

WEATHER AND WEATHER-RELATED NATURAL HAZARDS IN MEDIEVAL HUNGARY IV: DOCUMENTARY EVIDENCE FROM 1401-1450

VRIJEME I PRIRODNE OPASNOSTI POVEZANE S VREMENOM U SREDNJOVJEKOVNOJ UGARSKOJ IV: DOKUMENTARNI DOKAZI OD 1401. DO 1450.

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Summary

The aim of the paper is to provide a first, comprehensive overview of the weather events, weather-related extremes and reported socio-economic impacts recorded in the first half of the 15th century in medieval Hungary and the Carpathian Basin, based on contemporary, mainly domestic, source evidence by providing the original texts and, when available, (Central) European comparisons. While the first decades of the 15th century are of average documentation compared to the previous century, partly also due to the better source coverage (Pressburg accounts), the years richest in weather reports are the late 1430s–early/mid-1440s forming the hardest period of the early Spörer anomaly in large part of Europe. Winter is the best-documented season by far, but occasionally other seasons are also represented. Quite independently from differences in source coverage, similar to other parts of Central Europe, the highest frequency of hard winter periods are known from the 1430s–early/mid-1440s.

Partly or entirely unintentional settlement and forest fires as potentially weather-related natural hazards can provide additional, indirect weather-related information. Although many fire events were reported in the first half of the 15th century, mostly in the second part of the study period, relatively few fires were not the result of conscious criminal or war attacks. As another indirect, coupled weather signal, bad harvests, high prices, dearth and famines, reported in the years (1414-)1415-1416, 1428 and before, 1433(-1434), late autumn 1440 and early 1442, are also discussed in a regional context and potential causes identified in the paper.

Keywords: weather, Middle Ages, Carpathian Basin, early Spörer minimum, food shortage, fires
Ključne riječi: vrijeme, srednji vijek, Panonska nizina (Karpatski bazen), rani Spörer minimum, nestašica hrane, požari

INTRODUCTION

This paper is the fourth part of the series on weather events and weather-related environmental phenomena preserved in contemporary documentary evidence in the territories that belonged to medieval Hungary, today comprising Hungary, Slovakia, South-western Ukraine, Western and Central Romania, Northern Serbia, Northern Croatia, Eastern Slovenia and Eastern Austria (previous articles: Kiss 2013, 2014, 2016). When available, source evidence from other countries of the Hungarian Crown (i.e. Croatian kingdoms) are also presented. Although in the present paper primarily weather events are discussed, evidence reflecting on potential socio-economic consequences of anomalous weather conditions, such as fires and food shortages, is also mentioned briefly. Being already published (Kiss 2019a), floods are

not discussed separately in the case studies; only the cases with reference on weather conditions were considered. Partly due to the emergence of new source types, town account books in particular, the 15th century is much richer in known weather reports than the 14th century, and this difference is at least as significant as between the 13th-14th and the 11th-12th centuries.

The current work is mostly based on domestic source evidence; the only exceptions are mainly Austrian (e.g. *Annales Mellicenses*, *Continuatio Claustroneuburgensis*, *Wiener Annalen*, *Kalendarium Zwetlense*), Polish (*Długosz*, *Callimachus*) and German (*Rothe*) annals and chronicles. As for the source types, the 15th century shows a much greater variety than the previous centuries. Still, a dominant source type is legal documentation (charters), but domestic narratives (e.g. *Bonfini*, *Kottannerin*), and from the end of the 1430s, especially town accounts, gain particular importance. Occasionally, private and official correspondence (letters) may also contain weather-related information (e.g. frozen Danube in 1431).

The temporal distribution of weather data in the first half of the 15th century is uneven but much less uneven than in the previous centuries. Less weather-related information is known from the first two decades. Most evidence deals with the second half of the 1430s and the early/mid-1440s – the period of the early Spörer solar minimum, also famous of its anomalous weather conditions – manifesting itself mainly in cold winters and cool summers, under average harvest results and food supply problems especially in Western Europe (see e.g. *Camenisch et al. 2016*). This period is the best documented because, as mentioned above, apart from charters, systematic account books – especially in Pozsony/Pressburg (Bratislava-Sk) and partly in Bártfa/Bartfeld (Bardejov-Sk) and Sopron towns – are also available. Due to the low percentage of published 15th-century documentation, this is the century when there is still more chance for finding more evidence in the future.

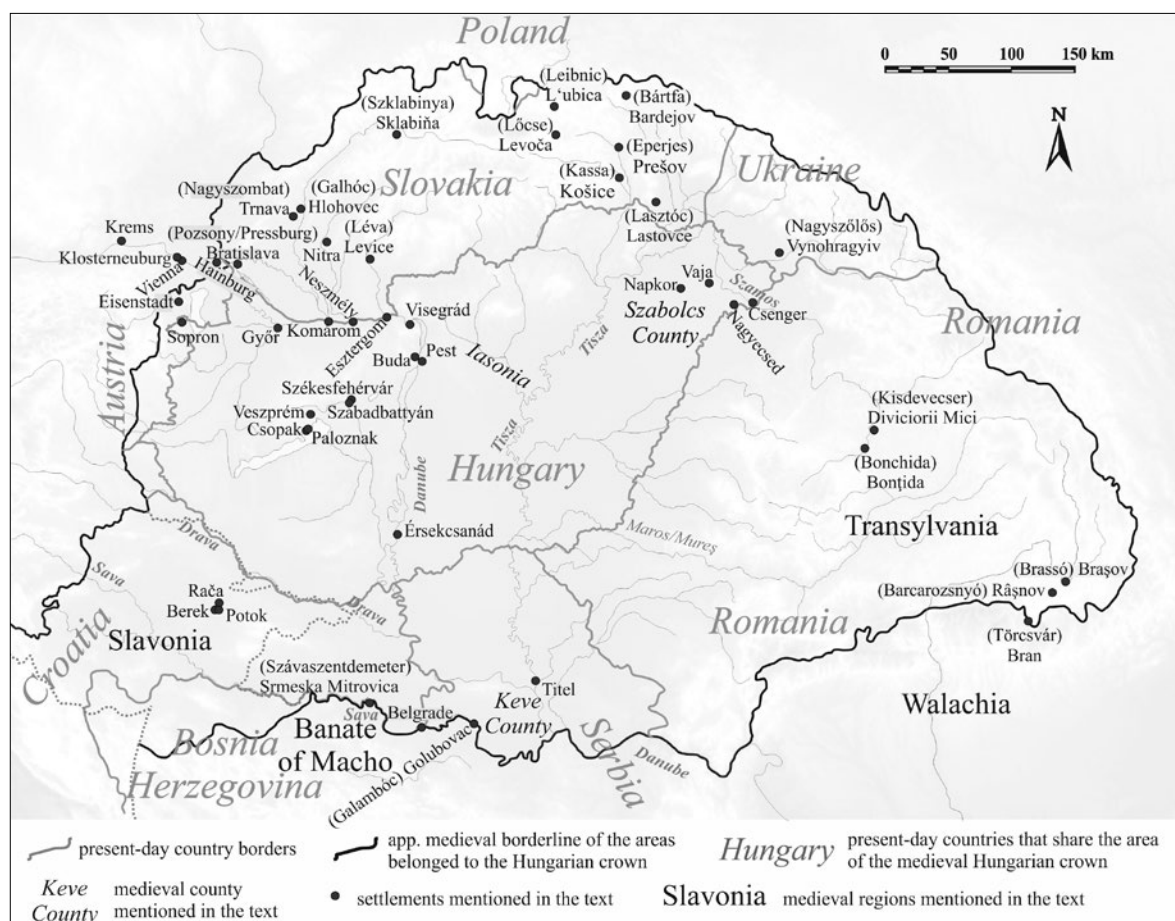


Fig. 1 Locations mentioned in the study. When applicable, historical settlement names are provided in brackets

The spatial distribution of the weather reports, just like in the previous centuries, is rather uneven: at this time, most data are from the northern, western and central parts of the country, while the weather of most of the Great Hungarian Plain and Transylvania remains without any reports (*Fig. 1*). Regarding quantity, most of the weather data, utilized in the current paper, come from the chamber accounts of Pozsony/Pressburg (Bratislava-Sk; hereafter Pressburg accounts).

The paper utilizes original, contemporary, mostly archival sources. Except for Hungary, modern official names with country codes are provided in brackets. As for datings, the original dates in Julian calendar are presented through the paper; when necessary, Gregorian dates (hereafter GC) are additionally provided in brackets.

THE YEAR 1402: DATE OF GRAIN HARVESTING

The first known weather-related information of the 15th century comes from 1402, when – during an outstandingly cruel attack by neighbouring nobles, their soldiers and serfs – peasants of Csopak and Paloznak villages (West-Central Hungary; see *Fig. 1*), with their women and children, were attacked on the field while harvesting (HNA DF 201139; regesta: Mályusz 1958, pp. 247-248).¹ The attack occurred on 7 July according to the Julian calendar; 16 July in modern (Gregorian) calendar date for an ongoing harvest (of usually mainly winter wheat, barley, rye) is around average timing compared to the traditional starting date of the harvest (around 2 July: e.g. Paládi-Kovács 2001). Next year, in 1403, there were high prices and famine in Austria (*Continuatio Claustroneoburgensis*: Pertz 1851, p. 736).

May was exceptionally warm and sunny in the western part of Germany, and the beginning of the summer was still good, but then it was wet with floods (Alexandre 1987, Buisman 2000, p. 358, Glaser 2013, p. 86). It is interesting to add that the summer was rather windy in North-east Anatolia (Telelis 2008).

WHEN THE DANUBE DEEPLY FROZE OVER: THE HARD WINTER OF 1408

The *Kalendarium Zwetlense* mentions a very hard winter that 'no one could remember' in 1408: the Danube froze over so much in Hungary, Austria and Bavaria that in Krems as well as in other parts of Austria, people carried wine and other necessities by (loaded) coaches over the ice of the Danube. Fruit harvest and sowings were expected to be destroyed in the great coldness. Nevertheless, afterwards, similarly, the *Kalendarium Zwetlense* reported on the abundance of harvested goods in 1408 (Pertz 1851, p. 697).² Disease caused high mortality in Austria in the same year (*Continuatio Claustroneoburgensis*: Pertz 1851, p. 737).

The winter was one of the hardest of the century in Europe; not only major rivers and lakes such as the Danube and the Bodensee but also the Baltic Sea froze over along its southern shores. Prolonged deep frosts were interrupted by melting that resulted in ice jam floods in Central Europe in February, amongst others, along the Upper Danube. In France, some even spoke about a winter that has not happened in the last 500 years. Amongst others, the Seine, Loire and the Garonne were reportedly frozen. Vinestocks, fruit trees and bushes were severely damaged by frost everywhere in Europe. Many people and animals (domestic and non-domestic mammals, birds, fish) died during this severe winter, from England to Prussia and beyond. The winter lasted from mid-November to mid-/late March (GC: late

¹ "... et super territoria possessionum prefati Capituli Vespremiensi Chopak et Palaznak vocatarum animo furibundo vehementem in mentes Georgium, Benedictum, Petrum et Jacobum filios Johannis filij Stephani Jobagiones memorie Capitulum ecclesie Wespremiensis in dictam eorum possessione Paloznak vocatam commorantes in Capitulum circa exercitium messis frugum et segetum ipsorum laborantes nudas tunc et inermes rapiendo et diu segetibus ipsius nudatis ensibus flexis lanceis"

² "Anno 1408 yemps frigida fuit, quod nulla meminit etas; nam Danubius per totam Ungariam et Austriam et Bavariam gelidatus fuit, ita quod in Krempsa et in omnibus partibus Austriae perrexerunt per Danubium cum curribus vinum portantibus et alia necessaria; et homines putabant quod omnes fructus arborum et omnia sata essent destructa propter nimium frigus. Quod non fuit factum, quia Deus misericorditer suis previdebat. Nam eodem anno vinum ubique per Austriam vendebatur pro Item eodem anno metreta siliginis vendebatur in Zwetl pro 15 denariis, aliquando minus; triticum pro 25 vel minus. Item eodem anno facta fuit habundancia frugum."

March/early April), but in Western Europe, the hard winter partly yielded already in early February. In many regions such as France, Austria, Poland, Lithuania and Prussia, the outstanding great amount of snow was also mentioned. The Rhine was completely frozen over between 25 January and 8 February at Koblenz; while a flood started on the Main and Rhine already on 7 February, the winter in South-Germany lasted until mid-March (e.g. Alexandre 1987, Brázdil-Kotyza 1995, pp. 120-121, Buisman 2000, pp. 385-396, Glaser 2013, p. 78, Retsö-Söderberg 2020).

Maybe because of the uninterrupted frosts (and snow cover), the grain seeds mostly survived this outstanding hard winter, and there was not a bad harvest afterwards. Ladurie (2004) lists it amongst the seven most severe winters of the Little Ice Age in Europe caused by a very powerful anticyclone settled over the North Sea and/or the British Isles, blocking the westerlies and forcing the arctic air from the north-east to extend to the south, towards the low-pressure areas over the Mediterranean. Based on the partial destruction of vine stocks and fruit trees, Ladurie suggested that the minimum temperature in this winter (in French wine and fruit producing areas) was -25°C at least (Ladurie 2004, pp. 112-114).

HIGH PRICES IN 1415

In a charter of a postponed lawsuit over a robbery case, issued on 30 July (GC: 8 August) 1415, very high prices or dearth of the recent past (*caristia magna preterita*) were mentioned in Bonchida (Bonțida-Ro) village in Doboka County, Central-Transylvania (HNA DL 73953; Mályusz 1997, p. 266). In theory, this means that the high prices or dearth were over by mid-summer at the latest, namely by the time of the harvest. Most probably this case reflects the harvest problems of the preceding year.

According to Jan Długosz, mid-summer 1414 was already very rainy in Poland; the Vistula was in prolonged flooding because of copious rains, while rainy autumn was also reported from Prussia. The *Rocznik Małopolski* reports on the year 1415 as unusually wet in Poland and (Western) Russia. The April flood of the Oder in Bresslau (Wrocław-Pi) in this year might have been also related to thaw and/or rains, and Western Europe was rather rich in precipitation during the winter, and south was unusually rainy in the summer (Alexandre 1987, Malewicz 1980, Brázdil-Kotyza 1995, p. 121; further discussion: Kiss 2019b). While in the summer of 1414 drought caused problems in Dortmund, resulting in bad harvests the summer of 1415 was unusually rainy with floods in Alsace and Bavaria (Glaser 2013, p. 68).

In conclusion, because of much rain, there were bad harvests and high prices in Bavaria and Austria in 1415 – with many floods in the latter case. In such a situation, before harvest time already there is usually a greatly increased demand in these countries for imported beverages, particularly from Hungary. Thus, the great dearth or high prices in Hungary could be, at least partly, caused by the increased grain export from Hungary to the west and north. However, it is also possible that harvest was also bad in Transylvania or over the entire Hungary. In that case, however, the bad harvest probably occurred already in 1414.

THE YEAR 1416

Winter 1416: deeply frozen marshland in the Sárrét wetlands

Following the order of the king written on 21 (GC: 30) January, on 25 January (GC: 3 February) 1416, an inspection was carried out by the officers of Fejér County, in Fehérvár (today Székesfehérvár) with the conclusion that the Chapter of Fehérvár, amongst others, had illegally ordered its serfs to cut and transport the reed of the Fehérvár Crusaders on the frozen surface of the Ingovány marsh (south-eastern part of the Sárrét marshland). This reed cutting had been completed on 16 (GC: 25) January when the harvested reed was transported away (Fejér 1842, pp. 700-703; regesta: Mályusz 1997, p. 403).³

³ “...Jobbagiones Capituli Ecclesiae Albensis in Inguan, in vico eorum Canonicorum, commorantes, feria quinta proxima post octavuum diem festi Epiphaniarum domini nunc proxime elapsi, ex mandato, voluntate, et permissione annotati Capituli Ecclesiae Albensis, ... per consequens ipsius Conuentus, manibus armatis, et potentiaris irruendo, vniuersas arundines in superficie et planitie aquae congelatae, seu glacie falcari, falcatasque asportassent et asportari fecissent, ac ibidem praefatum Ladislaum Cruciferum, ... et alios familiares

In traditional economy, reed-cutting was a rather important work, entirely dependent on weather conditions, and carried out in wetlands in wintertime, after at least one or two weeks of deep frost, when the ice cover was strong enough to support the weight of a man (Szabó 1994, p. 109; Bellon 1973, p. 108). Based on this report, prolonged frosts prevailed in the central part of the Carpathian Basin in most of January in 1416. However, as in Central Hungary, the coldest month of the year is January, prolonged frosts are part of a cold, but not necessarily extremely cold January. No information is available regarding the character of this winter in Central Europe.

High prices again reported in 1416 (and 1417?) – any weather factors?

Similar problems were recorded in the following year: on 3 (GC: 12) September 1416, a letter was sent by one of the leading officers of the Austrian prince to the council of Sopron town asking for the reason why the Hungarian king prohibited the export of oats from Hungary to Austria (Házi 1921, p. 112; regesta: Mályusz 1997, p. 624).⁴ Hardly more than a month later, on 6 (GC: 15) October, Queen Barbara (wife of King Sigismund) ordered Sopron County in West-Hungary near the Austrian borderline to prohibit anyone transporting cereals abroad against the order of the king. With this order, the king intended to stop a further increase of the already rather significant dearth or high prices (*caristia non modica*) in Hungary (Házi 1921, pp. 116-117).⁵

More than half a year later, on 23 June (GC: 2 July) 1417, the town of Belluno – located in Veneto, North-eastern Italy – asked King Sigismund to let home its ambassadors from Hungary, or at least one of them, since the town was in grave difficulties because of high prices (HNA DL 96927; Kiss 2019b). Thus, while in the summer of 1415, dearth was mentioned in the eastern parts of the country, and in autumn 1416, high prices (of the recent past) were reported in Western Hungary, in 1417, the same problem arose in Northern Italy. Enzi and her colleagues, in their recent work (2020), also referred to a food shortage in Friuli, similarly in North-eastern Italy, dated to 1417. As in Poland according to Długosz (see Malewicz 1980), there were also high prices in 1417 – caused by a week of snow (and frost) in March that damaged the crops, therefore there is a chance, especially after a hard winter, that the problem of high prices continued in Hungary in 1417, too. From 1415-1417, Ladurie (2004, p. 114) dates around 20 years with sunny and warm spring-summer periods in France and Belgium, rather favourable for agriculture.

ABUNDANT AND FREQUENT RAINS (CAUSING FLOOD) BEFORE 1417

A charter, issued on 24 February (GC: 5 March) 1417, mentions repeated flood events in the near past (ca. years) caused by abundant rainfalls, often obstructing or delaying the travel of the Vaja nobles (in the Nyírség area; NE-Hungary) to reach the jurisdictional centre of Szatmár County, Csenger (HNA DL 96927, Mályusz–Borsa 1999, p. 97). It is emphasised in the charter that frequent floods were caused by “the superabundant multiplication of rains” (*ex superhabundati pluviarum multiplicatione*), which clearly singles out the too heavy and too frequent great rainfalls as the reason for the floods in the preceding period (years), neglecting, for example, snowfall as a potential other major cause. The

eiusdem crudeli nece interimere voluissent, nisi protectio aliquorum proborum virorum, protunc ibi non adfuisset. ...”

