter SzabóKM] (Budapest: Magyar Nyelvtudományi Társaság, 2009), 477.

[91] 1522: QKron I, 380.

[92] 1528: QKron II, 135.

[93] 1570: SzabóKM, 460.

over the biggest water body of the area, it is only natural that it was more complex and had a different name compared to the other bridges which functioned in connection to the settlement.

A "long bridge" (*pons longus*) located near Sântioana (County Dâmbâca)[94] crossed a marshland.[95] This might not be just a simple bridge because sometimes corduroy roads were built to cross over areas with an elevated soil humidity.[96] However, the historical terminology overlapped in the case of isolated bridges and corduroy road tracks. The latter were the timber paved roads widely employed during the medieval and modern period, prior to large-scale river regulation and drainage works.[97] The general term used for paved road sectors on marshy and unstable terrain was *pons*, mostly in its plural form. As a result, it is mainly the context of the document that allows a clear distinction from the common bridges.

The account registers of Brașov recorded at least five areas of the district, where such timber roads were built (Fig. 2): along the road connecting Codlea (Brașov district) and Șercaia (Făgăraș Land)[98], in the woodland around Vulcan[99], along the Timiș – Prahova[100] and Bran – Rucăr trade routes[101], and north-west of Brașov, on the route to Hălchiu, across the marshes found between Ghimbășel and Bârsa Rivers.[102] A confirmation of this building technique[103], dated to 1574, is the description of the segment (*pontibus strata*[104]) between Codlea and Șercaia included in the travel journal

[94] 1347: WassLt, d. 84, 241–243.

[95] Another "long bridge", mentioned at the end of the sixteenth century, stretched across the defensive mote of the Făgăraș fortress (CS III, 671)

[96] This type of construction was investigated archaeologically in Timișoara: Florin Drașovean et al., *Timișoara în amurgul Evului Mediu. Rezultatele cercetărilor arheologice preventive din centrul istoric* (Timișoara: Mirton, 2007), 16–81; Florin Drașovean et al., "Cercetările arheologice preventive din anul 2015 în Piața Sfântul Gheorghe a Timișoarei," *Patrimonium Banaticum* VI (2016): 140–141.

[97] An exception could be *plateea cerdonum*, also called *Holzgasse*, inside the fortified perimeter of Bistrița. See Albert Berger, ed., *Urkunden Regesten aus dem Archiv der Stadt Bistritz in Siebenbürgen*, vol. I (Köln – Wien: Böhlau Verlag, 1986), d. 188, 61 and d. 1275, 339.

[98] During the first half of the sixteenth century: QKron I, 272–274, 345, 352, 528; QKron II, 323; QKron III: 169, 209, 272, 323.

[99] 1535–1536: QKron II, 430, 465.

[100] 1547: QKron III, 397. One tributary of the Prahova River was called *Hidlás völgye* in the nineteenth century, when it was still covered by corduroy roads: Pavel Binder, "Drumurile și plaiurile Țării Bârsei," *Studii și articole de istorie* XIV (1969): 212.

[101] During the first half of the sixteenth century: QKron I, 356; QKron II, 276, 527; QKron III 124, 182, 409.

[102] 1545: QKron III, 263; 1547: ibid., 397.

[103] Something similar happened in 1507 along the Sibiu – Ocna Sibiului road, where the track was repaired with tree branches and other organic material, probably also to prevent mud and high humidity (*ducti sunt rami ad locum pontis lapidei in strata versus Wyzakna et reformata est via pro palea sive cursu*). See: *Quellen zur Geschichte Siebenbürgens aus Saechsischen Archiven. Rechnungen aus dem Archiv der Stadt Hermannstadt und der Sächsischen Nation (1380-1516)* [hereafter QSiebRech], vol. I (Hermannstadt: In Commission bei Franz Michaelis, 1880), 476.

[104] 1574: CS II, 432.

of Pierre Lescalopier. According to the traveler, over a considerable distance, the road track was covered with tree trunks, for otherwise it would have been impossible to use it due to the high humidity caused by the land cover – dense woodland.[105] The repeated use of the word "bridge" in the account registers[106] and the nature of the terrain in those areas suggest that in some places (over streams, coulees, source and other small channels) wooden platforms suspended on piers existed; parts of the tracks were actual bridges.[107]

Apart from the presumed pile-bridges integrated in the long distance corduroy roads, individual bridges can be included in different categories according to their *building technique and material*. The wooden structures that employed piles were definitely the most frequent across the voivodeship.[108] However, only one clear mention of a *pons sublicius* ("bridge resting upon piles") is known in Transylvania, namely the one in Alba Iulia – *Portus*, which presumably crossed the Mureș River.[109] However, given the width of the river in that area and the need for a navigation channel clear of obstacles, the presence of a bridge that would rest in the actual riverbed is peculiar, because it could potentially hinder the water shipments. Whether some parts of it were mobile or not remains a subject for debate but one must note that the building technique of mixed structures was already known during the late medieval period.[110]

Besides ferries, some of the bridges crossing large water bodies were probably floating ones.[111] The two structures which functioned at the same time on the Olt River in Hăghig and between Belin and Măieruș appear to be ferry crossings. In 1512, the earliest preserved document describing a litigation between the Hídvégi family and the

[105] The structure was also recorded by John Óvary in 1678 (CS VII, 368).

[106] *Pontium in nemore*, *paraverunt pontes in Prahowa 200 cubutus*, *pontes ultra paludes* (see Tab. 1).

[107] The distances covered by corduroy roads varied depending of the need for building and upkeep. Between Codlea and Șercaia segments that measured 180 *ulnae* (cubits) or 560 cubits (*maiores*) were repaired at the middle of the sixteenth century. Between the Timiș and Prahova Valleys 200 cubits (1 cubit = cca. 0,45–0,68 m) of road were paved in 1547 (See Tab. 1). During the seventeenth century the corduroy segment in the Șercaia – Perșani region was two miles long (CS VII, 368). If the traveler John Óvary referred to the Transylvanian mile, then the distance was around 25–30 kilometers. For information on the seventeenth century Transylvanian mile, see: Nicolae Stoicescu, *Cum măsurau strămoșii. Metrologia medievală pe teritoriul României* (București: Editura Științifică, 1971), 98–99.

[108] A frequent representation in late medieval iconography. For example, the pile-bridge from Bazna (Mediaș Seat) was depicted on the altar of the church in Târnava, dated to 1485. According to this image it was a simple platform, with no side rails and rested upon piles which were reinforced with braces. See Hermann Fabini, *Sibiul Gotic* (București: Editura Tehnică, 1982), 31; Rusu, *Castelarea carpatică*, 179.

[109] 1585: CS III, 158.