⁴ “Ich Albrect von Puchaim, obrister drugsetz in Osterreich, embeut dem erbern vnd weisen, dem purgermeister, richter vnd dem gantzen rat der stat zu Odenburg vleischlich mein dinst. Mich ist ankomen, wi daz ir drin auf gegent verrüft habt lassen kain habern nicht zu führen. Nu wais ich nicht anders von meins heren wegen vnd mit mir verlassen, daz die land getrewlich mitenander arweitten sullen vnd solichs rufen nicht nott ist, vnd pit ew, daz ez also vnderkommen werd, wenn es wër nicht nachpulich, davon so pit ich ew mir daz zu verkunden, von welherlay daz sy, ob mans mit ew geschafft hiet, oder wie es zugee, wenn ich nicht anders versten, dann daz ir am gnedigen herren vnd nachpür an meinen herren, herczog Ernsten habt. ...”

⁵ “Ad nostre laicus deductum extitit audienciam maiestatis, quod displicenter percepimus extra liites dicti regni nostri Hungarie contra cimmissionem et mandatum serenissimi principis domini nostri Sigismundi regis et conthoralis carissimi exportarent et facerent exportari, propter quod caristia non modica in regni nostro predicto posset gravari. Super quo fidelitati vestre firmissime precipimus et omnino volentes mandamus, quatenus agnita presencium noticia amodo in antea et deinceps fruges et alterius generis blada predictis tam regnicolis nostris, quam forensibus hominibus per predictum comitatum extra limites dicti regni nostri Hungarie exportare et exportari facere nullatenus permittere et permitti facere debeatis, et aliud, sicuti dicti domini nostri regis et nostram gravissimas indignaciones incurrere pertimescitis, non facturi in premissis. ...”

travel route between Vaja and Csenger crossed the River Szamos and/or the Ecsedi swamp (located at Nagyecsed). As this area is primarily dependent on the precipitation surplus in Szamos and Kraszna river catchments, mainly located in Northern Transylvania, the years (decades?) before 1417 might have been referred to in the charter (Kiss 2019a, pp. 448-451).

In most of Europe, the winter of 1417 was hard with much snow (e.g. Alexandre 1987, Buisman 2000, pp. 425-428, Kiss 2019a, pp. 448-451). Concerning the direct neighbourhood, there was long and severe winter with much snow in Bohemia and Austria where the Danube deeply froze over (Malewicz 1980, Brázdil-Kotyza 1995, p. 121). Weather reports in Europe for 1416 are rather scarce, but, as we could see in the previous cases, 1415 was rather wet in Central Europe.

THE YEAR 1422

Rainy weather caused flood: summer 1422

Seeking for the answer whether the event was of natural or artificial origin, on 1 (GC: 10) August, a field survey took place in Lasztóc (Lastovce-Sk), in Zemplén County, where previously a flash flood had caused significant damages. The inspection of the area and objects concluded that the flood was not related to the mill or the mill sluice of the neighbour, but it was of natural origin, namely caused by a period of heavy rains (*'durii tempore pluviali ipsum Ronwa torrens'*; HNA DF 221420).⁶ As the destruction was still visible in the area, the rainy period causing the flood (see: Kiss 2019a, pp. 462-463) did not happen many months before the survey, thus maybe it occurred in (late spring or) the same summer. No information on the character of this summer is available in Central Europe.

Captured in great coldness: November 1422

On 12 (GC: 21) December 1422 *Nicolaus de Kallo* (Kálló) protested against the violent attack of *Johannes de Kallo* who, (sometime) in November, captured his serf from Napkor, in the Nyírség sandy area, for a week in calm (or unchanging/prolonged), very cold weather (*in frigore magno et sereno*; HNA DL 54271).⁷

Severe winter was recorded in Bohemia and the German areas; the Baltic Sea froze over along the North-German and Prussian shore on 21 November, and the firm ice cover stayed there until late February. The winter started unusually early, already in early (GC: mid-)November, and was rather hard till the end of the year in Nürnberg (Brázdil-Kotyza 1995, p. 123, Glaser 2013, pp. 78-79). The winter was colder than usual in Sweden, too (Retsö-Söderberg 2020, p. 36).

THE DANGER OF BEING DRUNK IN HARD WINTER WEATHER: 1426 OR EARLIER

Registered in Rome on 15 (GC: 24) April, the pope received an application from Hungary asking for dispensation in a rather delicate matter: a presbyter from the Csanád diocese, and vicar of the Saint George (Szent György) parish in Szentgyörgy, one night saw a number of drunken laymen quarrelling outside, and while he was trying to separate the fighters, heavily wounded one of them by accident. Because of his drunkenness and the very cold weather, the wounded drunken man died by the morning at the edge of the village (Lukcsics 1936, p. 182; regesta: C. Tóth-Mikó 2017, p. 187).⁸

⁶ "... in causam facti eandem particulam feneti non per preparationem prefati molendini nec per ipsam clausuram sed durij tempore pluviali ipsum Ronwa torrens efficitur per meatum ipsius fluvij destructam fore retulisset,"

⁷ "Nos (Anton)ius de Markij vicecomes et quatuor Judices Nobilium Comitatus de Zabolch datum pro memorie quod Nicolaus filius Lewkes de Kallo per modo protestacionis nobis significanter curavit quod Johannes filius Stanizlaj de eadem Kallo pridem in mense beati Andre Apostoli quendam Jobagionem suum nominem Stephanum filium Johannis de Napkor captivasset captumque in suis vinculis in frigore magno et sereno perebdamadam punire fecisset potentia mediante. ..."

⁸ "Suppl. Thome Gregorii, rectoris eccl. par. S. Georgii de Zentghenigh, presb. Cenad. d., de disp. super irreg., si quam propterea contraxisset, quod olim percipiens nonnullos ebriatos laicos sese verberare ad eos separandi causa appropinquavit et quendam eorum forte vulneravit, qui vulneratus propter intensum frigus et nimiam ebrietatem emisso cruore ea nocte mortuus sit."

The priest was the vicar in Szentgyörgy, and the summary mentions 'the village' for the location of the event. The medieval village of Csanádszentgyörgy was deserted during the Turkish occupation, and its memory is only preserved in the name of a bulk that belongs to Érsekcsanád at present. Because of the spring date of the summary, it is rather possible that the unfortunate event happened in the winter, still in 1426. However, as these matters had to go through the official channels, it is also possible that the case occurred in the previous year, in 1425. Little is known about the conditions of winter (spring, autumn) 1425 or 1426 in Central Europe, therefore at present, no parallels of this event are available outside of Hungary, and the case alone does not necessarily mean colder than average winter conditions.

THE YEAR 1427

February 1427: military campaign to the south in severe winter

Documented in a charter issued on 7 (GC: 16) July 1427,⁹ during the winter of 1427 when the king (Sigismund) was in Brassó (Braşov-Ro), he sent a Hungarian army to Walachia in late January to support the Hungarian army that was already there to replace the new, 'unreliable' duke (Radul, supported by the Ottomans) with the previous one (Dan) who was an ally (vasal) of the Hungarian king (Fejér 1842b, pp. 886-892). The army started on 24 January (GC: 2 February) from (Barca)Rozsnyó (Râşnov-Ro), a settlement located at the entrance of the Törcsvári Pass (Culoarul Rucăr-Bran in Romania) where the army had to cross the mountain area of the South-Carpathians to reach Walachia (see also: Kammerer 1895, pp. 310-311; C. Tóth et al. 2020, pp. 184-185).

The royal charter mentioned the severe winter conditions and troubles the army went through during this campaign when the frost and coldness of the earth were very intense and there was great abundance of snow. Although, based on the royal charter, during this military campaign the Hungarian army experienced hunger, very intense cold weather and several other difficulties and incommodities, the campaign was successful, and they managed to replace Duke Radul with the Hungarian king's 'faithful friend', Dan II. The charter particularly emphasised the very cold weather and hard frosts and the 'super'abundance of snow during the campaign (see also: Fejér 1842b, pp. 848-849, 872-878, 886-892; Fejér 1843, pp. 676-680; Thallóczy-Barabás 1897, pp. 283-289, Szendrei 1888).

Tragic outcome of a bad order: teenager froze to death

A tragic accident is also connected to the cold weather of this winter. *Benedictus Elie de Wthws* (Benedek Ötvösi), an acolyte of the Veszprém diocese (close to becoming a priest) asked a sixteen-year-old student and some other clerics in Székesfehérvár to bring him food as he was providing services in a nearby village. On the way back, suddenly very strong and cold winds attacked the student and the clerics, and while a couple of clerics hurried away to the town, the sixteen-year-old and another cleric remained behind. It only turned out next morning that the sixteen-year-old was missing, and the cleric (who stayed behind with him) could only tell that he left the student outside, near the gates. Frozen to death at night, the student's dead body was found next morning close to the town wall. Because of his responsibility in the accident, Ötvösi applied to the pope for dispensation from under the canonical malpractice considering his lack of placidity (Lukcsics 1902, p. 60, Fejér 1842b, pp. 886-892; regesta: C. Tóth et al. 2020, p. 138).¹⁰ The summary of the application was dated 26 February (GC: 6 March). The application letter was presumably written not long after the 'accident,' probably still in the same year.

⁹ "Nos Sigismundus etc. Memoriae commendamus ... Denique non pauci temporis elapso intervallo, idem Joannes Banus, dum pridem puta tempore hiemali proxime praeterito, quo tunc terra gelu et frigoribus intensissimis, nivibusque superabundantibus constringebatur, certum gentium belligerarum subsidium pro tuitione et defensione partium nostrarum transalpinarum amino repellendi eosdem perfidiae alumnos, videlicet Turcos, Crucis Christi persecutores, in Christicolos iugi rabidine saevientes quaeritasset;, ipsoque Joanne Bano cum dictis gentibus suis more exercituantium in eisdem partibus nostris transalpinis de speciali nostrae Maiestatis mandato remanentibus, ipsisque suis gentibus famem, frigora intensissima et alia incommoda, plurimaque damna graviter perferentibus, praedictis quoque Radul et Turcis abinde aufugatis, praedictum Daan Vaivodam in pristinum dicti sui Vaivodatus dominium restituit victorioso,"

¹⁰ "....., quendam iuvenem, suum scolarem, in etatis sue anno sedecimo vel circa constitutum cum quibusdam aliis iuvenibus et clericis

The cold November 1426, when in early/mid-November (GC: mid-/late) floating ice was observed on the Danube, was followed by a severe winter in Bohemia, Austria and Poland, when the Danube firmly froze over just like the waters in Poland where the very severe winter with much snow caused hunger (Brázdil-Kotyza 1995, p. 125).

Weirs illegally occupied since the Danube ice yielded

Indirect information on Danube ice was documented in two charters referring to the same legal case: on their lord's command, the people of the neighbouring (lay) landowner, Count György Szentgyörgyi, occupied the waters, fishing places, and cut (and were still cutting) the forests and groves of the Chapter of Pozsony. Written on 22 September (GC: 1 October), there is a special emphasis in the charter on the fact that the people of the neighbouring landowner started these illegal activities immediately after the Danube ice (in winter or early spring) had yielded (HNA DF 227966; regesta: C. Tóth et al. 2020, p. 405). Hardly more than a month later, the following official expection, led by the count of Pozsony County and the noble judges, proved the reasonability of the complains (HNA DF 227967; regesta: C. Tóth et al. 2020, pp. 430-431).¹¹

Postponed baptism because of too cold weather?

Recorded among the papal supplications on 6 (GC: 15) May in Rome, András Újkéri, the vicar of the church in *Olvod* in the Eger diocese (NE-Hungary), asked the pope for dispensation, because once after the mass he baptized four babies, but he refused to baptize the fifth because of the coldness – or maybe rather because the parents did not bring him the usual payment – and the baby died later, without being baptized (Lukacsics 1931, p. 192, C. Tóth et al. 2020, p. 223).¹² As the information already comes from the papal supplication records, the event could happen earlier in the winter or late autumn (or even the previous year).

Danube covered by ice in the south in mid-November

With reference to a chartulary, available only in manuscript form (*Simonyi: Flórenczi okmánytár Vol. 2, pp. 79–100*; also with the Italian archival reference: see C. Tóth et al. 2020, p. 470), a piece of rather interesting information got preserved in a letter of the Florentine legate, Piero Guiccardini, who visited the Hungarian king on 12 (GC: 21) November in Száva-szentdemeter (Sremska Mitrovica-Srb) where the king camped with the army. While the diplomat was there, the king received bad news, namely that the Turkish army had occupied Galambóc Castle (Golubac-Srb) not far from Belgrade. What is more, the Turkish troops had already crossed the icy/frozen Danube causing great devastation in (South-) Hungary, too.

Early December: danger of crossing the River Sava running with ice

In the next letter, written on 5 (GC: 14) December, the same Florentine legate continued his report excusing himself for being late with writing, and adding that he had wanted to finish this letter already on 2 (GC: 11) December, as he had planned to visit the king. However, because of the ice, crossing the

pro apportando sibi victu destinasset, sequenti (die) dum iidem clerici cum dicto iuvene reverterentur, quia tempus yemale erat, eos in media via ventus validissimus et frigidissimus invasit, et adeo pre frigore fuerunt destructi, quod vix ambulare poterant. Duo ditorum clericorum, qui prius ad civitatem pervenerunt, exponenti eos de iuvene suo interroganti responderunt, quod cum alio clerico eum in via dimisissent. Demum et dictus clericus, qui cum iuvene remanserat, ipso iuvene prope extra civitatem derelicto, ad exponentem venit, qui etiam exponenti de dicto iuvene, ubi eum dimiserit, interroganti respondit, quod iuvenem extra civitatem prope ipsum sequentem dereliquit et quod iam ipsum in civitatem intrasse crederet. ..."

¹¹ "...populi et Jobagiones Ladislai Groff de Zenthgyorg, inpossessionibus suis Lukkwn Kyurth et Nyarasd aquas et loca piscatorum ditorum domini propositi et Capitulum ecclesie Poseniensi prenotate, intra cursus metales possessionum eorundem Kyurth alinomine Vasarwth et Nyarasd ..., incipiendo statim post resolutionem glacierum aque Danubij usque ad presens piscati fuissent, Siluasque et virgulta intra terminos earundem possessionum existentem succidissent, piscarentumque et succiderent de presenti, inperidicium et dampnum annotatorum domini propositi et Capitulum valdemagnum,...."

¹² "Suppl. Jacobi Andree de Wyquar, plebani par. eccl. OO. SS. de Olvod, Agr. d., de disp. super irreg., si quam propterea sibi contraxit, quod olim post missam quatuor infantes baptizavit, quintum autem propter frigus et quia cum infante more patrio pro baptizando solvendum "unum par gallinarum et unum panem" non attulerant, catetizare et baptizare distulit, et infans sine baptismo expiravit."

River Sava was too dangerous, so he could come over only in the morning of 5 December, and meet the king later (*Simonyi: Flórenczi okmánytár Vol. 2, pp. 79–100*; see C. Tóth et al. 2020, p. 472).

Mid-December snow in Sopron

A payment for transporting snow from the Town Hall was introduced on 19 (GC: 28) December 1427 in the account book of Thomas Schadendorf, chamberlain of the royal town of Sopron (Házi 1931, p. 386).¹³ Based on the accounts of Sopron, the chamberlain paid 13 denars to one worker for two days' work. Thus, the note suggests that also in 1427 a rather significant amount of snow accumulated in the town by mid- (GC: late) December.

The information shows an interesting parallel (and partial contradiction) to a Czech report stating that a 'great thunderstorm with downpour' was observed in Přelouč or Kouřim (Bohemia) on 18 (GC: 27) December (Brázdil-Kotyza 1995, p. 125) thus, exactly at the same time when Sopron town paid for the two-day cleaning of snow. On the other hand, in Iceland the winter of 1428 was 'good and mild' (Ogilvie 2009).

THE YEAR 1428

High prices and hunger in Iasonia: in and before 1428

Because of the poverty and shortage following the dearth or famine of the last years that particularly affected the '*philistei*' – a name associated with Iasonians in Hungary (e.g. Töröcsik 2014, pp. 43-44) –, on 19 (GC: 28) October King Sigismund ordered to alleviate the *philistei*/Iasonians from the allowances of the royal judges (Fejér 1842b, pp. 920-922).¹⁴ Based on tree-ring evidence (Old World Drought Atlas: Cook et al. 2015), it is possible that the multiannual shortage was at least partly related to the unusually dry multiannual spring-summer period between 1417 and 1427 (Kiss 2019b), combined with hard winters, for example, in 1427. Located in the northern, north-eastern parts of the great Hungarian Plain (see Fig. 1), Iasonia was one of the most important cattle grazing and export regions of medieval Hungary. Like most parts of the Great Hungarian Plain, the area of Iasonia is quite sensitive to droughts.

There was great frost in late June 1424 in Bohemia and Lower Austria; in the summer 1425, there were extreme heats in Bohemia, and the spring and summer were so very dry and hot that grain fields and meadows dried up in Austria and Bohemia in 1426. After the bad harvest, there was hunger in Bohemia in 1426, while for 1426, Długosz suggested prolonged very rainy and wet period in Poland that caused famine. There was wet and cold summer in the German areas with a summer flood on the River Elbe in 1428 (Malewicz 1980, Brázdil-Kotyza 1995, pp. 124-125, Glaser 2013, p. 68; see also: Kiss 2019b).

WEATHER REPORTS IN 1431

Danger of Turkish attack over the frozen Danube: Belgrade area in January 1431

On 17 (GC: 26) January the captain of Belgrade Castle, Frank of Ragusa, ordered the vice-counts of Keve County (E, NE to Belgrade) to announce in the county that the nobles concerned should urgently come with their cavalry and infantry to the ferry of the Danube, because of the great danger of a Turkish attack, as the Danube had been deeply frozen over already for three days (HNA DL 54734).¹⁵ No evi-

¹³ "Item eim chnecht hab ich geben II taglan, facit XIII den. Albus, daz er den snee aüss dem rathaus gefurt hat. Factum am freitag vor Thome apostoli."

¹⁴ "Nos Sigismundus memoriae commendamus, quod nos egestati et inopiae, penuriaequae et paupertati fidelium nostrorum universorum et singulorum Philistaeorum nostrae Maiestatis, quibus ipsos propter caritatem sive famem aliquorum annorum, post sese continuo praeteritorum, acriter cruciatos et denudatos, oppressosque et involutos fuisse et esse agnovimus, pietatis visceribus compatientes, tum etiam ex eo, quod ipsi Philistaei nostri ex nostrae Maiestatis dispositione atque iussu certam pecuniarum summam annis singulis propterea nobis solvunt et solvere obligantur...."

¹⁵ "....., quod Danubium usque tres dies tantum plenarie congelatum et Turci cum ipsorum gentibus sunt prati venire in hungariam

dence suggests that any notable Turkish raid would have happened this winter, but the likelihood of a significant attack was evidently high, which means that the strenght of the ice could be in some places or entire cross-sections strong enough to bear more men together with their horses. As a deeply frozen Danube requires weeks of prolonged frosts in this and the upper sections of the Danube, the average daily temperature in most of January and perhaps already in late-December could be well below the freezing point, without major mild interruptions, suggesting colder than average (late-December–) January mean temperature in the Belgrade area.

Little is known about this winter in Central Europe or the Balkan Peninsula. Although not much is known about winter 1431 in the German areas either, at least part of the winter could be notably cold as the Bodensee reportedly froze over around Lindau (Glaser 2013 p. 79). Moreover, the winter was colder than usual in Sweden (Retsö-Söderberg 2020, p. 36).