[110] A relevant example for such a technical solution is the *pons-levis* located across the Someș and outside the fortification of Satu Mare. In 1574 it was described as a long wooden bridge with a mobile platform at its end, built for defensive purposes (CS II, 444).

[111] These were recorded in connection with military campaigns: Mircea Rusu, *Podurile de-a lungul timpului* (București: Editura Tehnică, 1988), 22, 25. Some were archaeologically researched: the Drávatamási (Hungary) bridge, dated at the beginning of the seventeenth century: Tóth, "Adatok," 880.

church in Belin over the rights to hold and manage a crossing point in the area refers to the structures as "ships": *magnae naves transvadales*, in the property of the church, and *parvae naves asseribus tectas*, managed by the noble family.[112] The smaller one consisted of small boats covered with planks, probably in the form of a platform. Even though the descriptions suggest ferries, the presence of a floating structure that connected both banks can also be considered, especially if one assumes that the toponym "Hăghig" referred to a road which ended in a bridge.[113] The later sources clearly record bridge structures in both locations. Moreover, the crossing between Măieruș and Belin is represented on the *First Military Survey* as a floating bridge resting upon boats and is considerably larger than the second one (Fig. 3/2), displaying the same difference in size as in the late medieval period.

Another type of semi-mobile river crossing, mainly with defensive purposes, is the drawbridge (hinged platform which can be raised), recorded as *pons pensilis*, *pons czwg* (both forms related to the Brașov town fortification as previously explained)[114], *pons tractilis*/*tracticius*[115] and *pons-levis*. The upper platforms were made of wood but the infrastructures were often built in stone. This was revealed by the archaeological research in castles, where bridges were associated with moats and ditches. Such structures guarded access into the fortifications from Florești (Cluj County), , Tăuți (Alba County), Subcetate, Deva (Hunedoara County), Turnu Ruieni (Banat) and, in some cases, such as Coronini, Mehadia (Banat), Oradea, Șinteu (Bihor County), Șoimoș (Arad County) the supporting pillars were preserved until present day.[116]

The aspect of stone river crossings connected to active water bodies is mostly known from iconographic sources.[117] In the former Hungarian Kingdom few medieval bridges supported by masonry arches are known[118] but none was yet recorded in Transylvania. Only one vague mention in the accounts of Brașov speaks of the construction of an arch close to Prejmer and associates it with an engineered river crossing, hence the possibility of interpreting it as an element of the bridge's infrastructure. In 1545, 25 forints were paid for the *arcis et pontis ultra Forkas wago* next to Prejmer[119] and, given the sum, this was probably a building activity or at least an extensive repair.

Bridges were recorded with higher frequency at the end of the medieval period. At the same time, the account registers of the town administrations show a slight change

[112] The litigation was almost continuous at least until 1561: SzOkl VIII, d. 135, 235–238; ANR BV-F-00001–1–465/486/489, accessed June 5, 2017; ANR BV-F-00001-02–1–296, accessed June 5, 2017.

[113] Based on the toponym the presence of a bridge in the area can be dated as early as 1332 (EO II, d. 1080, 393).

[114] See previous reference and Tab. 1.

[115] QKron III, 293.

[116] On this topic, see Rusu, *Castelarea carpatică*, 179–180.

[117] For example one panel of the early sixteenth century altar from the Lutheran church in Dupuș (Mediaș Seat) displays such an example, see: http://www.medievistica.ro/cataloage/cultura_mat/element.php?idprod=138, online iconographic catalogue, accessed June 24, 2017.

[118] Szilágyi, *On the Road*, 90–91.

[119] QKron III, 334.

in the building material as the number of mentioned stone bridges increased. For the fourteenth and fifteenth centuries only two stone bridges are known, whereas for the sixteenth century at least five more were identified in the written sources.

Besides the construction in Vama Marga[120], for which the stone structure is just an assumption which calls for solid evidence, a certain stone bridge was mentioned in a perambulation from 1307 near Oiejdea (Alba County), across the Galda River.[121] The chances for this construction to be an actual Roman relic are high, if one takes into consideration a charter reference to a *via lapidea* present in the same area and dated one decade earlier.[122] Another stone bridge (*lapidum pontem vulgo Keohyd vocatum*) was located in the same micro-region, on the road connecting Bucerdea Vinoasă and Craiva, across the Craiva Stream (*Kiralpataka*).[123] Despite the later dating of the charter (1590) the structure might have medieval origins but this hypothesis also calls for further evidence. The same situation can be noted for a stone construction (*keohid*) located on the outskirts of the urban settlement of Cluj, mentioned in 1603.[124] The bridge was part of the main road connecting Cluj to *Monostor* (today Cluj-Mănăștur) across the Valea Popii Stream. One must at least regard the necessity of a wooden structure that functioned during the entire medieval period, if not, a possible earlier dating of the stone bridge.

Out of the bridges dated to the sixteenth century, the earliest to be recorded was located on the road which connected Sibiu to the salt mine in Ocna Sibiului. The 1507 account registry connected it to a road[125] and the representation on the *First Military Survey* of a stone bridge is obviously located on the trajectory of what might be the former Roman road that lead to the salt mines (Fig. 3/3).

For the earlier bridges found across riverbeds an antique origin was generally accepted because they were located along former roads, and because, except for repairs, almost no building activity was documented during the Middle Ages for stone structures. On the other hand, in the sixteenth century the notes on the work related to stone bridges also included data on their construction.

For instance, a stone river crossing was located in the *Blumenau* suburb in Brașov, next to the leprosy. It crossed the *Tymes Graben* (a regulated and channeled secondary branch of the river) and can be observed as such on the *First Military Survey* (Fig. 3/1). The first mention of a bridge in the area is dated to 1520 and several records speak of the use of wood for its construction and repair.[126] However, in 1527, an entry in the account registers lists the sum paid for *8 vecturis ruderum ad pontem lapideum* (*asp. 16*)[127], needed

[120] See the previous discussion with bibliographic references.
[121] EO II, d. 71, 56–57.
[122] 1299: EO I, d. 589/13, 339. Moreover, the imperial Roman road was documented in the area as well.
[123] ErdKjkv, d. 774, 282–284.
[124] SzabóKM, 465.
[125] QSiebRech, 476.
[126] QKron I, 274, 348, 435; QKron II, 44.
[127] QKron II, 43.

for building or, more likely, for paving the road in its vicinity.[128] The main piece of information however, actually testifies to the existence of the stone construction.

This was also the case for the *Nagÿ hÿd* or *keo hyd* in Cluj. Its building started prior to 1580, the year of its documentary mention as an unfinished structure. The new feature was meant to replace the derelict wooden bridge across the Small Someș.[129] Furthermore, a special mention was made in the protocol of the town council, namely, that the wood from the previous crossing should be reused for building a bridge in the Chinteni Valley or, if needed, for other future constructions.[130] This type of intervention and change of material durability is understandable if one assumes that it was the main bridge of the town, which connected the two river banks[131] and a central point in which all the trade routes of the area converged.