Hussite attack: wet, cold mid-/late autumn in the north

Coming from Bohemia in mid-autumn, two Hussite armies attacked the northern part of the country (esp. in the areas of present-day Slovakia). One of the armies proceeded along the River Vág/Vah to the south and attacked Galgóc (Hlohovec-Sk), Nyitra (Nitra-Sk) and Nagyszombat (Trnava-Sk). However, the Hungarian army sent against them, gained a victory and pushed the remaining part of the Hussite army to Bohemia. As for the timing, Hussites broke into Hungary in late September (GC: early October) and were pushed back some time in early November (GC: mid-November; see Bánlaky 1935, Brázdil-Kotyza 1995, p. 125). Similar to Bohemia, the October–early November (till around 11 November; GC: 20) weather could be rather rainy as, according to both the *Chronicon Treboniense*¹⁶ and the *Chronicon veteris Collegiati Pragensis*,¹⁷ Hussites were struggling with progress in the rains (Höfler 1856, pp. 61-62, 92).

THE YEAR 1433

The hard winter of 1433

Although 1432 was famous of its weather extremes in large parts of Europe (e.g. Brázdil-Kotyza 1995, Ladurie 2004, pp. 125-129, Glaser 2013), up to now only flood reports are available regarding Hungary and the Carpathian Basin (Kiss 2019a, pp. 475-478). According to the *Wiener Annals*, the difficult year of 1432 was followed by a hard winter in Svevia, Bavaria, Austrian and Hungary in 1433.¹⁸

The winter was also particularly severe with deep frosts and occasional mild interruptions (with flood) and much snow in the German areas, Bohemia and Poland (Brázdil-Kotyza 1995, pp. 125-127). While long reports are available in Germany regarding the severe, long and snow-rich winter of 1432, no information is yet known about the severity of winter 1433 (Glaser 2013, p. 79). Based on Długosz, swamps and fishponds along the River Morava were weakly frozen at the end of November (GC: early December), and by 6 (GC: 15) January the Vistula was deeply frozen so that an army could easily cross it on the ice (Malewicz 1980). In this year there was cold winter in Denmark, too (Retsö-Söderberg 2020, p. 36).

videlicet partibus in toto comitatu Keveyense proclamare faciatus cum iudicibus nobilium subito ad portum Danuby cum ipsorum peditibus et Equitibus venire debeant."

¹⁶ "Quo facto Boemi Ungariam hostiliter invaserunt et ibidem multa dampna Ungarie intulerunt. ... Qui ibidem civitatem episcopi hujus terre nomine Nitra hostiliter debellarunt; super quos multi Moravi et Ungari congregati bello eos continuis decem diebus impugnabat; qui tamen strenue et fortiter se defendebant, curribus circumdati, diris bombardis Ungaros prosternentes, famem, sitim atque frigus intensum sustinentes, de loco ad locum armata manu castra moventes usque pervenerunt ad quendam locum lutosum, ubi limus erat, et ibidem currus fere ad duas sexagenas com ceteris rebus suis extrahere de ipso loco non valentes dimiserunt, et inimicorum die de ipsa effugato exercitu per vadum fluminis dicti Waha ad terram Boemie pervenerunt."

¹⁷ "Anno domini MCCCCXXI. ... Eodem etiam anno Syrotkones fuerunt post fluvium Wah in Ungaria, et obo proper frequentes pluvius ita aggravata est via, quod Ungari, qui venerant contra eps, repulerunt eos a majori parte corrum; quos ibi dimiserunt. Quie cum eis simul per X dies conctaverunt, ibi totam reliquerunt. Et hoc actum est circa festum Martini."

¹⁸ "Item darnach desselbig jar ward ain kalter winter, das die Tuonaw ganncz überfros unnd geslossn ward von Ungern unnd gar gen Swabnn durch ganncz Ostereich und Payrn, das man obnn unnd nyden im lannd überfuer mit wegnn."

When hunger threatens inland and abroad: no cereal export from October 1433

Based on the *Wiener Annals* and the *Rosenberger Chronik*, high prices of grain prevailed in Austria, Bohemia, Moravia and Hungary in 1433 (Höfler 1865, p. 77).¹⁹ However, according to the *Wiener Annals*, as a consequence of the two great floods, grain prices were already rather high in Austria in 1432 (Lhotsky 1952).

On 3 (GC: 12) October 1433, King Sigismund announced his special orders in Hungary regarding the limitation of food export: while describing the condition of high prices and threatening shortage of beverages, he prohibited the export of cereals. The royal order explicitly states that the problem in Hungary is caused by the dearth and increased demand of the neighbouring countries and not by the grain shortage in Hungary itself. While buying up the grain in the nearby (i.e. Western) Hungarian territories, the neighbouring countries were responsible for the high prices in the Hungarian areas near the border, and the situation threatened with causing dearth in the entire country (Fejér 1843, pp. 487-488).²⁰ In this year, King Sigismund, after two decades of monetary stability, also applied the tool of money devaluation in Hungary (e.g. Acsády 1906, p. 151).

In the same year, there were extremely high prices in Bavaria and Saxony, as the summer was rather wet with floods in Thuringia and the southern parts of the German areas (Brázdil-Kotyza 1995, pp. 127-128, Glaser 2013, p. 69). Thus, the problems in Hungary were rather clearly related to the very bad harvest of 1433 (and maybe also earlier) in the countries west and north to the Carpathian Basin, while in Hungary the harvest of this year and the combined temperature-precipitation conditions influencing harvest results – namely spring-summer temperature and precipitation – were not so unusual in this year, with particular attention to late spring and early summer.

THE YEAR 1434**Hard winter in 1434 – or rather 1435 (or 1433)?**

According to the *Wiener Annals*, 1434 was a year with a particularly hard winter: firm ice cover developed on the Danube, and many people got frozen in Svevia, Bavaria, Austria and Hungary (Lhotsky 1952).²¹ However, apart from this source, no other sources in Central Europe mention this winter as particularly hard. The only other weather-related information comes from Germany, but even there – apart from a winter storm in February – not much is known about the character of winter in this year (Glaser 2013, p. 79). However, there are plenty of sources discussing the severe winter of the next year, 1435. Although we cannot completely exclude the possibility of a hard winter also in 1434, it seems much more likely that the *Wiener Annals* mistakenly refers this data under 1434 and not under 1435 (or under 1433 that was also hard).

¹⁹ "Fuit diluuium maximum in Boemia, Moravia, Austria, Ungaria feria secunda ante Mariae Magdalenae et destruxit villas (et) civitates et in Praga destruxit pontem et molendinum. Et statim sequenti anno fuit caristia annonae sic quod siligo et triticum vendebatur pro 30 grossis albis."

²⁰ "..., qui viso et considerato hoc praesenti in Austriae, caeterarum quarumdam huic regno nostro Hungariae vicinarum et circumiacentium prouinciarum et terrarum partibus, frugum seu bladorum Caristiae vigentis tempore, fruges, seu Blada in ipso regno nostro Hungariae copiose emendo, seu comparando aggregassent, comparentque dietenus, et congregando per vestrarum, aliorumque illius partes Nobilium, et possessionariorum hominum possessionum tenutas, et territoria extra ipsum regnum nostrum et metas eiusdem, ad alienas et extraneas partes venditionis causa educerent, et deferrent. Vnde iam in ipso Regno nostro et quibusdam eius finibus magna ipsarum frugum instaret caritudo, ex quo nostra fames valida, nisi talismodi frugum eductoribus et exportatoribus opportune obuiaretur, in proximo potest euenire. Quare nos pro bono communi, prout ex suscepti regiminis tenemur officio, inuigilare, cupientes, habita eorumdem Praelatorum et Baronum nostrorum matura deliberatione, fidelitati vestrae firmiter praecipiendo mandamus, quatenus agnitis praesentibus continentis, per publicas proclamationes in foris et aliis locis publicis promulgari faciatis, vt nullus omnino hominum huiusmodi fruges et Blada extra hoc regnum nostrum educere praesumat. In casu autem quo aliqui fuerint rebelles, qui contra huiusmodi nostrum ac dictorum Praelatorum et Baronum nostrorum interdictum, ipsas fruges exportare vellent, tales etiam per huiusmodi frugum exportandarum et educendarum receptionem et ablationem, si necesse fuerit, modis omnibus inhibere, cernere, refroenareque et compescere debeatis. ..."

²¹ "Item desselbig jar war ain kalter wintter, das die Thonaw ganncz überfrof und geslossen ward von Ungarn unnd gar gen Swabnn durch ganncz Österreich und Payrn, das man obnn und nyden im lannd überfruer mit wegnn."

Great coldness causes long-term health issues

In a royal charter dated 27 June 1439, amongst others, the merits and excellence of Count István Perényi were described: he was a skilful diplomat who participated in many foreign missions, also in the furthest parts of Europe (e.g. England, Aragonia). He also accompanied Sigismund to Germany, Lombardy and Tuscany when the king travelled to Rome to gain the imperial crown. However, Perényi, greatly weakened by the very cold weather conditions and other difficulties of the long travel, died short after returning to Hungary (HNA DL 13410).²²

The king was in Germany from August 1430 until late autumn 1431, in the meantime visiting many German towns in the south, arriving to Italy in late November. He remained through the entire year of 1432 in Italy (e.g. Tuscany, Emilia-Romagna) and, after visiting several towns, he stayed in Rome from late spring until the end of the summer of 1433. In late August, he returned to Northern Italy. In the autumn of 1433, he went to Basel and stayed there until mid-May 1434. In May, he proceeded to the east along the Bodensee and the Upper Danube. After visiting the South-German merchant towns (e.g. Augsburg, Regensburg), he most probably continued on the Danube by ship, reaching Pozsony in mid-October 1434 (Engel-C. Tóth 2005, pp. 126-129). The present case is listed under 1434 because King Sigismund and his company returned to Hungary in 1434.

Thus, he and his company did not travel through the Alps in winter (i.e. December-February); however, they had to cross the Alps in the autumns of 1431 and 1433 and endure the winter in Basel in 1434. Moreover, Perényi was a diplomat who might have been sent to various missions in the meantime. As we could see before, the winters of 1432 and 1433 were particularly hard and long in Central Europe, but parts of 1431 were also very cold. A particularly likely 'candidate' for the mentioned very hard winter conditions is mid-/late autumn 1431 when, while travelling through the Alps, extremely hard winter conditions with intense frosts and snow were reported in most of Central Europe, and the Alps could be even worse at that time. Długosz in Poland, for example, speaks about hardest winter conditions already in early/mid-November (Malewicz 1980, Brázdil-Kotyza 1995, p. 125, Glaser 2013, p. 86).

Spring 1434: great frost destroyed vineyards

Based on the *Continuatio Claustroneoburgensis* (V), on the day of St. Mark (25 April; GC: 4 May) 1434, there was great snow, and the great frost on the next day destroyed all vines in 'entire' Austria and Hungary (Pertz 1851, p. 739).²³ The *Annales Mellicenses* similarly recorded a great frost event with snow that happened on 26 April (Pertz 1851, p. 518),²⁴ while the *Wiener Annals* dates it to the days after St. George, 25-26 April and only mentions Austria (Lhotsky 1952, p. 15). The *Kleine Chronik* adds Styria and Moravia to the country list but mistakenly reports the event under 1433.²⁵ Late April frost also caused great damage in German areas (Glaser, 2013, p. 86)

The month before was not without problems in other parts of Central Europe either. On 25-26 March, much snow fell in Bohemia that quickly melted and caused flood, while in South-eastern Poland, a great frost event was dated by Jan Długosz to 5 April (Malewicz 1980, Brázdil-Kotyza 1995, p. 128).

²² "...condam magnificus Stephanus de eadem Peren consimiliter magister dapiferorum annotati condam domini Sigismundi Imperatoris et Regis pretacto condam patri nostro in partibus Almanie Lombardie et Tuscie ad quas pro susceptione sacrarum Coronarum Imperialium intraerat gratum se reddidit et acceptum intentissimis frigore densitatibus viarum discriminibus et alijs incomofitium fatigacionibus grauitur affertus ceterorumque plurimorum laborum oneribus sic lacessitus extitit, sicque in viribus defecit quod tandem pauco tempore su vite expleto postque prefatus condam pater noster suscaptis votie Coronis Imperialibus, de predictis exteris regionibus, ad hoc Regnum nostrum Hungarie redijt in lecto egritudinis decumbens vitam finiuit..."

²³ "1434 venit magnum frigus in die Marci ewangeliste cum nive, et sequenti nocte perierunt quasi omnes vinee in tota Austria et Ungaria, ita quod modicum crevit de vino illo anno."

²⁴ "1434. ... Hoc anno in crastino sancti Marci ewangelistw subitum frigus inhorruit, adeo ut nives et glacies vise sint; unde vineta cum vite perierunt."

²⁵ "1433 in die s. Marci venit magna nix et in crastino statim de mane venit tantum gelu, quod destruxit omnes vineas per totam Austriam, Ungariam, stiriam et moraviam."

THE HARD WINTER OF 1435

In the first, entirely preserved volume of the chamberlain accounts in Pozsony/Pressburg (Bratislava-Sk; hereafter Pressburg accounts), payments for cleaning away the snow in the Town Hall, the moat and the Vödritzer Gate (south-west gate) bridge area were mentioned on 26(?) February (GC: 7 March) and 5 (GC: 14) March (AMB K1, 42).²⁶ Thus, at the least, the late winter–early spring period was snowy in the (north-)western part of the Carpathian Basin this year.

Based on the datings in the account book, it contains presumably payments between late 1434 and mid-1435. As the year of the account book appears under slightly other dates in archival catalogues (e.g. 1437, 1434) and the question of dating is rather crucial, it is worth to dedicate a bit more space to this question. The winter of 1435 was rather harsh in Central Europe (see below), and the order of the two snow-related entries in the account – namely that the *Kathedra Petri* dated entry is followed by an entry with *Invocavit* dating on the same page – makes it more likely that the February–March snow cleaning expenses refer to 1435, when *Invocavit* was after *Kathedra Petri*, and not before as it was the case in 1434. There is an even worse match for 1437. As we could see before, winter 1434 was also rather hard, according to the *Wiener Annals*. It is, of course, possible that also the winter of 1434 was hard; nevertheless, as mentioned before, in the case of the *Wiener Annals*, we cannot exclude the possibility of one year misdating either, so the hard winter report may refer to 1435.

Additionally, some entries in the account book suggest that Sigismund was in Pozsony/Pressburg for a long while (i.e. weeks), and on 18 (GC: 27) February, he is specifically mentioned to be there with the 'Junge Herzogin' (K1 81). The 'Young Princess' was most probably Anna of Habsburg (born in 1432), the oldest granddaughter of Sigismund, as his younger granddaughter, Elisabeth, was born in Vienna only in 1437. What finally clarifies the question is the itinerary of King Sigismund that also supports the 1434-1435 dating of the account book, and the 1435 dating of our two weather-related reports: Sigismund was in Pozsony for a longer while only in 1435 (and clearly not in 1434 or 1437), when he arrived on 13 February and stayed there until 10 May (Engel-C. Tóth 2005).

A severe winter was documented this year in Bohemia, where an extraordinary amount of snow fell already in late November (GC: early December) 1434, and the frosts yielded only in late February 1435 (GC: early March). In the German areas, the winter of 1435 was memorably harsh. The Rhine froze over at Cologne and people could cross over the ice by loaded wagons. Water bodies froze over, winter sowings and vine stocks were damaged by deep frosts, and people held a market on the ice. At the end of the winter, the ice jam caused a flood that destroyed mills along the Rhine (Brázdil-Kotyza 1995, p. 129, Glaser 2013, pp. 79-80).

THE YEAR 1436

Deep or prolonged frosts in the north-east and central areas: mid-January 1436

In the north-east, on 6 (GC: 15) January, two payments (2 and 3 fl.) were included in the Bártfa (Bardejov-Sk) town accounts for 'works in the ice' (Fejérpataky 1885, p. 361).²⁷ As payments mentioning ice rarely appear in these accounts, the case might be related to frosts harder or longer than usual, when already certain works could not be postponed further or works specifically related to ice were carried out and paid.

In the same week, a field survey took place in Central Hungary in the Eastern Transdanubia, in *possessio Feven* (Fövény: later deserted, today Fövenypusztá) – in the neighbourhood of *Batthyan* (Szabadbattyán, near Székesfehérvár; see *Fig. 1*) –, whose results were described in a charter dated 10

²⁶ "Item Am Sambstag Kathedra Petri vj arbaitter dy gerawmbt haben pey den Tamen Im graben und Im Rathaws, snee auß gewarffen haben per j-t d(enar) fa(ci)t iij libra d(enar) / / Item Eodem die (Sambstag for *Invocavit*) prüklein daß er den snee auf wedriczer Tor iij Tag zusammen hat geschart per j libra d facit."

²⁷ "Exposita huius anno 1436-ti / Judice Petro Amthar / Januarius. / Feria sexta in die Ephyfaniae / Item laboribus in glacie...fl. 2 / Item eisdem super eodem labore...fl. 3."

(GC: 19) January 1436. Although the land was ordered to be given (back) to its old landowner, the introduction of the rightful landowner to the landed property did not take place, as the perambulators decided to complete the procedure 'after the frost of the ground release, as soon as possible,' but latest on 22 February (GC: 2 March; HNA, DL 103576).²⁸ Based on medieval perambulation practices, the reasoning most probably means that the ground was frozen enough that it did not permit the perambulators to dig the ground and raise earth landmarks, which circumstance suggests considerable prolonged mid-winter frosts and also that most probably there was rather thin or no snow cover in the days of the land survey; but this alone does not necessarily mean an unusually cold winter condition.

Not much is known about the winter in Central Europe; according to Glaser (2013, p. 80), there was cold average winter in 1436. However, the mid-/late winter (January-February) was severe in Albania (Telelis 2008).

Heavy rain(?) causes damage in the north-east: the summer of 1436

On 29 June (GC: 8 July) a payment was implemented for the preparations after damages by water in the bleachery of Bártfa (Bardejov-Sk) town (Fejérpataky 1885, p. 365),²⁹ which most probably means a thunderstorm or torrential rain. Two weeks later, a great thunderstorm with downpour swept away the mill at Karlštejn in Bohemia (Brázdil-Kotyza 1995, p. 129).

THE HARD WINTER OF 1437 IN THE NORTH-EASTERN AND CENTRAL PARTS OF THE COUNTRY

On 4 and 11 (GC: 13, 20) January, two payments for one-one workers 'in the ice' were included in the Bártfa (Bardejov-Sk) town accounts (Fejérpataky 1885, p. 372).³⁰

Although the next charter is dated to 1 May, the description clearly refers to the same winter, when the harbour and ferry place owned by the Chapter of Buda – usually used for crossing the river also in winter – were so much frozen that people left the crossing place and rather started using the ferry at *Jenew* (Jenő; today part of Budapest), belonging to the nunnery of the *Insula Leporum* (Rabbits' Island; today the Margaret Island). Because of the hot springs of Buda, the Danube rarely froze over completely in the entire Budapest area, and some ferries were in use throughout the winter (Fejér 1843, pp. 862-864).³¹ The temporary desertion of their ferry was rather important and unpleasant for the chapter since one-third of all the incomes of this ferry place was possessed by them and thus, they lost this significant source of profit. Apart from the conflict with the ferrymen who did not want to pay this difference, the chapter reasonably feared the possibility that the customers might not return to their ferry even after the hard winter and, in this way, the temporary change might become the new norm. Thus, the origin of the problems was that the Danube heavily froze over this winter, much more than usual.

1437 was another severe winter in Bohemia, at this time without snow. There were so deep frosts that cattle got frozen, and fruit trees perished. Similar reports are known from the German areas where vine stocks, winter crops were damaged, and waters froze over during this severe winter (Brázdil-Kotyza 1995, p. 129, Glaser 2013, p. 80).