The majority of the *building material*[132] used for the analyzed bridges was wood. A variety of wood types and timber components were employed but other types of material were also used, such as stone, clay or iron. Each type was used for different parts of the bridge structure or for their surrounding anthropic features. Their quantity, provenance, and price were systematically recorded by the account registers of the medieval towns.

The terminology used for the timber components is the richest. These were either named with Latin or German terms: *magna ligna*, *Wandtruden*, *Swellen* or *Dylen* ("large beams", "tree trunks")[133], *frondes, Latzen* or *Kefferholcz* ("laths", "slats", "duckboards")[134], *asseres* ("planks")[135], and *rami* or *virgulis* ("branches").[136] The supporting structures were obviously made of large tree trunks, while for the upper structures slats, planks and duckboards were used.

The trodden surface was probably covered with additional material such as smaller branches or hay (*palea*) but at the same time these were connected to the upkeep of road tracks in the vicinity of bridges and of street surfaces inside settlements. Gravel (*lapilli*, *ruderum*, *saxifragis* or *Gerell*)[137] probably served the same purpose, and so was clay (*argilla*)[138], as these two types of material were often transported near bridge locations, for the consolidation of the road at the two extremities of the constructions.

[128] An entry from 1545 used a plural form showing that more than one bridge was located in the area (QKron III, 287).

[129] This one was still being repaired in 1570 (SzabóKM, 460).

[130] SzabóKM, 463, 465. This secondary building activity was postponed, until the completion of the *keo hyd*.

[131] One ford crossing existed on the Cluj-Mănăștur estate (Toda, "Căi de comunicație," 265).

[132] For the Saxon towns only a selection of the relevant data regarding the construction material was included in Tab. 1.

[133] QKron I, 237, 638; Otto Dahinten, *Geschichte der Stadt Bistritz in Siebenbürgen* (Köln – Wien: Böhlau Verlag, 1988), 359; Băldescu, *Transilvania medievală*, 135.

[134] Băldescu, *Transilvania medievală*, 135.

[135] SzOkl VIII, d. 135, 235–238; QKron I, 229, 245.

[136] QSiebRech, 476.

[137] QKron I, 235, 252, 302, 303, 312; QKron II, 43.

[138] QKron I, 251; Dahinten, *Geschichte Bistriz*, 451.

One record from 1529 refers to sand (*harena*) and limestone (*calcis lapidum*), known ingredients for mortar, which were transported to the location of the *pons porticae* in Brașov thus, suggesting the execution of some sort of masonry work connected to the structure.[139]

The entire wooden structure was held together with the help of nails of various sizes (*clavis magni*, *gyr Negell*, *brecken Negell*) that were in high demand for this type of work during the sixteenth century.[140] Additional fastening was done by using iron fittings (*laminis ferri*)[141] and iron tools (*instrumenta*) were especially requested for the woodwork.[142]

The quantities of building material varied and so were the prices paid for them which depended on the size of the structure, the degree of ruin, the need to build a completely new bridge or just to mend minor problems. The latter situation was recorded on a yearly basis for bridges found on the medieval urban streets or on the major trade routes of Brașov. Large sums (compared to those required for the simple bridges) were paid for the building material and the actual repair work of corduroy roads.[143] Prior to these activities individuals were contracted to examine the state of the bridges and timber road in these woodland areas. There is evidence for the payment of repair sums that followed the contracting and payment of a road inspection.[144]

Due to traffic, usually, bridges suffered small but constant damage which can be regarded as basic. At times maintenance work was done and preventive measures were taken against floods, as for example, the purging of the channels and the reinforcement of the banks and water beds near and under the bridges.[145] However, floods could not be avoided every time and in some instances reconstruction work followed the damaging weather events. One knows of several such cases in Baciu, Gușterița, Cârța, Var, or of the floating bridge on the Olt River.[146]

Generally, most of these problems were avoided as certain communities were commissioned with the maintenance and repair of roads and bridges. Apart from the well known Saxon communities involved in this type of work (Codlea, Șercaia, Dumitra, Râșnov, Cristian, Vulcan, Vințu de Jos), others are known in Bihor County[147]

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139 QKron II, 135.

140 QKron I, 251, 305; QKron II, 47; QKron III, 356, 358; Samuel Goldenberg, *Clujul în secolul XVI* (București: Editura Academiei Române, 1958), 80. For example, a clay paved road was archaeologically documented in Szentkirály (Hungary): Edit Sárosi, *Deserting villages – emerging market towns. Settlement dynamics and land management in the Great Hungarian Plain 1300–1700* (Budapest: Archaeolingua, 2016), 110–111, Fig. 52.

141 QKron II, 49; QKron III, 169.

142 SzabóKM, 460.

143 The entries in Tab. 1.

144 1542, *exploratores*: QKron III, 182.

145 QKron II, 154.

146 1540: ANR BV-F-00001–1–434, accessed June 20, 2017. Rarely, violent human actions were also recorded as the root cause of bridge destruction (Chendu, Tab. 1).

147 David Prodan, *Iobăgia în Transilvania în secolul XVI*, vol. I (București: Editura Academiei Române, 1968), 78.

or in the Feleac Forest, near Cluj.[148] In the case of urban centers, aside from the costs bared by the entire community, private individuals sometimes made voluntary donations for bridge repair[149] while others were assigned to this duty by the town magistrates[150], proving once again the high degree of involvement specific to these towns.

General conclusions and outlook

Even in the absence of easily retraceable field evidence for bridge structures, the written data alone contributes to the formulation of preliminary deductions on the topic. The present research was able to reach conclusions on the association of bridges to certain economic and administrative developments from late medieval Transylvania and also generated ideas on the particular aspects of better documented structures. Out of the approximately 109 identified bridges the highest number was located inside, next to, and around the most important settlements of the voivodeship. Their uneven spatial distribution is only partially due to source availability and relevance. It also reflects the higher involvement and regional control of the Saxon communities in the administration of the road network.

The thorough investigation of archival evidence is compulsory for a targeted field research and predictive modeling of the landscape elements. It provides clues for the existence of features that, if still present, are poorly preserved and hard to trace compared to the actual medieval sites. Furthering the study of bridges – and of other types of water crossings in general – is a task for landscape reconstruction on a micro-regional level, by correlating the aforementioned features with the road and settlement systems they were part of.

ASPECTE ECONOMICE ȘI MATERIALE PRIVIND PODURILE MEDIEVALE TÂRZII DIN TRANSILVANIA: SURSELE SCRISE

Rezumat

Analiza datelor arhivistice existente în legătură cu podurile medievale târzii ale Transilvaniei este punctul de pornire în repertorierea acestor tipuri de elemente ale sistemului rutier. Mai mult, informațiile referitoare la aspectele lor economice și fizice sunt extrem de variate și ajută substanțial la formularea unor concluzii în legătură cu structura, rezistența, administrarea și eficiența economică a podurilor. Ele s-au păstrat în special în documente de cancelarie, registre de cheltuieli sau jurnale de călătorie, tipuri de surse cu o reprezentare inegală pentru diferitele zone ale voievodatului.

Cu toate acestea, pe baza lor se pot trage concluzii în legătură cu localizarea, adesea foarte exactă, a multor amenajări, cu materialul utilizat în construcție, aspectul, maniera tehnică de realizare. Episoade legate de distrugeri, cheltuieli și acțiuni de întreținere sau venituri generate au fost deopotrivă consemnate documentar. Unele aspecte amintite pot fi abordate și prin

[148] DRH C XV, d. 204, 331–332.

[149] 1531, Cluj: KmJkv II, d. 4358, 532.

[150] 1578, Cluj–Baciu: SzabóKM, 471; 1590, Cristian: ANR SB-F-00001–2–2–2, accessed June 20, 2017.

studierea apelativelor medievale ale podurilor sau a toponimelor dezvoltate ca urmare directă a prezenței amenajărilor în puncte de trecere a râurilor.

Problematizări specifice acestei tematici țin de posibila reutilizare a unor poduri presupus romane din piatră și de realitatea medievală constantă a construirii podurilor din lemn, care, potrivit datelor documentare, încep să facă loc construcțiilor din piatră abia în secolul al XVI-lea. Anumite amenajări ies în evidență din perspectiva fondurilor substanțiale care sunt asociate întreținerii și funcționării lor și care le pun în directă legătură cu facilitarea transportului de sare din Transilvania înspre centrul regatului maghiar. Poziția strategică a altor poduri poate fi dedusă pe baza înregistrării de litigii succesive pe tema controlului, ori a abuzurilor realizate în administrarea lor. Implicarea continuă a administrațiilor săsești în menținerea podurilor în stare de funcționare indică, pe lângă costurile și materialele utilizate, o ierarhizare a amenajărilor discutate, a drumurilor, dar și a așezărilor. Registrele de cheltuieli ale orașelor germane reprezintă categoria de surse care permite cele mai solide estimări ale densității podurilor în teritorii mai restrânse pentru perioada de final a Evului Mediu.

Table 1. Transylvanian medieval bridges according to written sources: economic and physical aspects.

ID	Settlement/estate/ road segment	Medieval administrative unit	Watercourse/ landmark	First mention	General economic aspects	Physical aspects and material resources	Document edition/ abstract
1	Archid	Middle Solnoc c.	Coşeiu River or a tributary	1376	–	–	DRH C XV, d. 8
2	Derşida	Middle Solnoc c.	Crasna River	1349	–	–	Suciu, *Dicţonar* I, 197
3	Măierişte	Crasna c.	Crasna River	!1217/ 1351	bridge toll	–	EO I, d. 90/DRH C X, d. 83
4	*Bőnye/Benie*	Crasna c.	Zalău River	1327	–	*pons antiqus*	EO II, 592
5	Recea-Meseşenii de Jos	Crasna c.	Colişca River	1526	–	–	KmJkv II, d. 4136
6	Beclean	Inner Solnoc c.	over the southern branch of Great Someş	1524	–	–	KmJkv II, d. 3992–3
7	Gherla	Inner Solnoc c.	Someş or Fizeş River	1291	toll	–	EO I, d. 465
8	Bistriţa	Bistriţa d.	defensive moat (*porta Crenwaldt*)	1486	1505, 1518 repair	*pro lignis* (20 den., 1,32 fl., 34 den., 1,40 fl.)	Dahinten, *Geschichte Bistritz*, 359
9	Bistriţa	Bistriţa d.	defensive moat (*porta Hungalicalis*)	1488	1518, 1521 repair	*pro lignis* (69, 36, 24 den.)	Dahinten, *Geschichte Bistritz*, 359–60
10	Bistriţa-Sărata?	Bistriţa d.	*circa mons Zeret*	1521	repair expenses	2 fl.	Dahinten, 360
11	Var	Middle Solnoc/ Dăbâca c.	Someş or Almaş River?	1496	toll leasing 1492 and 1505	destruction; maintenance fund 1496 (150 fl.)	Kiss, "Floods," cat. 9.5.10.3; KmJkv II, 3345

ID	Settlement/estate/ road segment	Medieval administrative unit	Watercourse/ landmark	First mention	General economic aspects	Physical aspects and material resources	Document edition/ abstract
12	Bonţida	Dăbâca c.	Small Someş River	1321	toll (bridge, repair funds, 1576-*pontibus super fluvium Samusum, ad oppidum... Bontzhyda*)	100 fl./year for the repair of several? bridges (*ferratium et constructum*)	EO II, d. 409; ANR CJ-F-00320–1–2–1b–1–2
13	Feldioara	Dăbâca c.	Feldioara or Copru Stream?	1591	–	–	ANR CJ-F-00423–1–373
14	Sântioana	Dăbâca c.	stream and swamp (*Zaruastho*)	1347	–	*pons longus*	WassLt, d. 84
15	Apahida	Cluj c.	Someş River or a southern tributary	!1296/ 1326	traffic toll	–	EO I, d. 549; II, d. 569
16	Hida	Cluj c.	Almaş River	1333	–	–	EO II, d. 1067
17a	Cluj-*Nagÿ hÿd*	Cluj c.	one branch of Someş River? (*porta pontis*)	1362	1570 repair; dilapidated	*instrumenta* (A. *faber ferarius*);	DRH C XII, d. 96; SzabóKM, 460;
17b	Cluj-*keo hyd*	Cluj c.	Someş River channel (*porta pontis*)	1580	ongoing construction (1580)	*keo hyd* (1580, possibly a few years earlier)	SzabóKM, 463, 465
18	Cluj	Cluj c.	defensive moat (*Thorda ucza*)	late 16th c.	repair/construction	iron nails (A.K. *faber*)	Goldenberg, *Clujul*, 80
19	Cluj	Cluj c.	defensive moat (*media porta*)	1573	collapsed?, repair plans	–	SzabóKM, 466
20	Cluj	Cluj c.	inner channel? (*Ispotal hÿd*)	1573	–	–	SzabóKM, 462
21	Cluj-Baciu	Cluj c.	Nadăş or Popeşti? Stream (*Hegyes domb*)	1570	–	–	SzabóKM, 459