²⁸ "..., et reliqui supra nominati ante prescriptorum diem Cinerum resoluti gelu Terrae, citius, ut fieri poterit prescriptas Terras Possessionis nostra Feven nominata, a parte Possessionis terram Batthán..."

²⁹ "Feria sexta in die Petri et Pauli / Laboratoribus in alatorio ratione dampnorum illatorum per aquamden. 100."

³⁰ "1437. / Exposita huius anni et primo / Feria sexta ante Ephyfaniae / Item uni laboratori in glacie....den. 14 / Feria sexta infra octavas Ephyfaniae / Item uni laboratori in glacie....den. 6."

³¹ "....., quomodo Magistri nautarum nostrorum de Portu seu vado Pestiensi, tempore hyemali nouiter praeterito, naues eorum, aquam Danubii inter Ciuitates nostras Pestiensem praedictam et Budam fluentem, gelu constringente, in loco solito transitum non habent. ipsas eorum naues sursum ad portum et vadum de Jenew, religiosarum Dominarum, Sanctimonialium claustrum de insula leporum, cuiusquidem vadi prouentuum et obuentuum directa tertia pars ipsorum Praepositi et Capituli existit, ad aquam videlicet fluentem adducendo, homines cum eorum rebus nec non curribus et annualibus, multis diebus, ipso gelu durante, hinc inde per eundem vadum transfretari faciendo, et nulum seu pretium nauigii exigendo, et portionem prefatis Praeposito et Capitulo exinde cedere debentem, ipsis minime administrando, eandem pro se ipsis minime administrando, eandem pro ipsis vsurpassent, in ipsorum Praepositi et Capituli praedictorum praepudicium atque damnum."

WHEN THE GAME ENDS: LETHAL SNOW(BALL) FIGHT IN THE WINTER OF 1438 (OR 1437?)

Reported on 12 May 1438 in the papal supplication register, most probably sometime in the winter of 1438 or in the previous year, a Dominican monk with his fellows played with snow (presumably snow-ball game), while playing rather intensively, one of his fellows with fragile health conditions received a snow(ball) hit that became lethal, as the fellow died in 52 days. The lethal accident was followed by an inspection (Lukcsics 1938, p. 164).³² As we could see before, the winter of 1437 was hard but reportedly snowless in the areas of Central Europe with weather reports; no information in Central Europe is currently available about the character of the winter of 1438.

THE YEAR 1439

Hard winter in 1439?

The *Annales Mellicenses* referred to a destructive ice (jam) flood at Krems in this year (Pertz 1851, p. 519), which most probably also reached Hungary; however, from this year, no account books survived in Pozsony, and the remaining other sources are also silent about the weather of this winter. Only indirect information raises the (rather probable) possibility that there was also a destructive ice jam flood in Hungary this year (see Kiss 2019a, pp. 489-490).

Summer drought in the south

As already discussed by Kiss (2017), Johann Rothe in the *Düringische Chronik* (Liliencron 1859) reports about the very dry conditions in the south of Hungary, where the marsh(es) called 'Mossir' (a corrupted form of the Hungarian word 'mocsár'=swamp, marshland) rather much dried up in this summer.³³ The author or the original eye-witness of this information – who particularly emphasised the drought of the summer – probably was in the army or the king's company reaching the south of Hungary during (or in relation with) the military campaign in (mid-/late) summer 1439. Naturally, we have to take into account the author's concept about summer, slightly different from the local view, but the drying up of the marshlands is clearly a further indicator supporting the conclusions of the German author about the dry character of the summer. As we can see in the next case, the summer was also hot that further supports the idea of a notably dry (spring-)summer period.

August-September 1439: great heat caused gripes, dysentery in the south that killed the king

According to Antonio Bonfini, some unexpected problems arose in late August when a Hungarian army with Hunyadi and the king in the lead, marched against the Turks, in the camp at Titel (Titel-Srb), along the River Tisza near to its inflow to the Danube. The army was not large enough for an open battle against the approaching Turkish armies. Moreover, after a while, the king had to send away the soldiers and return to Buda because of a riot among the soldiers in the Hungarian camp. Namely, the soldiers wanted to leave as they suffered from severe gripes and dysentery caused by the great heat that were rather frequent and dangerous close to big rivers and marshlands. After returning to Buda, the king (Albert I) himself also suffered from gripes and dysentery that became even more severe because of

³² "Supplicat Nicolaus prior conventus S. Nicolai de oppido Segedinensi ordinis Praedicatorum, Baciensis d., pro absolutione irregularitatis, quam tali modo contraxit, quod cum olim hyeme ipse et Mathaeus frater dicti ordinis iter faciebant, dictus Mathaeus cum quodam familiari Vesprimiensis d. invicem recreationis causa nive colludebat et ludus inter illos se ad furorem evexit, dictusque familiaris, natura infirmus, icto accepto infra quinquaginta dies e vita migravit."

³³ "801. Wie die Torcken yn das lant zu Ungirn quomen Mossir Nu was der sommer etzwas dorre unde trocken, also das yn den landin das wassir gnant die Mossir gar vertruckent was, ..."

overeating honeydew melon. In Neszmély (West-Hungary) on 27 October, he died in dysentery, on the way to Vienna (Bonfini 1543, pp. 415-416).³⁴

From our present point of view, the great heat of late August and (early) September is of particular importance, and also the fact that this heat – in a wetland environment – greatly supported the appearance and a quick spread of dysentery and related illnesses in the camp. There is no data available in Central Europe for this summer, but the previous report and the tree-ring based summer precipitation reconstruction of the Old World Atlas (Cook et al. 2015) suggests considerable drought this year, and dry conditions are often accompanied in the summer period by hot weather.

THE YEAR 1440

Winter 1440 in Poland and Hungary – according to Długosz

In the kingdom of Poland and in surrounding territories, there was hard winter in 1440 (Długosz 1711, pp. 726-727).³⁵ Jan Długosz, so well-informed in Hungarian affairs, under 'surrounding territories' clearly also meant Hungary or at least parts of it. Furthermore, he provides a rather detailed description not only of the severity of the weather but also the broader antecedents and consequences: these are worth discussing in more detail.

First of all, according to Długosz, the very great snow and frost lasted from 11 (GC: 20) November 1439 through the entire winter and spring until around 24 April (3 May!), and – as Długosz himself emphasised – this meant that the snow stayed and the waters and grounds were also frozen until that date. The frosts during this winter were very intense, causing great destruction in fruit trees, and many of the four-legged domestic animals also died. Furthermore, we learn that the harvest in the previous year was already bad and caused dearth and starvation; people made bread from leaves and roots insufficient in the long term for human consumption. Consequently, many people got ill and were infected by pestilence (plague?). Moreover, the long and severe winter caused an even greater need and dearth, and many starved to death. People tried to give any old straw to the sheep and cattle to feed them, but the animals greatly weakened, and many died of starvation and the very late start of the spring.

Thus, in 1440, the winter was extraordinarily hard and long and, even if the description primarily reflects the conditions in Poland, exactly because of its reference to the neighbouring lands, at least to some extent, might have been relevant for Hungary, too. Fortunately, rather detailed accounts are available in Pozsony/Pressburg (Bratislava-Sk) from this winter, which makes it possible to compare the winter severity information gained from Długosz and from the Pressburg accounts. In Bohemia, this extraordinary winter lasted from 12 (GC: 21) November to 4 (GC: 13) April in 1439-1440, and the winter

³⁴ "Iam fines Vngariae Turcam, propagato plus opinione imperio, attigisse uident, immo pro foribus immitissimum praepotentemque hostem conspicantur. Sed quum post captum oppidum, dimissio tantum praesidio, Turcas hinc abiisse sensissent, ipse quoque Rex oborta in exercitu seditione, qui prae nimio aestu, uentris profluuio misere absumebantur, castra soluere coactus, Budam reuertitur. Ob ingentem aestum, quem in ea expeditione subiuerat, in profluuio alui perniciosamque dysenteriam concidit. Morbi causam, peponum arguunt fuisse edacitatem: nam dum praecordia, cum gluae oblectamento, refrigerare contendit, suae uitae tetendit insidias. Quamobrem quum aluus sisti non posset, praeuissa morte, ut in patria regione moreretur, Viennam uersus iter coepit: uenit Strigonium, obi prae languore aliquantis per immoratus est, sed cum Strigonio profectus, in uicium peruenisset, qui Nesmel dictus est, ingrauersente morbo, testamentum condidit: & secto calendas Novembres, ibi uita decessit."

³⁵ "Erat anno illo in Regno Poloniae & partibus circumvicinis hyems valida & aspera, quae multas arbores fructiferas sua asperitate deleuerat, & magnam fecerat in quadruedibus mortalitatem. Male insuper aestate praeterita frumenta prouenerant, & caristia magna vbique vigente, plures mortalium fame tabescentes moriebantur, nonnulli ex pinguedine & superfluitate arborum, quae Polonice lemola uocatur, nonnulli ex aliis herbis, solis, & radicibus panem facientes vorabant, qui postea aestate aduenente quasi quadam peste infecti moriebantur, nobiles et rustici detrahebant stabulis antiqua stramina & paleas, ut illis utcumque poterant esuriam et clamorem pecorum et pecudum mitigabant. Nix enim grossissima a festo S. Martini descenderat, et toto hyemis et ueris tempore vsque ad diem S. Gregorii cum intenso gelu durabat, nec erant aut niues, aut glacies, nisi circa festum S. Gregorii dissolutae, praebebantque et per terram et per fluuiorum alueos euntibus transitum. Vnde et ciconiae de calidis aduenientes oris, cogebantur pressae frigore hominum domicilia quasi domestica animalia intrare, et illic stare, donec resoluarentur glacies et niues, et tempus mitius et calidius superueniret. Multae uero aliae aues asperitate hyemis extinctae sunt, hybernae autem glacies vsque ad diem S. Gregorii fluuios tenebant, campos, syluas, montes, colles & saltus quoslibet niues obduxerant."

was similarly extremely long and cold in most of Europe as well (Malewicz 1980, Brázdil-Kotyza 1995). The winter started rather early, in mid-November also in the Low Countries, and – just like in France – the winter, in general, was unusually hard, especially its beginning (Buisman 2000, pp. 557-558). As in most parts of Europe, this winter was also unusually cold in Scandinavia (Retsö-Söderberg 2020, p. 36)

The hard (late autumn-) winter (-early spring) of 1439-1440 in the Pressburg accounts

Owing to the payment entries of the Pressburg accounts, it is possible to provide a detailed picture of the long and severe winter of 1439-1440. As this is the first account book with plenty of weather information, here – as a model example – the evidence is presented according to the account book chapters that contain weather-related information (for the rest of the 1440s weather data will be separately discussed by year and season). In the 1439-1440 account book, as in other account books of the 1440s, most of the weather data are related to four payment groups: 1) all kinds of (mixed) expenses for the town's necessities (*Czeancziges...*); 2) town messengers' wages (*Stat poten lann*); 3) bridge- and ferry-related expenses, particularly the special bridge expenses (in a number of small chapters listed later) and 4) the payments for breaking the ice in the town moat (*Eys hacker Im Stat graben*; only occasionally present in other years). However, it is important that not necessarily all the expenses paid by the town were documented in the accounts, and the works paid by someone other than the town (even if the works were carried out also for the town) were not included in these accounts.

1) All sorts of (mixed) expenses for the town's necessities (*Czeancziges ausgeben zu der Stat notdurift Allerlay*)

On 26 November (GC: 5 December), the town paid for woodcutting in the cold weather (AMB K2, 71).³⁶ On 7 (GC: 7 December) December, the road on the Danube (i.e. over the ice of the Danube) was ready (AMB K2, 75),³⁷ suggesting firm ice cover over the Danube at Pozsony, and the ice was mostly strong enough to hold people in early (GC: mid-) December, even if in some places perhaps it might have been artificially thickened to increase its holding capacity. On 20 (GC: 29) January, three workers were paid who cleared the Town Hall's roofs of snow (AMB K2, 87).³⁸ On 22 (GC: 31) January, payment for two small work(er)s were recorded in the town accounts for clearing the gutters of snow, particularly at the Town Hall (AMB K2, 88).³⁹ On 26 January (GC: 4 February), eight small work(er)s were paid for pulling out the stabs from the (bridge?)yokes in the ice (AMB K2, 89).⁴⁰ On 31 January (GC: 8 February), three workers were paid to clear the Town Hall's roofs of snow.⁴¹

On 1 (GC: 10) February, six workers were paid for clearing the stairs and the town wall of snow.⁴² On 3 (GC: 12) February, six workers were paid for taking the *Pleten* (shallow watercraft) from the ice.⁴³ On 4 (GC: 13) February, three small work(er)s were paid for cutting a ship from the ice (AMB K2, 90).⁴⁴

³⁶ Item eodem die (Am pfincztag noch katherine virginis) j knecht der dem furman gehautreicht hat daß holcz auszennänn (meaning: auszinnen?) In der kelden xij d(enar) wienn(er).

³⁷ Item eodem die (Am Mantag In vigilia Concepcionis marie virginis) viij aribatern dy den weg gemacht haben uber dy Tuna noch der herren gescheft per xij d(enar) wienn(er) uber daß eyß facit lxxxxvj d(enar) wienn(er).

³⁸ Item (Am Mitichen noch Anthonij tag) und iij aribatern Im Rathaüs der Snee von dem Rathaüs von dem dächarn fuder gewarffen haben, ydem xj d(enar) wienn(er) facit xxxij d(enar) wienn(er).

³⁹ Item auch an dem tag (freitag vor sand Pawlß bekerung) ij klain aribatern sunderlichen dy Snee In dem Rathaüs von den Rynnen fuder gewarffen haben per xj d(enar) facit xvij d(enar) wienn(er).

⁴⁰ Item auch an dem tag (Erichtag noch sand paul bekerung) viij klain arbatern dy dem maister hausen haben helffen auszziehen Stekken von den Jochern In dem Eyß ydem xj d(enar) wienn(er) lxxxij d(enar) wienn(er).

⁴¹ Item auch an dem tag (Sambstag vor unsere liben frawen der liecht mesß) iij aribatern dy Snee In dem Rat haüs von den deharm fuder geraumt haben per ix d(enar) wienn(er) fa(ci)t xxvij d(enar) wienn(er).

⁴² Item Am Mantag an unsere lieben frawen tag obund der liecht mesß vj klain aribatern noch der herren gescheft dy Snee von den Stiegen und von der Stat mawer fuder gewarffen haben und den Stand gepessert haben auf dy mawer ydem ix d(enar) wienn(er) facit liij d(enar) wienn(er).

⁴³ Item auch an den tag (Mitichen noch unsere lieben frawen tag) vj aribatern alß dy pleten Im eyß lag daß sy dem veitl und dem laris dy auß dem eiß gewonnen haben und dy derschept haben per xj d(enar) facit lxij d(enar) wienn(er).

⁴⁴ Item Am pfincztag noch unser frawen tag der liecht mesß iij klain aribatern dy ein Schieff auß dem eyß aus gehakt haben und daß geeyst haben mit dem verten ydem xj d(enar) wienn(er) facit xxxij d(enar) wienn(er).

On 5 February, three companions cleared the gutter and the pavement of snow where the wind had blown it from the roof (AMB K2, 91).⁴⁵ On 16 and 18 (GC: 25, 27) February, ten-ten workers were paid for helping carpenters to pull off stabs in the ice,⁴⁶ while on 17 (GC: 28) February, the town paid again for clearing the's Town Hall gutters of snow (AMB K2, 92).⁴⁷ On 26 February (GC: 6 March), two small work(er)s were paid for clearing the gutters and the pavement (attic?) of snow that had been blown there from the roof (AMB K2, 93).⁴⁸

On 1 (GC: 10) March, another payment was initiated to two workers who cleared the stairs and the town wall of ice, and another three workers were paid, amongst others, for clearing the gutters and the pavement (attic?) of snow.⁴⁹ On the next day, half-day works of two people were paid for clearing the snow at the wall near the Vödritzer Gate (AMB K2, 94).⁵⁰ On 7 (GC: 16) March, the road over the (ice of the) Danube was prepared (again, after made already once in December), most probably for the queen's arrival.⁵¹ On 11 (GC: 20) March, the ice jam moved, and six workers went after the woods that belonged to the bridge. On the same day, six workers were paid for removing the ice (AMB K2, 95).⁵² On 12 (GC: 21) March, further workers cleared ships of ice. Paid on the same day, a fisher was sent as a messenger on the Danube partly (still) running with ice and, after the ice jam moved further (i.e. left), the sailors went to search for ships and wooden materials (of the bridge) (AMB K2, 96).⁵³

On 25 March (GC: 3 April), two workers were paid again for clearing the snow off the gutter of the Town Hall and from the pavement (attic?) in the house of Hans Pauern. On the same day, four workers were also paid for clearing the snow off the stairs and the wall (AMB K2, 96).⁵⁴ Although, of course, there is always a chance that the workers were paid days later than the work had been carried out, usually such simple works were paid quickly, often on the same day. Here there is a slight problem with the dating as the account dating suggests Friday before *Annuncionis Marie*, and Saturday as the day of *Annuncionis Marie*, while in 1440 *Annuncionis Marie* fell on Friday and in 1441 on Saturday. Since the other entries fit the 1439-1440 dating – and, consequently, do not fit the 1440-1441 dating – this could be a simple mistake of the chamberlain, as he also made small counting mistakes (e.g., see the last entry).

⁴⁵ Item auch an dem tag (Am Freitag an sand Agathen) iij gesellen dy Snee In dem Rot haws von den Rynnen fuder gewarffen haben und von dem Estreich do der wint daß dach fuder gefuert hat xiiij d(enar) wienn(er).

⁴⁶ Item auch an dem tag (Erichtag noch sand valentini deß heiligen martir) x aribatern dy den zymmerleuten auf dem eyß Steckhen haben ausczihen helffen ydem xj d(enar) wienn(er) facit iij s(ilber) d(enar) wienn(er). /...../ Item auch an dem tag (pfincztag noch sand valentini tag deß heyligen martier) x aribatern dy den zymmerleuten auf dem eyß Stekchen haben aüsczihen helffen ydem xj d(enar) wienn(er), facit iij s(ilber) d(enar) wienn(er).

⁴⁷ Item auch an dem tag (Mitichen noch sand Valentini tag des heiligen martier) ij aribatern dy Snee In dem Rothaus von den Rynnen fuder gebarffen haben ydem xj d(enar) facit iij s(ilber) d(enar) wienn(er).

⁴⁸ Item auch an dem tag (Freitag noch sannd Mathiaß) ij klain aribatern dy Snee In dem Rathaüs von den rynnen fuder gewarffen haben und von dem estreich do von der windt daß dach fuder gefuert had ydem xj d(enar) wienn(er) facit xxj d(enar) wienn(er).

⁴⁹ Item Am Erichtag noch Oculi hab wir gehat ij aribater noch deß herren Matheß Mendl gescheft dy daß Eyß von den Stiegen fuder gerawumpt haben und von der Stat mawer yder ein halben tag per v d(enar) facit ix d(enar) wienn(er). /...../ Item auch an dem tag iij aribatern dy ainß tailß holcz in dem Rathaüs gehakt haben In dy herren stuben und den Soldnarn und Snee fuder von den Rynnen gebarffen haben und von dem estreich ydem ix d(enar) wienn(er) facit xxvij d(enar) wienn(er).

⁵⁰ Item Am Mitichen noch Oculi ij aribatern dy Snee ein haben tag von der mawer pey Bedritzer thar fuder gebarffen haben noch deß Bartolomei Scharrach gescheft ydem j tag v d(enar) wienn(er) facit x d(enar) wienn(er).

⁵¹ Item Am Mantag noch Letare hab wir geben zu der zeit allß herr peter Inngettel gerieten ist zu der kunigin iij gesellen dy ym den weg uber dy Tuna gemacht haben noch daß purgermaister gescheft hab wir geben xx d(enar) wienn(er).

⁵² Item Am Freitag noch letare vj aribatern dy nach dem prukholz gefaren sein, daß der stoß hin gefuert hat ydem xj d(enar) wienn(er) lxiiij d(enar) wienn(er). /...../ Item auch an dem tag vj aribatern dy daß Eyß fuder gerawumpt haben zu der pleten daß man dy gewonnen hat ydem xj d(enar) wienn(er) facit lxiiij d(enar) wienn(er).

⁵³ Item Am Sambstag Gregorij pape mer vj aribater dy mer gerawumpt haben daß eyß von der pleten zum anderen mal ydm xj d(enar) wienn(er) facit lxiiij d(enar) wienn(er) / Item auch an dem tag (Sambstag Gregorij pape) hab wir geben den fischer gesellen daß sy in Stat poten uber dy Tuna gefuert haben allß dy ainß tailß mit eyß gieng der ken koczsee gelauffen ist noch den Soldnern dem nidendran und sein gesellen j pint wein xij d(enar) wienn(er) /...../ Item auch an dem tag (Sambstag Gregorij pape) hab wir geben besunderlichen iij gesellen dy mit andern Schifluten gefaren synd und haben Ennßpawm und Strew gesucht und Schif daß der stoß fuder gefuert hat ydem xj d(enar) wienn(er) facit xlij d(enar) wienn(er).

⁵⁴ Item Am Freitag vor unsre frawen tag Annuncioniß marie ij aribatern dy Snee in dem Rathauß von den Rynnen fuder gebarffen haben und von dem Estreich In deß Hanns Pawern hawß ydem xj d(enar) wienn(er) facit xxj d(enar) wienn(er) / Item auch an dem tag iij aribatern dy Snee von dem Stiegen und von der mawer fuder gebarffen haben ydem xj d(enar) wienn(er) facit xlij d(enar) wienn(er).

Reported on 28 March (GC: 6 April), great wind tore off the ropes (of the Danube pontoon bridge) and swept away one of the bridge ships, what the fishers collected and pulled back (AMB K2, 98).⁵⁵

In a later deleted entry (probably paid by someone other than the town), without providing a date, the expenses of a horse are mentioned that was used by Peter Jungetell getting to the queen when the ice was broken under the horse (or both of them; see AMB K2, 100).⁵⁶ Most probably, the accident happened around the time when the queen was travelling to Pozsony/Pressburg after giving birth to her son (the latter Ladislaus V) in Komárom (Komarno-Sk).

There are further payments for works, consequences of damage caused by ice, in April (AMB K2, 104, 105, 111; and May, later also: K2, 259) and even in June (AMB K2, 129); however, as in these cases the past destruction is mentioned, the payment entries could be connected still to the winter and early spring events.

2) Town messengers' wages (*Stat poten lann*)

The town quite often sent messengers to the settlements in the neighbourhood or further, to Vienna, Buda or different parts of Austria. In some cases, the messengers had to endure severe weather conditions, for example, very cold weather or strong winds, snow or other weather-related difficulties, in which cases usually they were entitled to more wage, introduced into the account books together with the reason of extra payment. On 20 (GC: 29) November 1439, a messenger had to travel in great coldness,⁵⁷ on 22 November (GC: 1 December), there was not only great coldness but also significant wind,⁵⁸ while on 2 (GC: 11) December, again the great wind made the messenger's task more difficult (AMB K2, 194).⁵⁹ On 23 December, messengers travelled in great coldness to Stampfendorf in Upper Austria (AMB K2, 196);⁶⁰ on 5 January 1440, a messenger was sent to Köpcsény/Kittsee (located between Hainburg and Bratislava, in Austria) and Hainburg – both in great snow.⁶¹ On 10 (GC: 19) January, messengers travelled to Marchegg (north of Hainburg) and Peilstein (Upper Austria?) again in great snow,⁶² similar to the messenger who travelled to Nagyszombat (Trnava-Sk) a week later, on 17 (GC: 26) January (AMB K2, 197).⁶³ On 7 (GC: 16) March, a messenger was paid for taking letters to Vienna on a rather dangerous mission as the Danube was running with ice (AMB K2, 199).⁶⁴ Note that the town messenger's wage can as well appear in other expense groups such as the town's general mixed expenses.

3) Bridge (and ferry) related expenses

In a short list of ferry-related expenses (*den urfar gesellen wohnern*), a payment on 5 (GC: 14) December suggests that the Danube froze over on the very same day (AMB K2, 251).⁶⁵ The same infor-

⁵⁵ Item Am Mantag noch Ostern In dem grossen wint alß der windt daß tawffel ab raiß und j prukschieff do hab wir geben den Schifleiten daß sy daß tawffel und daß prukschieff auf haben gefangen und daß hin wider gegen dem wasser ausher gefuert und gezogen haben zu lan und den zymerleit zu vertrinkchen lx d(enar) wienn(er).

⁵⁶ (Am Suntag noch Ostern) Mer von dem Roß herr Peter Jungettel gesprochen hat in dem eyß alß er zu der kunigin gerieten waß, und den Smidknechten umb iren Sikt und Müe iij s(ilber) d(enar) wienn(er).

⁵⁷ Item Am Freitag noch Elyzabeth j poten noch der herren gescheft ken wienn, dem wisinger In grosser keld iij s(ilber) d(enar) wienn(er).

⁵⁸ Item auch an dem tag (Suntag vor Katherine virginis) poten ken weinn zu dem hueb mister noch herren gescheft In grosser keld und wind lxxxvij d(enar) wienn(er) /...../ Item auch an dem tag (Suntag vor Katherine virginis) mer j poten ken Marihek und von dan ken Stampha In grosser kel xl d(enar) wienn(er).

⁵⁹ Item Am Mitichen noch sand Andre ainem poten dem wisinger ken weinn Im unfrid noch der herren gescheft. Im grossen windt lxxxiiij d(enar) wienn(er).

⁶⁰ Item Am Mitichen noch sand Thomas tag j noch poten kenn Stampha noch deß purgermaister gescheft und deß kunigfelder gescheft In grosser kelten alß auch dy veint do weren xxj d(enar) wienn(er).

⁶¹ Item (Am Erichtag an der heiligen frey künig obund) und mer j poten der nacht ken koczse und ken hainburgk In grossem Snee dem mert pehem noch deß purgermaister gescheft xxxvj d(enar) wienn(er).

⁶² Item Am Suntag noch der heyligen drey künig tag ainem poten ken Marihek und feyrer den der purgermaister selver ausgeschickt hat und ken peylenstain in grossem Snee xliij d(enar) wienn(er).

⁶³ Item auch an dem selbigen tag (Am Suntag An Sand Anthony tag) j poten ken Tyrna mit ainem prieff zu herren Stephan In grossen Snee lvj d(enar) wienn(er).

⁶⁴ Item Am Mantag noch letare j poten kenn wyenn zu dem herczog Fridereich von Osterreich, und zu dem von Schawmburg mit brieffen In posen weg alß dy Tuna mit eyß ran do er cham iij s(ilber) d(enar) wienn(er).

⁶⁵ Item Am Sambstag vor Nicolai episcopi hab wir geben iij urfar gesellen und haben ydem geben ein wochen iij s(ilber) d(enar) wienn(er),

mation also appears, similarly under 5 December, in the short accounts of the toll officer (*dem hanns preussen pruk(er)*) indirectly suggesting that the bridge was still in work on that day (AMB K2, 253).⁶⁶ Further temperature-related information can be gained from the special (mixed) bridge-related payments (*Czeancziges Ausgeben zu der pruk*): on 20 (GC: 29) and 23 March (GC: 1 April), the types of works – typical after the ice jam and/or the heavily running ice – had left, were paid, namely the sailors were collecting ships and the woods that had gone loose from the bridge (AMB K2, 258).⁶⁷ Similar works, after the destruction of ice, continued in April, May and June (AMB K2, 259, 261).

4) Payments for breaking the ice in the town moat (*Eys hacker Im Stat graben*)

The ice cutter received a payment every time after two weeks of work. The payments were recorded in the account book under the title '*Eyß hacker im Stat graben*' (AMB K2, 372), covering every week when the ice cutter was at work. The ice cutter received 36 Viennese denars as a salary per week; the first two-week period with a salary was from 14 (GC: 23) November to 28 November (GC: 7 December) 1439.⁶⁸ From 28 November 1439, without a break, regular payments (72 denars every two weeks) continue until 12 (GC: 21) March, which are followed by a final payment for only one week, until 19 (GC: 28) March. The chamberlain ended the ice cutter's payment list by noting that, with this last entry, the cold partly ended ("*Item und hat ein end ains tails der Kalt*"). This statement may suggest that – although the steady freezing conditions were over – perhaps this was not the end of the winterly weather, and the cold conditions, even if to a lesser extent, were still present for a while (or occasionally) after 19 (GC: 28) March.

In conclusion, the beginning of the winter mentioned by Długosz fits the dating in Pozsony, where the first two-week payment for ice cutting was provided for the period between 14 (GC: 23) and 28 November (GC: 7 December), and strong frosts had to start at least a couple of days before the ice became strong and thick enough so that cutting became necessary. On 5 (GC: 14) December, the Danube froze over so much that the road over the ice was prepared within two days.

Snow cleaning was mentioned on 20, 22 (GC: 29, 30) and 31 January–1 (GC: 9, 10) February that suggests at least three notable or great snowfall events in late January. Furthermore, messengers travelled in snow already on 5, 10 and 17 (GC: 14, 19, 26) January that suggests significant and long-lasting snowfall(s) in the first half of January, too. At least three other notable or great snowfalls occurred in February – mentioned in snow cleaning payments on 5, 17 (GC: 14, 26) February –, and two in March, recorded on 1–2 (GC: 10, 11 March) and 25 March (GC: 3 April). Based on the number of workers hired and the type of activities, the March snowfall events were not less significant than any of those in January or February.

Preparing for the queen's arrival, most probably just before the ice cracked, the road was again made over the ice of the Danube on 7 March. Interestingly, the messenger who travelled on the same day to Vienna already had to cross there the Danube running with ice. This circumstance suggests that warm air masses arrived and broke up the ice in the Upper-Danube catchment around the beginning of March. Finally, on 11 (GC: 20) March, the ice jam cracked at Pozsony and started moving. On 12 March, the Danube was running quite much with ice; after that, there is no information any more about the presence of considerable ice in the river. In the meantime, ice clearing was also mentioned several times until 12

und an dem selbigen tag ist dy Tuna gestossen, und ir lan ist ab gesagt warden xij s(ilber) d(enar) wienn(er).

⁶⁶ Item Am Sambstag vor Nicolai episcopi hab wir geben dem hanns preussen sein wochen lan, und dy Tuna ward gestossen, und sein Soldt hat ein end. iij s(ilber) d(enar) wienn(er).

⁶⁷ Item am Erichstag noch Domine ne longe xj Schiffluten dy etzleich Schif und Ennspawm aufher gefuert haben dy der Stoß fuder gefuert hat ydem xviiij d(enar) wienn(er) facit vj s(ilber) d(enar) wienn(er)/...../ Item Am Mitichen noch domine ne longe mer xj Schiffluten dy Ennspawm und Schragen gegen dem wasser aufher gefuert haben, daß der Stosß fuder gefuert hat von der pruk ydem xviiij d(enar) wienn(er) facit vj s(ilber) cviiij d(enar) wienn(er).

⁶⁸ Item von dem Sambstag noch Martini untz auf den Sambstag In vigilia Andree apostoli hab wir geben dem Eyshacker Im Stat graben das er tagleich daß eyß ausgehakt hat wen daß not ist gebensen frü und spot daß prengt xiiij tag und haben ym geben von yden wochen xxxvj d(enar) wienn(er) lxxij d(enar) wienn(er).

March, while the last week paid for ice cutting was 12-19 (GC: 21-28) March and, based on the additional comment, after that the very cold weather partly ended.

Accounting with the late March (GC: early April) snowfall event accompanied by frosts strong enough to keep the snow unmelted for a while, winterly weather probably lasted at least until the end of March. Thus, winterly conditions can be traced in the Pressburg accounts until late March; this is a month earlier dating of the end of winter than the late April ending suggested by Długosz, perhaps mainly based on his experience in Poland. Apart from that, in agreement with Długosz, the Pressburg accounts describe an unusually long, cold, snowy – sometimes very windy (e.g. late November–early December) – and therefore severe winter that lasted for (almost) 5 months.

Smuggling Crown and baby-king through North-Transdanubia: late winter–early spring 1440

Rather interesting details about the weather can be gathered from the memoirs of Helena Kottannerin, the wetnurse of the new-born baby of Queen Elisabeth and King Albert I, Ladislaus V. On 21 February (GC: 1 March), Queen Elisabeth, widow of the late King Albert, being heavily pregnant, travelled from Visegrád to Komárom on sledges⁶⁹ that suggests sufficient snow cover on the roads. After giving birth to Ladislaus in Komárom, most probably still in early March (GC: mid-March), the queen and her company crossed the Danube on ice near Pozsony that requires a firm ice cover able to carry the weight of the heavy sledges (with people and goods). However, the ice broke under the sledge of the Silesian princess and other ladies; they had no harm, but all their belongings perished in the water, under the ice (Mollay 1971, pp. 13-14, 17).⁷⁰

May-June weather reports in the memoirs of Helena Kottannerin

Before the coronation of the new-born baby in Székesfehérvár, coming from Komárom, on 12 (GC: 21 May) May the queen and her court crossed the Danube in strong wind, and then travelled to Tata in rain (Mollay, K. 1971. Vol. 2, p. 25).⁷¹ Długosz also described this event and the events before and after the coronation of the baby king, Ladislaus (V), in great detail; he did not mention the weather but provided the date of the coronation (Długosz 1711, pp. 733-734).

⁶⁹ "... Vnd das tet ich vnd kam auf das haws vnd in meinem gewant pracht ich dar von in grosser geheim meiner gnedigen frawn Kran vnd all Ir klainat auf ainem Sliten. Daz si sich dar nach solten richten, wann der wagen kêm, daz Si bereit wêren zu faren gen Gumaren zu i(e)ren gnaden, wann Si hiet mu(e)t he auf gen Prespurk, vnd das het man allem lë(e)rm Hofgesind angesagt. Do nu(e) der wagen bereit was, den man nach den Junkchfrawn solt schickchen, vnd der Sliten, darauf ich faren solt, Danu(e)n die Junkchfrawn vnd das hofgesind bereit waren, daz wi(e)r von dannen solten farn, Vnd der do mit mi(e)r was in den sorgen, Der nam den polster, dar Inn dew heilig kran vernët was, vnd enphalch dew seinem dienër, der im geholfen hiet, daz er den polster solt aus dem haws auf den Sliten tragen, dar auf inch vnd er sassen., daz es verr auf den tag was, vnd solten dennoch desselbigen tags von der Plintenpurg (Visegrád) gen Gu(e)marn (Komárom) komen, als es dann geschach, vnd es sind doch zwelf meil dahin."

⁷⁰ "... Do wir nu(e) geessen heten, do nam der got gesell den polster vnd legt in wider auf den sliten als vor vnd fu(e)eren nu(e) da hin vncz in vinster nacht. Do kam wir an die Tu(e)naw, die was dennoch gesto(e)ssen mit eis, Aber es was an etlicher stat nu(e) du(e)n ward. Do wir nu(e) auf das eys komen, vnd wol enmitten auf der Tu(e)naw, da prast der wagen mit Junkchfraw(e)n ein, vnd viel vmb vnd was ein geschray von den Junckhfrau(e)n vnd macht ains das ander nicht gesehen. Do erkam ich hart, vnd gedacht, wi(e)r mu(e) sten mitsambt der heyligen kran in der Tu(e)naw beleiben. Aber got was vnser helfër, daz kain mensch vnder das eys nicht kam, Aber ander ding, das auf dem wagen was, das viel ettleichs in das wasser vnder das eys. Do nam ich die HerczogInn aus der Slesy vnd die pestenn Junkchfrau(e)n zu mi(e)r auf den Sliten, vnd kamen mit der hilff gotes vber das eys, vnd auch dir andern all. Vnd da wir nu(e) da hin komen gen Gu(e)marn in das haws, do nam der, der da mit mi(e)r kam aus den sorgen, den polster mit der heiligen kron vnd trueg in an die stat, da So wol behalten was, vnd da ich nu(e) in das frau(e)n Zymer kam zu meiner frawn gnaden, do ward ich schon enphangen von der edeln KungInn, die wessat nu(e) wol, daz ich ain gu(e)ter pot gewesen was mit der hilf gotes."

⁷¹ "Da nu(e) das hofgesind zu einander was, das zu Weissenburg mit meiner frau gnad ziehen solt, Do sandt i(e)r gnad zu dem Erczbischoue zu Gran, daz er kêm vnd zug mit ir gen Weissenburgk vnd half i(e)ren Sun zu kro(e)nen. Vnd der kam mit ainem gu(e) ten zeug. Da nu(e) die wiegen was zuegericht, dar Inn man den Jungen Kung solt tragen, Do muesten abeg Vier zu sein, die sein gnad truegen, vnd des phincztags Vor dem Phingstag nach mittag, Da hueb sich die edel kunginn mit dem Jungen Kung, vnd der edel graf von Zily vnd die grafen von Krabaten Vnd die herczogen von Lynndbach vnd kam auch der gross graue her Larencz vom Haydenreichstu(e)renn in gelaitt zu meiner fraw(e)n gnad. Dar zu kam ain grosser windt, nach half vns got mit freuden hun v(e)ber, do wir hin v(e)ber komen, ... Vnd het vast geregent, daz es po(e)s zu geen was. Do was ain fromer Ritter Da, Der hies her Hanns der Pielahër, der weis hait mich durch das gemu(e)s. Vnd do wir zu dem Totans komen, da was es nu(e) vinster nacht, vnd bleiben da vber nacht."

After the coronation in Székesfehérvár, which according to Długosz was on 15 May (GC: 24 May), Helena Kottannerin travelled with the baby-king through the Northern Transdanubia. She travelled from Székesfehérvár to Győr on a good road but in changeable weather: in the way to Tata, sometimes it rained heavily, sometimes the wind was so strong that the baby king could hardly open his eyes, and sometimes it got so hot that the baby was sweating all the time (Mollay, K. 1971. Vol. 2, pp. 30-31).⁷² In the last part of their journey to Sopron, in the way from Eisenstadt to Sopron – before 12 June but most probably end of May, beginning of June – it was rainy, and finally, there was a huge shower in the Sopron area followed by a 'never-seen' (flash) flood of waters (Mollay 1971, pp. 34-35).⁷³

In conclusion, at least the second half of May and early June were wet, but not all the time wet as sometimes it was also warm and changeable, which is an overall not unusual weather in late spring and beginning of summertime. In theory, this means altogether favourable weather conditions for the development of grain unless the rain was too abundant much or the type of devastating, torrential rain. Only one torrential rain (in the Sopron area) was clearly described, while the very muddy roads and much rains mentioned can, but does not have to, refer to a higher than average precipitation in the late spring–early summer period.