ID	Settlement/estate/ road segment	Medieval administrative unit	Watercourse/ landmark	First mention	General economic aspects	Physical aspects and material resources	Document edition/ abstract
22	1? × Cluj–Baciu	Cluj c.	Nadăș River	1570	1570, 1578 collapsed; repair plans	wood	SzabóKM, 453, 471
23	2 × Cluj–Bekas	Cluj c.	Becaș Stream (*Zappanuca*)	1562	1570 repair/ construction	wood?	SzabóKM, 453
24	2? × Cluj–Chinteni	Cluj c.	Chinteni Stream (*Cayanto*)	1570	1570 repair; 1580 delayed construction	*lignis ad pontem* (1570); reused wood of the old Someș bridge, new *keo hyd* (1580)	SzabóKM, 453, 463
25	north-east of Cluj	Cluj c.	small stream? (*Sz. Gy. hegy*)	1578	upkeep work required	footbridge	SzabóKM, 477
26	Cluj–Cluj-Mănăș-tur	Cluj c.	Popii Valley? (*Monostor vcza*)	1603	–	*keohid*	SzabóKM, 465
27	Cluj–Feleacu ("middle bridge")	Cluj c.	small stream	1584	–	–	Prodan, *Iobăgia* II, 738
28	Cluj-Mănăștur–Florești	Cluj c.	Gârbău Stream	1417	–	–	ZsOkl VI, d. 1266
29	Pruniș	Cluj c.	stream near the *curia*?	1525	–	–	KmJkv II, d. 4129
30	Fildul de Jos–Fildul de Mijloc (*Haromfyld*)	Cluj c.	stream *Dragnahpathaka* (*pons Dragnahyda*)	1451	–	–	ANR CJ-F-00546–2–86
31	Podeni	Turda c.	stream?	1291	–	–	EO I, d. 478
32	Păgida	Aiud s.	Mureș River?	1343	–	–	EO III, d. 157
33	Oiejdea	Alba c.	Galda River	1307	–	*pontem lapideum Woiasd*	EO II, d. 71

ID	Settlement/estate/ road segment	Medieval administrative unit	Watercourse/ landmark	First mention	General economic aspects	Physical aspects and material resources	Document edition/ abstract
34	*Fahíd* (Galda area)	Alba c.	Mureș River or a tributary?	!1277 (19th c.)/ 1321	–	wood	EO I, d. 353/EO II, d. 399
35	Benic	Alba c.	Cetea Stream	1337	–	–	EO II, d. 939
36	Bucerdea Vinoasă-Craiva	Alba c.	Craiva Stream (*Kiralpataka*)	1590	–	*lapideum pontem/ Keohyd*	ErdKjkv, d. 774
37	Alba Iulia	Alba c.	Mureș River (*Portus*)	1585	–	*ponte sublicio*	CS III, 158
38	Vințu de Jos-Vurpăr	Alba c.	Mureș River	1289	traffic toll; tax deduction for construction and upkeep (1393)	–	Ub I, d. 227; Ub III, d. 1308
39	Bârsău	Hunedoara c.	stream	1591	–	–	ErdKJkv, d. 851
40	Tătărăști	Hunedoara c.	stream in the Mureș floodplain	1418	–	–	ZsOkl VI, d. 2035
41	Vama Marga	Banat c.	Bistrița River (or a tributary)	1439	traffic toll; upkeep and repair (before 1439 until the 17th c.)	stone?; 500 salt blocks/1 salt *tumen*	CD XI, d. 162; Rusu, "Pons Augusti," 249–50
42	Orăștie-Șibot?	Orăștie s.	Romoș Stream?	1591	–	–	ErdKJkv, d. 848
43	Răvășel	Șeica s.	Metiș or Chijesii Stream	1394	–	*pontem unam curiam*	Ub III, d. 1319
44	Bazna-Blăjel	Mediaș s.	stream?	1345	–	–	EO III, 263
45	Boian-Bazna	Mediaș s.	*Egerespotaka*	1372	–	–	Ub II, d. 985
46	Valchid-Hoghilag	Mediaș s.-Sighișoara s.	Târnava Mare River	!1343 (1548–1550)	–	–	EO III, d. 123

ID	Settlement/estate/ road segment	Medieval administrative unit	Watercourse/ landmark	First mention	General economic aspects	Physical aspects and material resources	Document edition/ abstract
47	Valchid-Hoghilag?	Mediaș s.– Sighișoara s.	Târnava Mare River?	1494	repair?	6 fl. (*pro ponte*)	QSiebRech, 176
48	Laslea-Daneș	Sighișoara s.	Târnava Mare River tributary	1393	–	–	Ub III, d. 1298
49	Hosman	Nocrich s.	Hârtibaciu River?	1494	repair (1494-1496)	1/1/3 fl. (*reformatione/ preparatione/ fabrica* 1494); 3/6/2 fl. (*preparatione* 1495-1496)	QSiebRech, 164, 173-4, 176, 212-3
50	Agnita	Cincu s.	Hârtibaciu River?	1494	repair?	6 fl. (*pro ponte*)	QSiebRech, 175
51	Merghindeal	Cincu s.	Hârtibaciu River tributary	1494	repair?	6 fl.	QSiebRech, 175
52	Vărd	Cincu s.	Hârtibaciu River tributary	1496	?	2? × 5 fl. (*pro ponte*)	QSiebRech, 212, 220
53	Gherdeal-Șomartin	Cincu s.	Gherdeal Stream (*Pons Tiliarum*)	1302	–	*ultimus pontis*	ANR SB-F-00011–1–393
54	Cornățel	Sibiu s.	Hârtibaciu River or tributary	1509	construction?	10 fl.	QSiebRech, 501
55	Cristian	Sibiu s.	Cibin River?	1590	–	–	ANR SB-F-00001–2–2–2
56	Gușterița (*iuxta*, *infra*!)	Sibiu s.	Cibin River (*ultra*)	1494	construction and repair (1494, 1507)	2,24 fl./22,14 fl. (*pro structura/carpentarii* 1494); 1,16 fl. *(aqua diluerat* 1507)	QSiebRech, 167, 170, 478
57	Ocna Sibiului	Sibiu s.	small river	1583	–	–	ErdKJkv, d. 345
58	Sibiu-Ocna Sibiului	Sibiu s.	Cibin River or a tributary	1507	repair work for the road	*pons lapideum*; *rami*, *palea*	QSiebRech, 476