No information is known about the character of spring, but June was rather wet and cool in Paris (Buisman 2000, p. 558). Tree-ring evidence suggests rather dry (spring-)summer conditions in the Carpathian Basin as in most of Europe (Cook et al. 2015).

1440? (or 1441, 1442): deserted vineyards and bad harvest(s) of hay in Pozsony

In a contemporary document (letter of application), only known from the 'History of Pozsony' by Tivadar Ortway (1900, p. 164), the town citizens complained about the problems related to bad fodder harvest and grave (multiannual) problems in the vineyards, and asked Queen Elisabeth for the reduction of their taxes (in 1440).⁷⁴ Ortway did not provide more information about this application, and for the source availability he only referred to a certain local chartulary (*Memoriale Rakovszky: Dipl. Pos. I. 833*) whose whereabouts are currently unknown. As the town applied to Elisabeth, this application had to be written before 19 December 1442 and most probably after the summer of 1439. The severe problems and bad condition (as well as desertion) of vineyards may refer to a series of hard winters (e.g. 1437, 1439, 1440, 1442 – but one can list most winters of the 1430s) when the vine stocks could be potentially damaged; but – taking into consideration the plague in 1441 and the siege of Pozsony in February–March 1442 – pestilence and war destruction might also be a likely reason. However, as we will see in the late autumn 1440 case (see below), the Pressburg accounts do mention higher prices of fodder (hay, oats), while the severe lack of fodder also appears in narrative sources during the siege of the town in February-March 1442. In conclusion, as suggested by Ortway, the dating of the application is most probably 1440, but the early months of 1442 can also be a possible dating.

⁷² "Da nam ich in an den armb vnd trueg in ainen gueten weg, vnd die am gieng mit, vncz das wir mued waren, da legt Ich In wider in die wiegen. Vnd der wechsel werat all die weil wir v(e)ber Land zugen. Ettwann regnats, daz der edel Kung oft vast ward begossen, Wann wir heten vns nicht zugericht auf ain lange Reys, sunder auf ain Kuercze. Vnd het ain ku(e)rsen mit mi(e)r aus gefuert zu meiner notdurft Vnd wann der regen als gras was, so dekchat Ich die kuersen auf die wiegen, vncz daz si vast nas was, so lies ich sy dann ausreiben vnd dekchats dann wider auf die wiegen, als Lanng sein (nat) nat was, es was auch ettwann (10) der wint als gros, daz es in die wiegen stab, daz der edel Kung die augen kawm aufgetet. Es was auch ettwann also hais, daz er aller swiczet, daz trophen auf im lagen vnd gewan dann vil hycz plateren."

⁷³ "Vnd do wir nu(e) schi(e)r komen gegen der Eysnein stat v(e)ber, Da waren wi(e)r aber in sorgen, Wann (35) man het vns gesagt, es wër ain michlër zeug von geraisigen in die Eysnein Stat komen vnd es wëren auch veint. Vnd es regnat gar vast vnd wir warn gar still vnd farchten vns hart. Vnd da wir nu(e) schier zu Odenburgk komen, do gieng man mit dem heiltumb aus der Stat vnd ain michel volkch mit von frau vnd von manen, dem edelen kung entgegen vnd enphiengen in als i(e)ren naturlichen herren, vnd da wir nu gen O(e)denburgk komen, da nu wolten wir da rasten. Nu solt ir merkchen, daz desselbigen nachts, als wir komen waren, da kam ain solcher grasz wasser flus, daz kain mensch in der ganczen gegent was, daz ains also aines grossenn wasser flus mocht gedenkchen."

⁷⁴ "Item man mag In gnaden auch erzellen, wie die Stat kainerlay nucz noch Rentt nicht hat, weder vil noch wenig als gandre stett mer allein die weingarten die haben, uns ettlich Jar noch einander gar grobleich gevelet, und besunderleich fert und hew. Dorumb auch maniger weingarten öd bleiben musz und dy armen lewt awuch vil schuldig bleibent den Juden."

Turkish siege of Belgrade in 1440

Jan Długosz, who was especially well informed in Hungarian inner affairs in the early 1440s, mentioned the windy conditions during the Turkish siege of Belgrade in 1440 (Długosz 1711, p. 749).⁷⁵ Even if there were some fights already in spring, recent investigations – also based on Długosz – suggest that the siege of Belgrade was in fact restricted mainly to a few weeks in the summer, ending well before August (Pálosfalvi 2017). Based on this information, the mentioned windy conditions can most probably be dated to early or mid-summer.

Late autumn 1440 in the 1440-1441 Pressburg accounts

As the year 1440 is covered by two account books, and the account book of 1440-1441 covers only the later parts of the year, from now on, the weather information reported in the accounts will be described according to seasons, calendar years and, within these, the chapters where the information was documented, followed by a short conclusion of weather conditions by season (or month, if necessary).

In the accounts of the guard at the Laurence Gate (*Tarhueter Larenczen tar*), located at the south-eastern edge of the town, a rather interesting entry suggests that already on 19 (GC: 28) November 1440, a payment was introduced in the accounts for the weekly work of ice cutting in the town moat (AMB K3, 132).⁷⁶ As the payment covered the week prior to this week, the entry suggests steady freezing conditions in mid-November.

In the bridge-related expenses (*Czeancziges ausgeben der pruk*), on 25 November (GC: 4 December), a higher price of oats was mentioned,⁷⁷ while on 26 November, the Danube was already running with ice (AMB K3, 177)⁷⁸ that requires at least some days of constant frosts, also in Lower Austria. On 29 November (GC: 8 December), the ferryman received a higher wage for the work of carrying wooden boards and straw (all necessary to the bridge) because, as the account book itself explained, in the great coldness both the oats and the hay (for the horses) were more expensive. The Danube was running with ice on the same day.⁷⁹

November frost and Danube ice entries suggest that, similar to the previous year, winter started early this year, already around mid- (GC: late) November, and by this time, due to the great coldness, the fodder became more expensive. Although similar or even greater problems were already mentioned by Długosz in the previous winter, in the Pressburg accounts this is the first time when such a problem is mentioned in the payments.

December 1440 in the 1440-1441 Pressburg accounts

Documented amongst the mixed town expenses (*Czeancziges ausgeben*), on 1 (GC: 10) December, a worker was paid for handling the coaches in great coldness (AMB K3, 51).⁸⁰ On the next day, on 2 December, workers were paid for clearing the snow from the gutters of the Town Hall and for cutting

⁷⁵ "Hi vero qui ex aqua in neuibus pugnabant, non blandiorem fortunam exerti sunt, plures enim naues fulmine bombardarum a castro percussae, ab aquis absorptae sunt, aliae impetu ventorum, ad murum castri, qui nobiliter in alueos Szawe&Danubii protensus est, appulsae, per castrenses captae. Conflictus autem & certamen huiusmodi ab hora prima diei duravit vsque in vesperam, & animos Turcorum spe potiundi castrialacres successu suo perterruit & confregit. Caesar Turcorum magna clade taliter accepta, sex mensibus in castri obsidione incassum exactis, motis castris in terras suas confusus abiit."

⁷⁶ Item Am Sambstag An sand Elsbeten tag hab wir geben dem Jacob Wild sein wochen lan und daß er daß eyß Im Stat graben auf gehakt hat tagleich j lb xx d(enar) wienn(er).

⁷⁷ Item Am Sambstag noch sand kathrey tag hab wir gehat pey der Aussern pruk j furman mit ij Rossen der Enpawm und Strew fuder gefuert hat alß man dy an hueb Abzetragen dem hab wir geben noch deß purgermaister gescheft alß der habern tewer waß lxxxv d(enar) wienn(er).

⁷⁸ Item Am Suntag noch sannd kathreitag alß dy tuna mit eysß ran, hab wir gehat an der Aussern pruk ij wagen dy Ennspawm und Strew fuder gefuert haben ydem lxxxv d(enar) wienn(er), mit ij Rossen facit v s(ilber) xx d(enar) wienn(er).

⁷⁹ Item Am Erichitag an sand Andre obund mer ij furmann yder mit ij Rossen dy Ennspawm und Strew fuder gefuert haben von der Innern pruk und haben geben ydem lxxxv. d(enar) wienn(er) In grosser kelden alß habern und hew tewer waß facit v s(ilber) xx d(enar)/...../ Item auch an dem tag hab wir gehat x gesellen dy dem veit schopper prukschiff haben helffen fueren In dy habern rousen alß dy tuna mit eysß ran, daß man dy geheft hat daselß und haben ydem geben xvij d(enar) wienn(er) facit v s(ilber) xx d(enar) wienn(er).

⁸⁰ Item auch an dem tag (pfinczttag noch sannd Andre tag) hab wir gehat pey dem wagen j aribater der dem wagen gehantreich hat dem hab wir geben, In der grossen kelden xvij d(enar) wienn(er).

the wood (AMB K3, 52).⁸¹ On 21 (GC: 30) December, workers were paid, amongst others, for clearing the snow from the gutters again (AMB K3, 53).⁸²

Recorded in the chapter that discusses the wages of messengers (*Stat poten lann*), on 6 (GC: 15) December, a messenger had to travel to *Saint Marien* (Somorja; Šamorín-Sk). By doing so, he had to cross the Danube – running with ice – back and forth.⁸³ A similar problem, namely the Danube running with ice, was mentioned in another payment entry on 17 (GC: 26) December.⁸⁴ On 18 (GC: 27) December, a messenger was paid for travelling to *Altenburg* (Óvár; today Mosonmagyaróvár-H; i.e. he had to cross the Danube) while the Danube was running quite much with ice, and then the queen further took him (or sent him) to *Raab* (Győr-H; AMB K3, 112).⁸⁵ Payment on 21 (GC: 30) December suggests that the messenger travelled to *Weisen Kirchen* (Székesfehérvár?) in great coldness.⁸⁶ On 26 December (GC: 4 January 1441), a messenger was paid who was first sent to Marchegg and then to Pöttsching (today in Burgenland, Austria – NE of Eisenstadt); after that, the mayor sent him back to Marchegg on bad ('evil') roads (AMB K3, 112).⁸⁷

Based on the entries of the bridge-related expenses (*Czeancziges ausgeben der pruk*), on 1 (GC: 10) December, the Danube was already running thick with ice, so the ferryman with workers took wooden boards and straw from the inner bridge. On the same day, people worked on taking to safe place and fix each ship because the Danube was running strongly with ice, and the helpers did the same with two (bridge)ships from the outer bridge.⁸⁸ Based on the descriptions, the inner bridge over the Danube branch at the town could at that time be a (fixed wooden) yoke bridge, while the outer bridge over the main course of the Danube was a pontoon bridge. Workers were paid on 5 (GC: 14) December for further continuing the latter work with two other ships, and another payment was initiated on the same day for wine to the helpers who so diligently brought the bridge ship in the ice.⁸⁹ The transportation of ships in the ice to the safe place continued on the next day (6 December, Wednesday), when ten ships were taken from the outer bridge in the ice, and two of them were bridge ships.⁹⁰ Without mentioning the ice, the works continued through the rest of the week and next Monday (11 December; GC: 20). On Tuesday and Wednesday, payment records suggest that the Danube was already running with ice, so the bridge ships

⁸¹ Item auch an dem tag (Freitag noch sannd kathrei obund) hab wir gehat besunder Im rathaüs iij aribatern zwen dy Snee von den Rynnen Im Rothaus fuder gewarffen haben und zwen dy holcz gehakt haben zu der herrren stuben ydem xij d(enar) wienn(er) facit xlvij d(enar) wienn(er).

⁸² Item auch an dem tag (Mitichen In die Thome apostoli) hab wir gehat In dem Rothaus iij aribatern zwen holcz hacker und zwen dy Snee von den Rynnen geborffen haben ydem xij d(enar) wienn(er) facit xlvij d(enar) wienn(er).

⁸³ Item Am Erichtag an sannd Niklaß tag j poten ken sannd Marein(?) zu dem weihenperger mit ainem brief alß dy tuna mit eyß gieng daß der pot hat geben uber zu fueren hun uber und hinwider xxij d(enar) wienn(er) hab wir ym geben l ij d(enar) wienn(er).

⁸⁴ Item auch an dem tag (Sambstag vor sand Thomas tag) hat herr ludweig kunigsfelder geschikt zu unsern richter alß dy Tuna mit eyß ser ran ken Altenburgk, und dy kunigin waß von dan fuder geczogin ken Rab den hab wir geben iij s(ilber) d(enar) wienn(er).

⁸⁵ Item auch an dem tag (Suntag vor sannd Thomaß) hat herr Ludweig Kunigsfelder geschikt hinwider ein andern poten mit ainem brief zu unsern richter alß dy Tuna mit eyß ser ran ken Altenburgk, und dy kunigin waß von dan fuder geczogin ken Rab dem hab wir geben iij s(ilber) d(enar) wienn(er).

⁸⁶ Item auch an dem tag (Mitichen an sannd Thomas obund) mer j poten ken weissen kyrichen zu dem purgraffen mit ainem brief Im unfrid und In grosser kelden noch deß purgermaister gescheft j l(i)b(ra) xx d(enar).

⁸⁷ Item auch an dem tag (Mantag noch weynachten) j poten ken Marihek, und von dank en ken posing den der purgermaister hin geschikt hat alß pald er von Marihek cham. hab wir ym geben In posen weg lxij d(enar) wienn(er).

⁸⁸ Item Am pfinczttag noch sannd Andre tag alß dy dy Tuna dik mit eisß ran hab wir gehat ij furman dy Strew und enspawm von der Innern pruk fuder gefuert haben ydem lxxxv d(enar) wienn(er) facit/..../ Item auch an dem tag hab wir gehat vj Schif gesellen dy dem veit etzlich pruk an dy steten haben helfen fueren und umb tailen daß man dy geheft hat alß dy tuna ser mit eisß ran ydem xvij d(enar) facit iij s(ilber) xvij d(enar)/..../ Item auch an dem tag hab wir gehat xj Schif gsellen alß dy tuna mit eisß ran, dy zway pruk Schif von der aussern pruk zum art umbher gefuert haben zu der nagsten pruk zu der steten und haben ydem geben xvij d(enar) wienn(er) facit vj s(ilber) xvij d(enar).

⁸⁹ Item am Mantag vor Nicolai episcopi hab wir gehat mer xj Schif gesellen, dy zway prukschiff auch von der aussern pruk zum art umbher gefuerth haben ydem geben xvij d(enar) wienn(er) facit vj s(ilber) xvij d(enar)/..../ Im auch an dem tag (Mantag vor Nicolai episcopi) wir dem veit schopper und den prukkneicht gesellen geben umb ij pint wein daß sy der prukschif In dem eisß fleissik sind gebesen per d(enar) wienn(er) facit viij d(enar) wienn(er).

⁹⁰ Item Am Mitichen vor Concepcionis x Schif gesellen dy auch zway prukschif von der aussern pruk umb her gefuert haben zu der steten durich daß eysß und haben ydem geben xvij d(enar) facit vj s(ilber) d(enar) wienn(er).

had to be moved to the *Wisgrund* (Danube island area; haylands).⁹¹ Works continued for the rest of the week (AMB K3, 178).

Despite the coldness and ice discussed in the December entries, there is a notable difference compared to the previous year: while the Danube froze over very quickly in early (mid-)December 1439, the Danube was still 'only' running with ice on 18 December that suggests altogether higher (even if still rather cold, freezing) average temperatures compared to the same time of the previous year. Snow clearing, most probably related to new snowfall, was mentioned twice: on 2 and 21 December.

THE YEAR 1441

Cutting the ice of a fishpond in January 1441 in Bártfa town

On 20 (GC: 29) January, 10 denars were paid by Bártfa (Bardejov-Sk) town for cutting the ice in a fishpond.⁹² This is one of the rare occasions when the town accounts contain an ice (or weather) related entry, although taking into consideration its hilly/mountain valley location, ice-related works could usually have rather great importance in winter. A possible explanation is that (extra) workers were only occasionally hired for these works, while normally the town organised these works in a different way (e.g. with their own people or workers were paid 'in nature').

Winter weather data in the Pressburg accounts

Among other payments for the necessities of the town (*Czeancziges ausgeben*), on 7 (GC: 16) January, four workers were paid for clearing the snow from the gutters and the pavement of the Town Hall (AMB K3, 55).⁹³ Similarly, on 12 (GC: 21) January, workers were paid again for clearing the gutters from the snow (AMB K3, 56).⁹⁴ Shortly before 23 January (GC: 1 February), the Danube froze over (AMB K3, 58).⁹⁵

Mentioned in the chapter on wages of messengers (*Stat poten lann*), on 3 (GC: 12) January, a messenger was paid for travelling to Galitz (Gamlitz in SE-Styria?), Weißkirchen (in S-Styria?) and Goding (in Carinthia?) on bad (or evil) roads.⁹⁶ On the same day, another messenger was paid for going to *Tyrna* (Nagyszombat; Trnava-Sk), again on bad and unpeaceful road(s).⁹⁷ Paid three days later, on 6 (GC: 15) January, a messenger was sent to Hainburg, and he travelled through *Teben* (Dévény; Devín-Sk) because the Danube was running with ice. Paid on the same day, a messenger was sent to Saint Marien (Somorja; Šamorín-Sk). The messenger departed but was sent back because the Danube was running quite much with ice.⁹⁸ Reported on 11 (GC: 20) January, the messenger to Hainburg again had to travel

⁹¹ Item Am Erichtag an sand Lucein tag hab wir gehat xj. Schiffgesellen dy etzlich prukschif mit dem veitel schopper gefuert haben alß dy Tuna mit eisß ran In wisgrunt, und dy geheft haben und haben ydem geben xvij d(enar) wienn(er) facit vj s(ilber) xvij d(enar)/.../ Item Mitichn noch sand Lucein tag hab wir mer gehat xj Schiff gesellen dy auch mit dem veitel schopper prukschif gefuert haben alß dy tuna mit eisß gieng In wisgrunt, und daß sy dy daselß gehefft haben, ydem xvij d(enar) wienn(er) facit vj s(ilber) xvij d(enar) wienn(er).

⁹² Fejérpataky, Bártfa town accounts p. 517.: "1441. / Item in die sanctorum martyrum Sebastiani et Fabiani (20 January) / Item qui secavit glaciem in piscina.....10 den."

⁹³ Item auch an dem tag (Sambstag noch der heiligen drey künigk) hab wir gehat Im Rothaus iij gesellen dy Snee von den Rynnen und von den estreichen fuder geschert und gewarffen haben ydem xij d(enar) wienn(er) xlviij d(enar) wienn(er).

⁹⁴ Item Am pfincztag noch der heiligen drey künig tag vij gesellen dy den zymmerleuten gehant reicht haben und dy groß puxen haben helffen Inheben und Snee von den Rynnen gebarffen haben ydem xij d(enar) wienn(er) facit lxxxiiij d(enar) wienn(er).

⁹⁵ Item Am Mantag vor sand pauelß bekerung hat wir geben den vasczihern und sein gesellen dy zway alß dy Tuna deß tagß gestossen ward den hab wir geben do von uber zu zihen und dar nach auf den wagen zu heben den hab wir geben xxviiij d(enar) wienn(er).

⁹⁶ Item Am Erichtag noch dem Newen Jar j poten ken Galitz und ken weisen kyrichen und ken Goding zum herren Tzenko mit briefen, hab wir geben Im posen weg vij s(ilber) d(enar) wienn(er).

⁹⁷ Item auch an dem tag (Erichtag noch dem Newen Jar) j poten kenn Tirna noch der herren gescheft Im posen weg und ym unfrid lx d(enar) wienn(er).