ID	Settlement/estate/ road segment	Medieval administrative unit	Watercourse/ landmark	First mention	General economic aspects	Physical aspects and material resources	Document edition/ abstract
59	Turnișor–Șura Mică	Sibiu s.	?	1549	–	–	ANR SB-F-00001–1-U4–595
60	1? × Șura Mare–Slimnic	Sibiu s.	small stream	1349, 1464?	–	–	Ub III, d. 1502; Ub, IV, d. 3385
61	Slimnic–Rușsi	Sibiu s./Alba s.	stream or small river	1575	–	–	ANR SB-F-00063–40–390
62	Vurpăr–Noul Săsesc	Sibiu s.	*Chygenbach* Stream	1350–1359	–	–	Ub II, d. 656
63	Daia	Sibiu s.	stream	second half of 14th c.	*der dy bruk macht*	19 gulden	QSiebRech, 2
64	Cașolț–Daia	Sibiu s.	Hârtibaciu River	1542	construction	2 fl. from Sibiu	ANR SB-F-00001–2–2–1
65	Cisnădie	Sibiu s.	Cisnădie River?	1591	–	–	ANR SB-F-00001–2–2–2
66	Sibiu	Sibiu s.	defensive moat (*porta beatae Elizabetae*)	1497	repair (1497, 1501)	*pro laminis ferri* 72 den. (1497); *clavis* (1501)	QSiebRech, 254, 356
67	Sibiu	Sibiu s.	defensive moat (*porta versus Heltau*)	1497	repair	*pro laminae ferri 15* 1,12 fl. (1497)	QSiebRech, 254
68	Sibiu	Sibiu s.	defensive moat (*versus leprosos*)	1501	repair	*magna ligna*; 25/4 den./1 fl.	QSiebRech, 345–6
69	Sibiu?	Sibiu s.	*ante domum Blasi Fabri*	1501	repair	*frondes*	QSiebRech, 347
70	Sibiu	Sibiu s.	defensive moat? (*Sagbreck*)	1501	repair	*frondes*, *ligna*; 20/2,68 fl.	QSiebRech, 347, 349, 353
71	Sibiu	Sibiu s.	*Spitalbach*	1572	construction and upkeep	stone bridge	ANR SB-F-00001–2–2–2

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72	Chendu	Târnava c.	Târnava Mică River	1325	traffic toll	destruction of the bridge by villagers in 1366	EO II, d. 517; Ub II, d. 847
73	Sânsimion	Mureș ș.	*Halygos* stream (*Halygos híd*)	1574	–	–	ErdKJkv, d. 226
74	Avrămești	Cristur s.	*Nagyáj*	early 15th c.	–	–	Benkő, *Keresztúr-szék*, 240
75	Ineu-Cârța	Ciuc s.	Olt River or *Csorgo* stream?	1406	flood water management	*palló* (footbridge)	SzOkl I, d. 87
76a	Hăghig	Alba c.	Olt River	1332	–	–	EO II, d. 1080
76b	Hăghig	Alba c.	Olt River	1512/ 1516	floating bridge and toll? (litigations with Belin Church and Brașov concerning the bridge at least until 1561)	*parvae naves asseribus tectas* (Hídwégi family forbidden to build a larger one not to affect the crossing in Belin)	SzOkl VIII, d. 135; ANR BV-F-00001–1–465/486/489; ANR BV-F-00001-02–1–296
77	Măieruș-Belin	Brașov d./Alba c.	Olt River	1512/ 1516	floating bridge and toll point (litigations 1512-1561)	*magnae naves transvadales* of the church in Belin (see above ID 74b)	SzOkl VIII, d. 135; ANR BV-F-00001–1–465/486/489
78	Brașov	Brașov d.	inner channel (*pons fori piscium*)	1520	repair or construction (possibly another one from 1524)	*vectura lignorum Keffer* asp. 2; *vectura gerell* asp. 6; *gerell* asp. 4 (1521); frequent work until 1550	QKron I, 229, 252, 312, 570, 601; II-III
79	Brașov	Brașov d.	inner channel (*pons circa ospitale*)	1520	repair	*uno ligno wantrud* asp. 2	QKron I, 239

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80	Brașov	Brașov d.	inner channel (*pons fori equuorum*)	1520	repair or construction	2 × *vecturae argilae?* asp. 4; episodic work until 1550	QKron I, 251; II-III
81	Brașov	Brașov d.	inner channel (*pons oppositus plateae monialium*)	1520	repair	1 fl. 2 asp.	QKron I, 252
82	Brașov	Brașov d.	inner channel (*platea Bred*)	1520	construction	2 × *lignis swellenn et wantreuden,* 3 × *Keffer* asp. 26	QKron I, 237
83	Brașov	Brașov d.	defensive moat (*porta Corpus Cristi/ Katharinae*)	1520	repair	*vectura asseres* aps. 2; *lapillorum gerell* asp. 6*; asseres* asp. 4; *clavis* asp. 34 (1521); *pons czwgg*; episodic work until 1550	QKron I, 245, 248, 304-5; II-III
84	Brașov	Brașov d.	defensive moat (*porta Petri/Claustri*)	1520	construction and repair	*vectura lapillorum* asp 6; *pro clavis ad pontem* asp. 3 (1520); *lapillorum gerell lapillis saxifragis* asp. 20; *melioratione* 9/16 asp. (1521); *gerell* 10/16 asp. (1522); *pons czwgg* (1523); frequent work until 1550	QKron I, 235, 251, 302-3, 317, 319, 405, 407, 487; II-III

ID	Settlement/estate/ road segment	Medieval administrative unit	Watercourse/ landmark	First mention	General economic aspects	Physical aspects and material resources	Document edition/ abstract
85	Brașov	Brașov d.	defensive moat (*cica porta Portice*)	1521	repair	24/10 asp.; *asseres* asp. 2; *parvus pons*, 16 asp.; *pons pensilis* (1528); frequent work until 1550	QKron I, 302–4, 380, 548; II, 135
86	Brașov	Brașov d.	channel in *Forrum Civitatis* (*pons lÿgen*)	1523	repair?	3 × *vectura lapillorum gerell* asp. 6	QKron I, 498
87	Brașov	Brașov d.	*extra muros*? (*pons super anger/angÿr*)	1527	repair or construction	*magno ligno* asp. 5; middle of the16th c.	QKron II, 50; III
88a	Brașov	Brașov d.	*extra muros* (*pons propre leprosos*; in *Blumenau*)	1520	construction; repair	*pro trabibus magnis quercinis* 16 fl. 5 asp. 46; *carpentariis pro labore* asp. 36; *reformatione* asp. 34/32 (1521 and 1522); *ligna* (1527)	QKron I, 274, 348, 435; II, 44
88b	Brașov	Brașov d.	*ultra Tÿmes channel* (*pons circa leprosos; ultra Tÿmes*)	1527	repair for road	*pro 8 vecturis ruderum ad pontem lapideum* 16 asp.; 2 × *pontibus* in 1545	QKron II, 43; III, 287
89	Brașov	Brașov d.	*Grafft* Stream *circa portae corporis Christi* (*extra muros*)	1524	repair?	*2 vecturis asserum de ponte* asp. 3	QKron I, 548
90	Sprenghi	Brașov d.	Ghimbășel River tributary (*scaturigines*)	1523	repair	*melioratione*	QKron I, 521; II 416, 586
91	Bartolomeu	Brașov d.	small stream	1545	repair	*pons parvus*, *clavis*; 1546	QKron III, 286, 356

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92	Braşov-Feldioara	Braşov d.	Bârsa River	1520?/ 1542	construction? and repair	*pro ligno quercino* 4 asp. (1520); 1 fl. in 1542 (*melioraverunt*)	QKron I, 276; III, 181
93	Hălchiu	Braşov d.	Bârsa River (*versus Foldvar*)	1533?/ 1603	construction	23 fl.; *melioraverunt* (1542)	QKron II, 325; IV, 162; III, 181
94	Braşov-Hălchiu	Braşov d.	Ghimbăşel River	1533	construction and maintenance	*facerunt de novo* (from wood, 1533); *paraverunt in pontibus* in 1545; *pontes ultra paludes* (1547), etc	QKron II, 324; III, 263; 397
95	Braşov-Hălchiu	Braşov d.	*Lauterbach* Stream (in Stupini)	1520	construction, repair	8 fl., same amount in 1522; *parvus pons* (1523); frequent work until 1550	QKron I, 287, 459, 533; III, 167
96	Braşov-Hărman	Braşov d.	stream (*novi pontis in via Herman*)	1534	upkeep	1 fl.; 1546	QKron II, 350; 358
97	Braşov-Sânpetru	Braşov d.	*ultra Tÿmes* (*novum pontem*)	1545	construction	*clavis*; 1546	QKron III, 358
98	Braşov-Prejmer	Braşov d.	*Tÿmes*?	1546	repair	construction material; two bridges in 1549	QKron III, 286, 358; 517
99	Prejmer	Braşov d.	Prejmer River (*Forkas wago*)	1534	construction?	4 fl.; 25 fl. for *arcis et pontis ultra Forkas wago* (1546)	QKron II, 380; III, 334
100	Braşov-Săcele	Braşov d.	*Tÿmes*?	1553	repair	10 fl. (construction material)	QKron III, 487

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101	Ghimbav	Brașov d.	Ghimbășel River	1521	repair or construction?	20 fl. (1521); *meliora-tione* (1523); episodic work until 1550	QKron I, 371, 521
102	Ghimbav-Codlea	Brașov d.	Bârsa River	1521	repair	*pro schwarden* asp. 23; *laboribus* fl. 5 (1523); *4 lignis wantruden* (1526); *laminis ferri, clavos, labor* 11,23 fl. (1542); frequent work until 1550	QKron I, 335, 533, 638; III, 169.
103	Vulcan	Brașov d.	stream (*in nemore Wolkaniensi*)	1535	construction	2/2 fl. (1535–1536)	QKron II, 430, 465
104	Codlea- Șercaia	Brașov d.	streams	1520	construction and maintenance; inspection and contracting (1521-1523)	4fl. /27fl. /12 fl. 30 asp. /4 fl. in 1520 (*pontium in nemore* fl. 27); 10 fl., 12 fl. 25 asp. in 1521; 1542 (*paraverum pontem*); segment length *180 ulna* or *560 cubitus maiores*; frequent work until 1550; description 1574	QKron I, 272-4, 345, 352, 528; III:209, 323; CS II, 432
105	Șercaia	Brașov d.	Olt River	1568	permission for building a bridge and a toll	wood	ANR BV-F-00001–1–509
106	Făgăraș	Făgăraș Land	defensive moat	end of 16th c.	-	long bridge	CS III, 671

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107	Șercaia-Perșani	Brașov d./Făgăraș Land	mountain rivers and streams (*pons heremitam*, *ultra fl. Dobraÿn*)	1533	construction and maintenance	15 fl. (*paraverum pontem*) in 1542 and 1545; description 1574	QKron II, 323; III, 169, 272; CS II, 432
108	Brașov-Timișul de Jos	Brașov d.	Timiș River, streams	1547	construction and repair	*paraverunt pontes in Prahowa 200 cubutus,* fl. 6 (corduroy)	QKron III, 397
109a	Bran-Rucăr	Brașov d.	mountain streams and springs (*Piatra Craiului*)	1521	construction/ repair	1532 (33 fl.) 1541 (14 fl. 36 asp.); *exploratores* (1542); frequent work until 1550	QKron I, 356; II, 276; III 124, 182, 409
109b	Bran-Rucăr	Brașov-Wallachia	mountain streams and springs	1533	toll/repair (1537)	45 fl. (one bridge?); 70 fl. (several bridges in 1537; corduroy); frequent work until 1550	QKron II, 323, 527; III

Abbreviations Table 1:
Benkő, *Keresztúr-szék* Elek Benkő, *A középkori Keresztúr-szék régészeti topográfiája* (Budapest: MTA, 1992).
Suciu, *Dicționar* I Coriolan Suciu, *Dicționar istoric al localităților din Transilvania*, vol. I (București: Editura Academiei Române, 1967).