⁹⁸ Item auch an dem tag (Freitag an der heiligen drey künigk tag) j poten ken hainburg zum fuxen und zum Nutzhaimer mit briefen der hat muessen geen zu Teben uber zu fueren xj d(enar) wienn(er) und hin wider alß vil dem hab wir geben alß dy Tuna mit eyß rann l d(enar) wienn(er) swartz/.../ Item auch an dem tag (Freitag an der heiligen drey künigk tag) j poten ken sannd Marein zu dem weihenpurger den der Lanng Paul hin geschickt hat alß dy Tuna ser mit eyß gieng hab wir geben xlij d(enar) wienn(er).

through Dévény back and forth because the Danube was still running quite much with ice.⁹⁹ A 20 (GC: 29) January payment entry suggests that the messenger had a quite difficult road to Sopron and back because the Danube was still very much running with ice (AMB K3, 113).¹⁰⁰

Recorded in the Laurence Gate guard accounts (*Tarhueter Larenczen tar*), on 3 (GC: 12) February, the town again paid for hacking the ice in the town moat (AMB K3, 132).¹⁰¹ Furthermore, it is interesting that – as mentioned in the *Czeancziges ausgeben der pruk* – already around St. Valentine (14 February; GC: 23), a large bridge ship from Vienna was presented, and the bridge ships were pulled to the water. Bridge-related works were mentioned in the next days, which may suggest that by this time, the ice mostly left the river (AMB K3, 179-180).

Thus, snow clearing, probably reflecting a notable amount of new snow, were mentioned only twice this month, on 7 and 12 January. The Danube was running rather much with ice in most of January but only froze over before 23 January. Most probably, it did not last long, as by 14 February most of the ice presumably left the river. The problem of bad roads might be related to mild periods – this would also explain why the Danube froze over so late –, but it can as well be connected to the uncertainties on roads due to the political situation in the country.

In Bohemia and Silesia, the winter was again very long and snowy – with an interruption in early February –, the snow cover lasted until mid-April (Brázdil-Kotyza 1995, p. 130). According to Glaser (2013, p. 80), the winter was long, cold and snowy, but there was a thaw in mid-February, followed by floods.

THE YEAR 1442

Winter of 1442 in Hungary based on narratives

As for the Polish narratives, both Długosz (1711, p. 764)¹⁰² and Callimachus (1582, p. 85)¹⁰³ noted the unusually hard, very frosty and snowy winter conditions in Hungary in 1442. They particularly men-

⁹⁹ Item auch an dem tag (Mitichen noch der heiligen drey kunig tag) j poten ken hainburg und hat muessen geben zu Teben über zu fueren xxj d(enar) und hin wider alß dy Tuna ser mit eyß ran zum Nutzhamer mit ainem brief lx d(enar) wienn(er) Swartz.

¹⁰⁰ Item Am freitag noch Anthonij abbatis j poten In posen weg alß dy Tuna ser mit eyß rann hab wir geben ken Ödenburg v s(ilber) d(enar) wienn(er) Swartz.

¹⁰¹ "Item Am Sambstag noch unsere frawen tag der der licht mesß hab wir dem Jacob Wild gemynnertdar umb daß er nyimmer eyß aushakt In Stat graben dem hab wir geben iij s(ilber) d(enar) wienn(er)."

¹⁰² "Helisabeth Vngariae Regina cum omni ardore & diligentia castrum Preszburg, sep & necessitate eam impellente, impugnare adorsa, iterum plurimis conatibus, bombardarum projectionibus, aliisque ingeniis illud vel conquirere, vel ad additionem compellere satagit. Cuius periculo Wladislaus Rex sibi nuntiatio mouit exercitum de Vngaris & Polonis hyeme asper nimis niuosa, & pruinosa temporis incommoditate minime pensata, post festum videlicet Purificationis S. Mariae, quo etiam in horreis incipiunt singula deficere, & in Presburg perueniens, castrum quod longo tempore obsidionis ferebat molestiam, obsidione & Polonis hyeme asper nimis niuosa, & pruinosa temporis incommoditate minime pensata, post festum videlicet Purificationis S. Mariae, quo etiam in horreis incipiunt singula deficere, & in Presburg perueniens, castrum quod longo tempore obsidionis ferebat molestiam, obsidione liberat, restaurat & reficit, ciuitatem Presburg sibi rebellem, ex qua Elisabeth Regina audito Wladislai Regis aduentu Viennam profugerat, reciproca obsidione fatigabat, bombardarum ictibus de castro multos domos eiuium frangit & demolitur, si diuitius perseverasset. Verum compassus Baronum & militum suorum, damnis plurimis propter equorum defectum, qui fame tabescentes moriebantur, (non enim poterat alicubi, etiam in locis remotis pro equis pabulum, sed neque palea reperiri, diebus plurimis frondes arborum erant equorum potiora pabula, equisque deficientibus non minor homines premebat fames) obsidionem soluit, & in Tarnawam transiit, inde Budam rediit, festumque Paschae Budae celebrauit."

¹⁰³ "Interea subsidia ex Polonia petita a Uladislao, numero, et apparatu insigni aduenerant. Itaque principio insequentis anno, licet annona grauiter laburaretur, hiemsque perniciose rigeret: tamen quia festinabat animus ad pacandum regnum vndique, Uladislaus Caesouiam versus, Buda mouit. audito suorum periculo, in ipso rigore hiemis rex Buda accurrisset, cum egregia utriusque gentis manu. Eius aduentu, & suorum animi erecti, & regina ad consternata, ut, copiarum parte illic relicta, clam cum caeteris Viennam se receperit. Rex, immisso in arcem subsidio, tentauit urbem, si forte on potestatem regidere posset. Tandem, quom diu continuata obsidio intus & extra omnia consumsisset, appareretque in difficiliori anni tempestate non minus discriminis a coeli, & terrae rigore, quam ab hoste affuturum: tumultuario opere instauravit, quicquid munitionum hostis circa arcem labefactauerat, moxque Budam redijt. Eodem tempore Poloni, voluntaria manus, nulloque stipendio publico adiuta, duce Petro Odrouansano, in Hungariam transcensuri, arcebantur a Boemis, qui angustias in montium iugis occupauerant. Itaque illi die frigidissima, tum lenta, sed iungi pluuiam aliginosa, atque, ob id, minime suspecta, praemiis impigris, robustisque, quibusque, iuuenibus, a quibus resistentes, si qui forte affuissent, obtruncarentur, per solutas Boemorum custodias, nemine omnino aduersante, saltum superauere."

tioned the periods after the king left Kassa (Košice-Sk), and during the siege of Pozsony (Bratislava-Sk) that started at the beginning of February when both food/fodder and horses were lacking in the severe winter. Largely because of the limited success, unfavourable weather conditions, the lack of food and fodder (and the loss of animals), the king gave up the siege in late March.

The same story is described by Bonfini, adding that at the beginning of the year, there was great famine and frost in Hungary; despite the grave difficulties, Vladislas wanted to fight for peace in the country. From Buda, he first went to the north against Jan Giskra, and then – after unsuccessful negotiations – ordered to occupy Kassa. Afterwards, the king returned to Buda where there was a great plague at that time. Later, Bonfini also refers to the severe winter conditions during the siege of *Pisonium* (Pozsony; Bonfini 1543, p. 437).¹⁰⁴

The beginning of winter was severe in Bohemia; the winter was described in most of Central Europe as hard and rich in snow, with the hardest frosts mentioned at the beginning of February (Malewicz 1980, Brázdil-Kotyza 1995, p. 130). It is interesting to add that the winter in Sweden was probably milder than usual (Retsö-Söderberg 2020, p. 36).

Summer rain in the Pressburg accounts

Documented in the messengers' payment accounts (*Stat poten lann*), on 24 July (GC: 2 August), a messenger was sent to Ebersdorf (Lower Austria) in great rain (AMB K4, 65).¹⁰⁵

Starting already in spring, there was great drought and heat during the summer in Bohemia, while the summer was hot in the southern German areas (Brázdil-Kotyza 1995, p. 130, Glaser 2013, p. 69).

Late November – December 1442 in the Pressburg accounts

In relation with the works of the ferryman, on 7 and 8 (GC: 16, 17) November, the chapter '*Czeancziges ausgeben zu der Statnotdurift*' of the accounts mention 'iced' (frozen) woods (AMB K4, 47)¹⁰⁶ suggesting that notable frosts set in early (mid-)November. In the chapter containing the wages of the messengers (*Poten lan mer*), an entry on 10 (GC: 19) November records payments for the works when the outer bridge was pulled over, the ice was removed from the *plätten* (shallow bottomed watercraft), and they were taken to the land (AMB K4, 62).¹⁰⁷ However, in a later deleted entry – deleted most probably because the expenses were paid from a different budget – the same problem is mentioned already on 7 (GC: 16) November (AMB K4, 63).¹⁰⁸

Payment on 24 November (GC: 3 December) in the town expenses (*Czeanczigs Ausgeben zu der Stat notdurft*) reports on woods in the ice, and the town also paid for clearing the snow from the gates and

¹⁰⁴ "Vladislaus, insequentis anni principio, quamuis famae hiemisque saeuitia laboraret Vngaria, acceptis tamen auxilijs, de pacando regno, quod in primis apprime necessarium uisum est, vogitare coepit, de pacando regno, quod in primis apprime necessarium uisum est, vogitare coepit, ut hac re feliciter gesta, expeditius uniuersas uires conuerteret in Turcas. Quare Buda prius in Giscram nouit, ut occupata ab hoste oppida, recuperaret, impoiste circum Reginae praesidia deijceret. Item dicere, melius esse reconciliatione, quam bello regnum pacare: ad expugnandam Cassouiam, praefectos aliquos, prout res ipsa postulat, esse relinquendos Quam rex Budam reuertisset, quae uaesaniante pestilentia laborabat....uerum etiam Pisonianum agrum, sic igni ferroque deuastat,Vniuersas deinde uires, hi ad expugnandam arcem vonuere, turres circum erexere nonnullas, crebris tormentorum ictibus moenia quaterere, eaque modo testitudine, modo quouis alio machinarum ignem perfodere, cominus adactis scalis uectibusque pugnare, rigente hieme eo uehementius instare, atque (ut aiunt) nisi rex cum ualidis copijs Buda mouisset, arcique succurrisse, eo praesidium regium redactum erat, ut propediem deditionem facere cogereetur."

¹⁰⁵ Item Am Erichtag In vigilia Jacobi apostoli hab wir geben j poten noch deß Richter gescheft der pey der nacht In grossen Regen gelauffen ist ken Ebersdarif mit j brief zu dem herren Mainhart von dem Newen hawß, dem Aynok Jorigen Ixij d(enar) wien(ner).

¹⁰⁶ Item auch an dem tag (mitichen vor Martini) hab wir gehat iij aribater dy daß auf einander gelegt haben und zu dem holcz geeist haben und dem furman gehaut reicht haben und haben ydem geben x d(enar) facit xl d(enar) wien(ner) /..... / Item auch an dem tag (phincztag vor Martini) hab wir gehat iij aribater dy daß holcz auf einander gelegt haben und zu dem holcz geeyst haben, und dem furman gehautreuhet haben und haben ydem geben x d(enar) facit xl d(enar) wien(ner).

¹⁰⁷ Item auch an dem tag (Sambstag an Sannnd Mertein Obund) hab ich geben dem Schreiber mit sein gesellen daß sy dy prukschif von der aüssel pruk heruber gefurt haben und dy pleten auß geeist haben und auch ober gefurt haben auf daß lannd den hab wir geben xij s(ilber) d(enar) wien(ner).

¹⁰⁸ Item auch an dem tag (Mitichen vor Martini) hab ich geben dem Schreiber mit sein gesellen daß sy dy prukschif von der aussern von der aussern pruk her uber gefurt haben alle mit einander, und dy pleten geeyst haben, und dy auch heruber gefurt haben do von zu lan xij s(ilber) d(enar) wien(ner).

from the gutters of the Town Hall. Still on the same day, further two workers were paid, amongst others, to clear the snow from the gutters of the Town Hall (AMB K5, 25).¹⁰⁹ Documented in the chapter on bridge-related expenses (*Czeaczigs ausgeben zu der pruk notdurfft*), on 30 November (GC: 9 December) the town paid for removing the ice from two *plätte* (AMB K5, 54).¹¹⁰

Thus, winter set rather early, as significant frosts were reported already in early (GC: mid-) November, and at least one notable snowfall (with standing snow) also occurred in late November (GC: early December).

December 1442 in the Pressburg accounts

Later, on 14 (GC: 23) December, the Danube froze over on both sides (AMB K5, 25).¹¹¹ On 22 (GC: 31) December 1442, the town paid again for snow clearing at the Vödritzer Gate (the SW gate) and some other gates (AMB K5, 26).¹¹² As reported in the chapter on the wages of messengers (*Stat poten lann*), on 10 (GC: 21) December 1442, a messenger was paid for travelling in ice and cold weather to the queen while the Danube was running with ice.¹¹³ On 22 (GC: 31) December, a messenger was sent to Győr and another one to Hainburg, in great coldness (AMB K5, 79).¹¹⁴ Thus, the Danube froze over early on this year (though not as early as in 1439), but snow was only mentioned at the end of the month.

THE YEAR 1443

The January weather-related entries in the Pressburg accounts

On 2 (GC: 11) January 1443, the ferryman was paid for driving six horses in deep snow (*Stat Czerung*: AMB K5, 61).¹¹⁵ As recorded in the chapter '*Czeanzigs Ausgeben zu der Stat notdurfft*', similarly on 2 January, a worker was paid again for clearing the snow (AMB K5, 27).¹¹⁶ The next entry refers to a payment that was carried out on 7 (GC: 16) January: this day was very cold and icy (AMB K5, 27).¹¹⁷ On 10 (GC: 19) January, a worker was paid for clearing off the snow under the Laurence Gate (AMB

¹⁰⁹ Item auch an dem tag (Sambstag vor Katherine virginis) hab wir gehat iij aribater dy zu dem holcz geeyst haben und dem furman gehantrecht haben und daß holcz auf einander gewalzen haben und haben ydem geben viij d(enar) wienn(er) facit xxxvj d(enar) wy(enner)/...../ Item auch an dem tag hab wir gekauft von dem hauß Smerber zu der Stat notdurfft viij Schauffeln zu den tharren und Inn daß Rathauß zu Snee ausze rawmen dy Rynnen, und under den tharren und haben ym geben fur yde schawffel x d(enar) facit lxxx d(enar)/...../ Item auch an dem tag hab wir gehat Im Rathauß ij aribater dy Snee von den Rynnen Im Rathauß fuder gewarffen haben und dy gestell von den puxen under ein dach getragen haben und waß not ist gebesen, ydem viij d(enar) wienn(er) facit xvij d(enar) wienn(er).

¹¹⁰ Item auch an dem tag (Freitag noch sand kathrey tag) hab wir geben von den zwain pleten daß man dy auß geeist hat, und daß man di an daß land gefurt hat iij s(ilber) x d(enar).

¹¹¹ Item am Freitag noch sand Lucein tag wardt dy Tuna zu paiden Seiten gestossen den selbigen tag hab wir gehat j furman mit ij Rossen dem Hanuß Leitgeben der mist auf dy Tuna gefurt hat zu dem weg alß man den gemacht hat dem hab wir geben lxx d(enar) wienn(er).

¹¹² Item auch an dem tag (Sambstag noch Thome apostoli) hab wir gehat ij aribater undr Bedritzer thar dy Snee fuder gewarffen haben, von dem thar und den kasten gerawmpt haben daß man dy thar auf hab mügen zihen, und waß do not ist gebesen und hab ydem geben vij d(enar) facit xiiij d(enar) wienn(er)/...../ Item auch an dem tag j aribater der Snee Im thurn unger feint genant fuder gewarffen hat und holcz gehakt hat Im Rathauß zu der herren stuben vij d(enar) wienn(er).

¹¹³ Item Am Mantag noch unsere frawen tag Concepcionis Marie ainem poten alß di Tuna seer mit eyß raan, zu unsere genedigen frawen der künigin und zu dem Andre von Frona mit briefen der awß waß beliben von eyß wegen, und von kelden wegen j l(i)b(ra) xx d(enar).

¹¹⁴ Item Am Sonntag vor dem heiligen Christ tag j poten ken Raab zu dem Pischolff von Grann und zu dem Cardinal, und zu dem Czeti Tomasch und waß awß beliben untz an di vierde wochen In grosser kelden mit iij brieggen, dem schuef der puergermaister zegeben iij floren auri x d(enar) wienn(er). / Item auch an dem tag j poten ken heinburgkch zu dem Richter In grosser kelden hab ich geben xxj d(enar) wienn(er).

¹¹⁵ Item (Am Mitichen vor der heiligen drey kunigk tag) und haben geben dem furman der sy gefurt hat Im tieffen Snee mit vj rossen j l(i)b(ra) d(enar) wienn(er).

¹¹⁶ Item Am Mitichen noch dem Newen Jar hab wir gehat besunder j aribater der Snee Im Rat hauß von dem Tarhäus fuder gewarffen hat vij d(enar) wienn(er).

¹¹⁷ Item Am Mantag In die Valentini episcopi hab wir gehat j furman mit ij Rossen der holcz von der pruk von den Jochern In daß Rothauß und In den wasser thurn gefurt hat und waß not ist gebesen den Jung Hannß leigeben iij grsser kelten lxx d(enar) wienn(er)/...../ Item auch an dem tag j knecht der dem furman auf dem eiß auf den wagen holcz geraicht hat dem hab wir geben In grosser kelten vij d(enar).

K5, 28).¹¹⁸ On 16 (GC: 25) January, woodcutters were paid for cutting wood in the *Stadttau* (grove), for the town's necessities, in great coldness.¹¹⁹

Despite the wood stored earlier (e.g. in summer: AMB K4, 40), it seems that the Town Hall mostly ran out of firewood by mid-January, as on 18 (GC: 27) January, woodcutters were paid again for cutting wood in the grove (*Stadttau*) for the needs of the Town Hall in great coldness.¹²⁰ In fact, the woodcutters already worked there for several days before, for the (extra?) needs of the town (AMB K5, 28), and the woodcutting for the town (for firewood) continued in the next days and week, too. On 23 January (GC: 1 February), two more workers were paid, one for clearing the Town Hall gutters from snow and the other for woodcutting (AMB K5, 29).¹²¹ The town again paid for snow clearing in the Town Hall area gutters on 28 January (GC: 5 February; AMB K5, 30).¹²² On 31 January (GC: 9 February), one worker was paid for clearing away the snow from the gutters and the passage to the Town Hall (AMB K5, 31).¹²³

Reported as part of the bridge-related expenses (*Czeaczigs ausgeben zu der pruk notdurfft*), on 2¹²⁴ and 3¹²⁵ (GC: 11, 12) January, the ferryman and four workers were paid for works on the ice in the *Aw* and at the *Schlagbrücke* (located at the south-east), all at or over the Danube (or its branches). On 7 (GC: 16) January, two workers were paid for helping to take a wooden board (of the bridge?) on ice to a cart.¹²⁶ On the following day¹²⁷ and later, on 24 January (GC: 2 February),¹²⁸ standing ice was mentioned in a similar context (AMB K5, 54, 55).

Payment entries in the chapter on the wages of messengers (*Stat poten lann*) suggest that on 11¹²⁹ and 14¹³⁰ (GC: 20, 23) January, a messenger had to travel in great coldness to Vienna and Kittsee. Messengers were paid for taking letters to Dévény (Devin-Sk) on 15 (GC: 24) January¹³¹ and to Vienna on 26 January¹³² (GC: 4 February) – in both cases, there was very cold weather. Later, in February-April, “*posen weg*” in the meaning of bad or vicissitudinous road/travel was mentioned several times, particu-

¹¹⁸ Item auch an dem tag (Am phincztag noch valentini episcopi) hab wir gehat j aribater besundr under Sannd Larenczen thar der den kasten gerawmpt hat daß man von Snee zu mocht tuen hab ich geben viij d(enar) wienn(er).