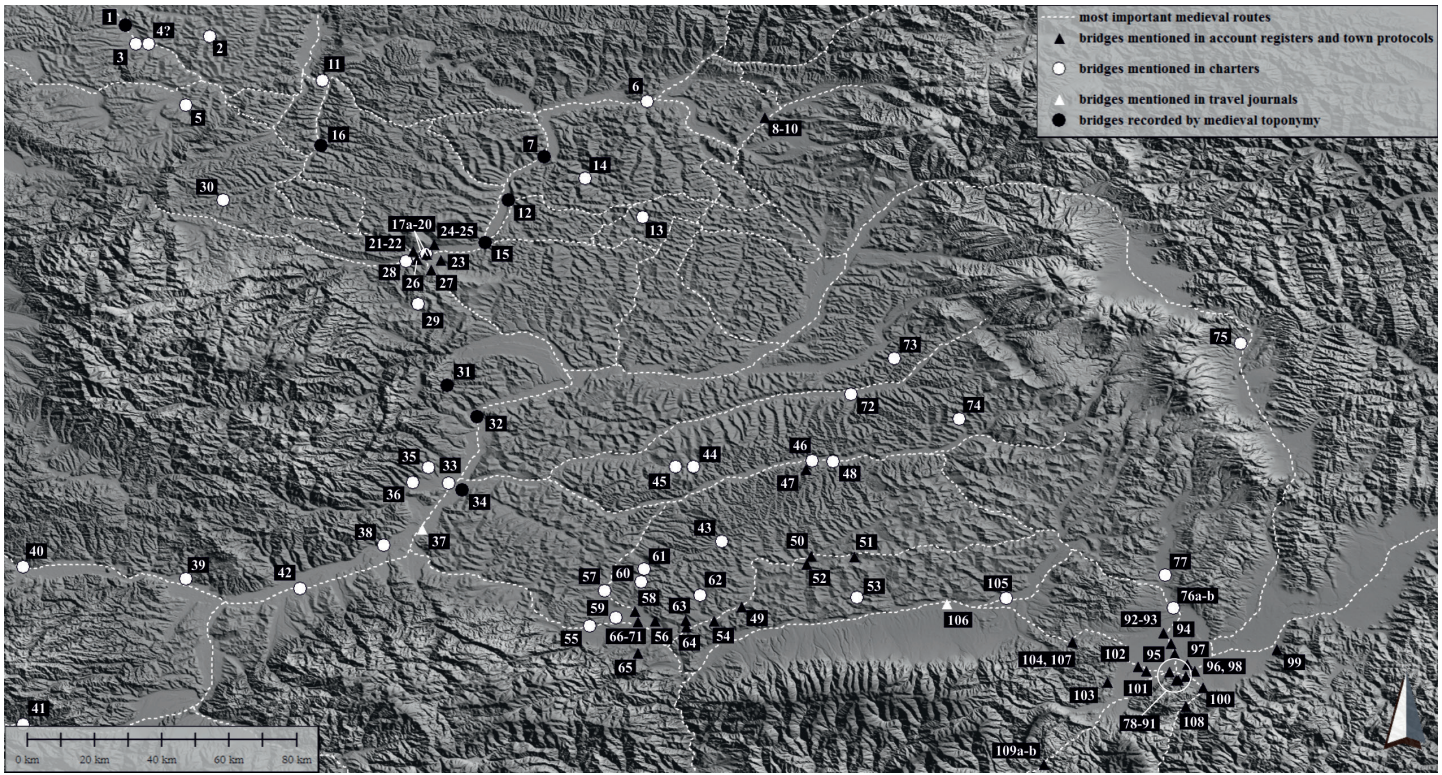

Figure 1. Map of the medieval bridges in Transylvania according to written source types (for the bridge locations corresponding to the ID list go to Table 1) / Harta podurilor medievale din Transilvania conform surselor scrise (pentru podurile corespunzatoare listei ID, vezi Tabel 1)

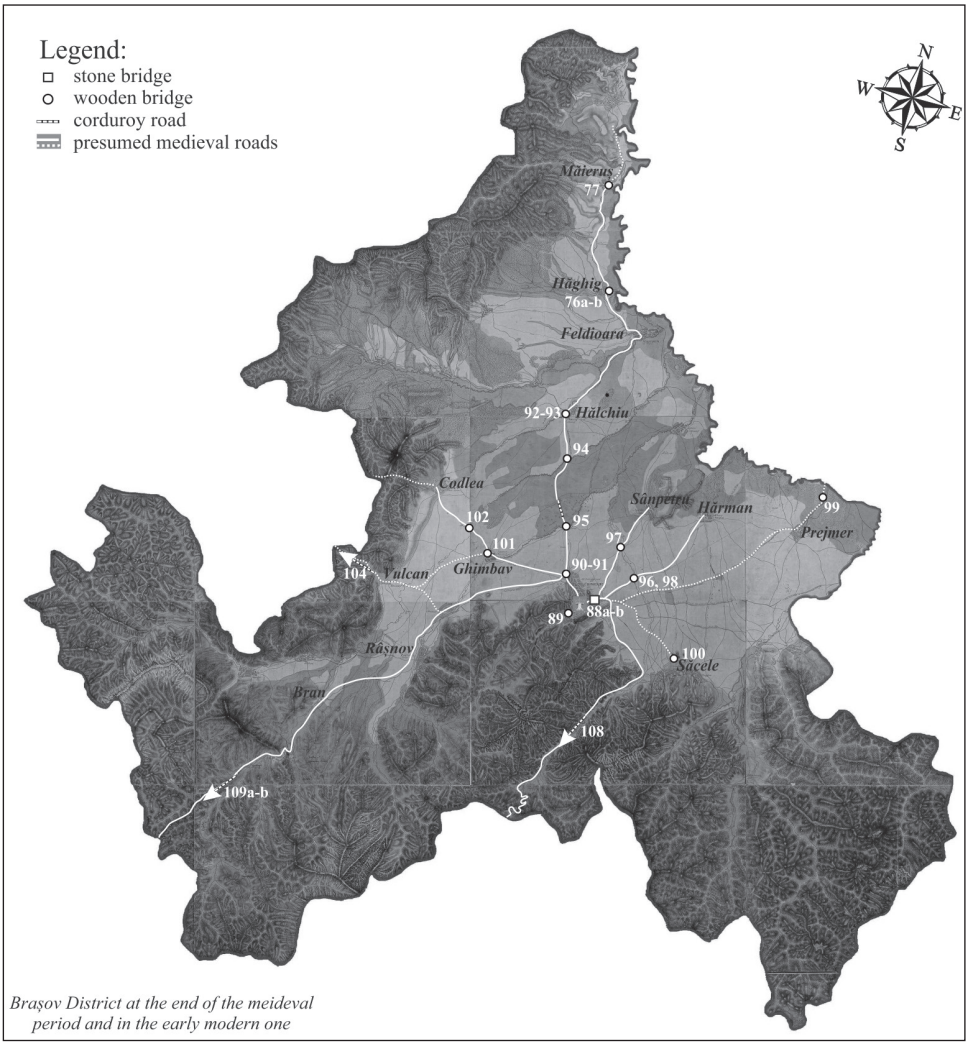

Figure 2. Map of the bridge and road network around Brașov during the first half of the sixteenth century / Harta podurilor și a rețelei de drumuri din jurul Brașovului în prima jumătate a secolului al XVI-lea (edited after *commons.wikimedia.org/wiki/File:Kronst%C3%A4dter_Distrikt-Josephinische_Landesaufnahme_1769–1773.jpg*, accessed 20 June 2017)

Figure 3. Representations of bridges with late medieval origin on the *First Military Survey of the Habsburg Empire. Transylvania (1769–1773)*: stone bridges (**1.** Braşov – Tab. 1/88b; **3.** Sibiu – Tab. 1/58; **4.** Cluj-Mănăştur – Tab. 1/77); floating bridge, probably former ferry crossing (**2.** Măieruş – Tab. 1/26), after online database *http://mapire.eu/en/map/firstsurvey/?layers*, accessed 20 June 2017 / Reprezentarea podurilor de construcţie medievală târzie, pe *Prima ridicare topografică a Imperiului Habsburgic. Transilvania (1769–1773)*: poduri din piatră (**1.** Braşov – Tab. 1/88b; **3.** Sibiu – Tab. 1/58; **4.** Cluj-Mănăştur – Tab. 1/77); pod plutitor, posibil fostă traversare cu bacul (**2.** Măieruş – Tab. 1/26), după baza de date online: *http://mapire.eu/en/map/firstsurvey/?layers*, site accesat în 20 iunie 2017