¹¹⁹ Item Am Mitichen vor Anthonij Abbatis hab wir gehabt ij aribater dy holcz In der Stat aw auß gemaist hat zuder Stat notdurift, und hab ydem geben In grossen kelden viij d(enar) facit xvij d(enar) wienn(er).

¹²⁰ Item Am Freitag noch Anthonij abbatis hab wir gehat Im dreswerd In der Aw viij holcz hacker zu der Stat notdurift In daß Rothauß und In di Thurren und haben ydem geben ix d(enar) wienn(er). In grosser kelden facit lxxij d(enar).

¹²¹ Item auch an dem tag (Mitichen vor sannd Paul bekerung) hab wir gehat Im Rothauß besunder ij aribater a mer der Snee von den Rynnen gewarffen hat, und der ander der holcz gehakt hat ydem viij d(enar) wienn(er), facit xvij d(enar) wienn(er).

¹²² Item Am Mantag noch Sannd Paul bekerung hab wir gehat j aribater Im Rothauß der Snee abgerawmpt hat ob den pühen und auß den Rynnen hab ich geben viij d(enar) wienn(er).

¹²³ Item Auch an dem tag (Am phincztag vor unsere frawen tag) j aribater der Snee Im Rathauß von den Rynnen und von dem gangk fuder gewarffen haben hab ich geben viij d(enar) wienn(er).

¹²⁴ Item Am Mitichen noch dem Newen Jahre hab wir gehat auf dem Eyß j furman mit iij rossen der laden und plocher von der aussern pruk von dem thar gefurt hat In di Aw daß di zimmerleut zefelt hatten dem hab wir geben dem Hannß Leigeben zu lann lxxxx d(enar) / Item auch an dem tag hab wir gehat iij aribater auf dem eiß di den zimmerleuten(?) daß tar und di slachpruk haben helffen zefellen und dem furman laden und plocher auf den wagen haben helffen heben, ydem viij d(enar) wienn(er) facit xxxij d(enar).

¹²⁵ Item Am phincztag noch dem Newen Jahre hab wir gehat auff dem Eyß j furman mit iij Rossen den Hanns Leigeben, der laden und plocher von dem thar, auf der aussern pruk daß di zymmeren zefelt haben gehat gefurt hat In di Aw zwischen paide pruk dem hab wir geben lxxxx d(enar) / Item auch an dem tag hab wir gehat iij aribaer auf dem Eyß pey der aussern pruk di dem furman auf den wagen laden und plocher geraicht haben, und den zimmerleuten(?) auch gehantreich haben waß not ist gebesen, ydem viij d(enar) facit xxxij d(enar).

¹²⁶ Item auch an dem tag (Mantag vor Pauli Conversioniß) hab wir gehat j aribater dy Ennspawm auf dem eyß auf den wagen haben helffen heben, und waß not ist gebesen ydem viij d(enar) wienn(er) facit xvij d(enar) wienn(er).

¹²⁷ Item Am Erichtag vor Pauli Conversionis hab wir gehat j furman mit iij Rossen der auf der Innern pruk auf dem Eyß Ennspawm In dy Aw gefurt hat den Hanns Leigeben dem hab ich geben zu lann iij s(ilber) d(enar) wienn(er) / Item auch an dem tag hab wir gehat iij aribater auf dem eyß dy laden und ennspawm auf den wagen haben und gewalczen haben ausenander und haben ydem geben viij d(enar) wienn(er) facit xxvij d(enar) wienn(er).

¹²⁸ Item auch an dem tag (phincztag vor sannd Paul bekerung) hab wir gehat auf dem eyß v aribater di dem furman gehantreich haben und Ennspawm und laden auf einander gelegt haben und haben ydem geben viij d(enar) wienn(er) facit xlv d(enar) wienn(er).

¹²⁹ Item Am Freitag noch Valentini episcopi j poten ken wienn zu dem Erhart Haesser, und zu etzlichen andern purgern In grosser kelden mit iij brieffen dem hab wir geben zu lann j l(i)b(ra) x d(enar) wienn(er).

¹³⁰ Item Am Mantag vor Anthonij abbatis j poten ken Choczsee In grosser kelden zu dem Cappler xvj d(enar) wienn(er).

¹³¹ Item Am Erichtag vor Anthonij abbatis j poten ken Teben zum purgraffen In grosser kelden xvij d(enar) wienn(er).

¹³² Item Am Sambstag noch sannd Paulß bekerung j poten mit ij brieffen ken wienn zum Hannß Prenner In grossen kelden hab ich geben j l(i)b(ra) d(enar).

larly when travelling to the north-east or to the east along the Danube (AMB K5, 79, 80). However, as this term mostly means travel difficulties in a more general sense, the problems were not necessarily (only) a consequence of weather. Amongst the entries related to the carpentry works for the bridge (*Czammerleut zu der pruk*), works on the ice at the outer bridge were mentioned on 21 (GC: 30) January 1443 (AMB K5, 49).¹³³

In conclusion, there was great snow in early (GC: mid-) January, and snow clearing works were paid on 10 (GC: 19), 23 and 31 January (GC: 1, 9 February), most probably suggesting repeated snowfalls. Based on the other payments, it seems that January was particularly cold.

February weather in the Pressburg accounts

In the chapter on bridge-related expenses, on 9 (GC: 18) February, the town paid a ferryman and his helpers to pull off some flat-boats (*zillen*) of the ferry from the ice.¹³⁴ On 20 February (GC: 1 March), five workers cleared the snow and de-iced the *pletten* (AMB K2, 55).¹³⁵ On 21 February (GC: 2 March), the town hired workers as the lead ship of a ship train was covered by ice.¹³⁶ On 27 February (GC: 8 March), ten people helped as the ice jam was moving away, the Danube was cracking the ships (*Plätten*) day and night; and a ship (*Schiff*) was de-iced (AMB K5, 55).¹³⁷

Still reported in the '*Czeanczigs Ausgeben zu der Stat notdurft*', on 18 (GC: 27) February 1443, the town paid for three workers who cleaned the snow from the ships near the inner (Danube) bridge (AMB K5, 32).¹³⁸ On 25 February (GC: 6 March), four workers were paid for pulling off a wooden board (of the bridge?) from the ice,¹³⁹ while on 27 February (GC: 8 March), workers were paid for pulling the woods (away from the shoreline?), as the Danube ice jam was moving (AMB K5, 33).¹⁴⁰

This month, snow clearing was mentioned only twice, on 18 and 20 February, but the cold weather continued at least until mid- (GC: late) February and, based on the date when the ice jam started to move, the milder weather arrived probably soon after the snows. This winter was also mentioned as hard in the *Continuatio Claustroneoburgensis* (V; Pertz 1851, p. 740).¹⁴¹ The winter started early and was again long, hard and rich in snow in most of Central Europe, in many places lasting until mid-April. Fruit trees were damaged and the cattle were starving because of the lack of fodder (Brázdil-Kotyza 1995, Glaser 2013, p. 80).

Weather-related expenses in spring, in the Pressburg accounts

Mentioned in the chapter '*Czeanczigs Ausgeben zu der Stat notdurft*', on 2 (GC: 11 March) March 1443, a worker was paid for cleaning the snow over the Vödritz Gate (AMB K5, 34).¹⁴² On 20 (GC: 29)

¹³³ Item Am Mantag vor sannd Paulß bekerung hab wir gehat den Hannß Leigeben furman mit iij rossen der di Ennspawm von der aussern pruk fuder gefurt hat di man von den Jochern auf daß eyß gebarffen hat, und der daß zwischen paide pruk In di aw gefurt hat hab ich geben iij s(ilber) d(enar) wienn(er).

¹³⁴ Item Am Sambstag noch Dorothee virginis hab wir geben von der urfar zullen, daß man di geeist hat, und auß dem eist ganz gewonnen hat iij s(ilber) d(enar) wienn(er).

¹³⁵ Item auch hab ich geben Am Mitichen vor Mathie apostoli v aribatern di dy pleten gerawmpt haben und den Snee dar auß gewarffen haben und daß eyß von den podem geleidigt haben zum andern mal ydem viij d(enar) facit xl d(enar) wienn(er).

¹³⁶ Item Am phincztag vor Mathie apostoli hab wir auch gehat v aribater dy die Schieff hohenawerin geeyst haben, und di kipph do von gewonnen haben und haben ydem geben viij d(enar) wienn(er) facit xlv d(enar) wienn(er).

¹³⁷ Item Am Mitichen noch sannd Mathiaß tag hab wir gehat x gesellen alß der Stoß giennng von Stat In der Tuna di der pleten pey dem tag und pey der nacht gehnet haben, ij tag und ein Schif auß geeist haben dar auf daß tafelf stet, do von hab wir geben Inn zu vertrinkchen j l(i)b(ra) viij d(enar) wienn(er).

¹³⁸ Item auch an dem tag (Mantag vor Mathie apostoli) iij aribatern die Snee von dem Schiften auß den hohenawerin auß gerawmpt genhaben der Innern pruk per ix d(enar) facit xxvij d(enar) wienn(er).

¹³⁹ Item auch an dem tag (Erichtag noch sannd Mathias) hab wir gehat iij aribater ainer der dem furman gehantrecht hat und ainer der di ennspawm gegen dem Stephan Unger uber, auß dem eysß gewonnen hat und di Jocher ab gerawmpt hat und ij aribater di daß holcz auf einander gewalzen haben, daß Hanns leigebt gefurt hat, ydem viij d(enar) facit xxxvj d(enar) wienn(er).

¹⁴⁰ Item Am Mitichen noch sannd Mathias tag alß der stoß In der Tuna giennng auf di pühenn getragen haben und ander holcz ydem viij d(enar) facit xvij d(enar) wienn(er).

¹⁴¹ "1443 yems valde durus fuit, quia frigora inceperunt se circa Simonis et lude, et duraverunt usque ad cathedra sancti Petri, et etiam ultra quasi ad festum sancti Georgii martiris. Et forte non fuit talis yems in sexaginta annis ante, et duravit quasi ad festum Urbani episcopi."

¹⁴² Item auch an dem tag (Sambstag noch Mathie apostoli) hab ich geben j aribater der Bedriczer thar oben gerawmpt hat von dem Snee viij d(enar) wienn(er).

March, people were paid for finding a bridge ship as the ice jam had already gone (AMB K5, 35).¹⁴³ A payment amongst the smaller incomes (*Eyn klaynn Innemen*), dated similarly to 20 March, mentions a ship that had been taken by the water as the ice block had gone, and the town bought it back (AMB K5, 4).¹⁴⁴

As recorded in the chapter on bridge-related expenses, on 9 March 1443, workers were paid for breaking the ice around some ships (AMB K5, 56).¹⁴⁵ On 11 (GC: 20) April, fourteen workers were paid, who took stabs and the wooden boards into a ship and over the Danube to the outer bridge, as people could not get from the Danube to the bridge in the wind (AMB K5, 57).¹⁴⁶

In conclusion, significant snow for the last time is mentioned in early (GC: mid-) March; winter weather continued at least until around mid-/late February when the ice jam moved away.

Summer 1443 in the Pressburg accounts

In the chapter on general (mixed) town expenses (*Czeancziges ausgeben zuder Stat notdurfft*) rains are mentioned twice in the summer of 1443: on 1 (GC: 10) June, it was raining rather heavily at night,¹⁴⁷ while on 18 (GC: 27) July 1443, a great rain that had occurred in the previous days, was mentioned (AMB K6, 33, 41).¹⁴⁸ Moreover, summer rains and showers are notified in three further cases among the bridge-related payments (*Czeancziges ausgeben zu der pruk notdurfft*): reported on 11 (GC: 20) June 1443, (great) shower hit the vineyards, and two guards were sent there to watch in the bad (rainy/stormy?) weather at night (AMB K6, 76).¹⁴⁹ Similarly, on 14 (GC: 23) June at night, there was great rain and wind (AMB K6, 76).¹⁵⁰ Noted on 2 (GC: 11) August, the great Plätte got filled with water, an accident that usually occurred during high water level of the Danube or rains (AMB K6, 76).¹⁵¹

Thus, the summer is characterised by a high number of rain-related records. Although little is known about most of Central Europe, the summer was most probably rainy in the Czech Lands (Brázdil-Kotyza 1995, p. 131). It is interesting that at the western edges of Europe, the summer was also rich in unusual rains. Quoted in the Annals of the kingdom of Ireland, the text of the Dublin Fragments (p. 931) suggests for 1443 'A rainy tempestious yeare after May, so that many filthes multiplied in all the Rivers in Ireland, and hurted both bees and sheepe in Ireland.' And later 'A wett Summer & harvist which made all Corne maltish for the most parte' (O'Donovan 1849, p. 939).

¹⁴³ Item Am Mitichen vor Oculi hab ich geben den leuten zu Rakendariff di ein pruk schiff auf hatten gefangen alß der Stoß waß gegangen und daß hattn si verkauft umb ij floren alß man daß findt In unsern Innemen, darumb hab wir geben den selben lewten umb Irmüe zu vertrinken xxxij d(enar) wienn(er).

¹⁴⁴ Item Am Mitichen vor Oculi hab ich emphanen von aineß prukschif wegen, daß vor hin gerunnen waß alß der Stoß gegangen waß, und daß hatten erber leut zu Rakendariff auf gefangen und hatten daß verkauft, umb ij floren und daß selbig gelt haben sy unß geschickt ken prespurgk ij floren auri.

¹⁴⁵ Item auch an dem tag (Sambstag vor Inuoca) hab wir geben von der alden urfar zullen und von ainem alden prukschief und einer Regenspurgerin daß man di zeslagen haben hat In dem eyß do von hab wir geben ze lann iij s(ilber) d(enar) wienn(er).

¹⁴⁶ Item Am pfincztag noch dem Swartzen Suntag hab wir gehat xiiij aribater di Steckhen und Ennspawm In ein Schif getragen haben und di uber di Tuna gefurt haben zu der Aussern pruk alß man Im wind aus der Tuna nicht geslahen mocht zu der pruk, ydem xij d(enar) facit v s(ilber) xvij d(enar).

¹⁴⁷ Item auch an dem tag (Sambstag noch gotzauffartz tag) hab wir geben noch deß purgermaister geschafft ij gesellen di der pruk schif gehut haben und di der warffen haben alß esß di gancze nacht gar ser regenn und grobleich nyder giennng xij d(enar) wienn(er) facit xxiiij d(enar) wienn(er).

¹⁴⁸ Item auch an dem tag (pfincztag noch sand Margarethen tag) hab wir gehat ein man pey der hain zum Stam alß man xij potigen kallich ab gemessen hat und ist do gebesen iij tag alß der groß regen waß und hat auch den kallich ab geschieben mit andern gesellen pey der nacht alß Schiff mit dem kallich under wold gen, den hab ich geben iiij s(ilber) d(enar) wienn(er).

¹⁴⁹ Item Am Erichtag noch pfunczsten alß der Shower di wiengarten derslug ij wachter pey der nacht alß groß weter waß dem prukkhuter Hannß Trogler zu huliff und ich hab ydm geben xij d(enar) wienn(er) xxiiij d(enar) wienn(er).

¹⁵⁰ Item Am Fritag vor der heiligen driualdikait hab wir geben zu hulff dem Hannß Trogler der pey der nacht dem Hannß di Schif hat helffen der werffen In grossem regen und wint j aribater xiiij d(enar) wienn(er).

¹⁵¹ Am Freitag vor Inuencioni Sancti Stephani hab wir geben vij gesellen zu vertrinken alß di groß pleten vol hab mit wasser waß, und daß si di der warffen haben, und di nyderhalb der mullen ausher gefurt haben, den hab ich geben xxviiij de(nar) wien(ner).

Low water level of the Danube in September

As discussed by Kiss (2017), on 13 (GC: 22) September, the rather low water level of the Danube was mentioned in the Pressburg accounts (AMB K6, 77).¹⁵²

THE YEAR 1444

Winter 1444 in the Pressburg accounts

As recorded in the chapter entitled '*Czeancziges Ausgeben zu der Stat notdurft allerlay*', on 30 January (GC: 9 February), two workers were paid for clearing the snow from the (Town Hall?) corridor, the stairs and the guesthouse(?) (AMB K7, 29).¹⁵³ On 4 (GC: 13) February, two workers were paid for clearing the snow from the gatehouse over the notary's house (AMB K7, 30).¹⁵⁴ A week later, on 11 (GC: 20) February, similarly, two workers were paid for clearing the snow from the gutters of the Town Hall and from the kiln house(?) (AMB K7, 30).¹⁵⁵ On 14 (GC: 23) February, the town again paid for cleaning more snow from the gutters of the Town Hall and the kiln house (AMB K7, 31).¹⁵⁶ On 26 February (GC: 6 March),¹⁵⁷ and on the next day,¹⁵⁸ workers were paid, amongst others, for sweeping the snow in the *Juden Gasse* (AMB K7, 32). On 29 February (GC: 9 March),¹⁵⁹ the town repeatedly hired two people for cleaning the snow from the gutters at the Town Hall and the gatehouse (AMB K7, 33).

As mentioned in the chapter '*Poten lann zu der Stat notdurft*', on 6 (GC: 15) February, a messenger was paid for travelling to Vienna on bad (or 'vicious') roads (AMB K7, 65).¹⁶⁰ Messengers were again paid for travelling on bad roads to Nagyszombat (Trnava-Sk) on 11 (GC: 20) February,¹⁶¹ and to Komárom (Komarno-Sk) and Győr on 14 (GC: 23) February (AMB K7, 65).¹⁶²

In conclusion, only late-winter weather reports are available in the accounts in this year: there is no information about the weather in the first half of the winter but the second half, meaning late January-February, was rich in snow and prolonged frosts: snow clearings were mentioned six times at the end of January and in February. Very severe and long winter started in Bohemia on 6 December and lasted until 19 March, with wolves attacking people and animals; many domestic animals perished in the frosts. There were strong frosts and a hard winter in Austria and Bavaria, while the winter was temperate with moderate snow and sometimes with strong frosts in Silesia (Malewicz 1980, Brázdil-Kotyza 1995, p. 131). The winter was altogether normal; it was mild and wet in the Low Countries until around 17 January when frosty weather and snow arrived. Colder winterly weather, with occasional mild interruptions, lasted

¹⁵² Item Am phincztag noch Natiuitate Marie virginiß hab wir gehat pey den Schopparn xxij aribater di di groß pleten von dem lannd In daß wasser gezcogen haben alß do Tuna gar klain waß ydem vij di zu vetrinken facit v silber iij d(enar) wienn(er).

¹⁵³ Item Am phincztag vor purificacioniß marie virginis ij aribatern dy Snee von dem gang und von den Stigen fuder gerawmpt haben und von dem Tauerhauß(?) ydem viij d(enar) facit xvj d(enar) wienn(er).

¹⁵⁴ Item Am Erichitag noch purificacioniß ij aribater dye oberhalb deß Stat schreiberß vom Tharhauß Snee fuder gerawmpt haben per viij d(enar) wienn(er) facit xij d(enar) wienn(er).

¹⁵⁵ Item auch an dem tag (Erichitag vor Valentini martiriß) hab wir gehat In dem Rathauß ij aribater dy Snee von der Rynnen und vom darrhauß abgewarffen haben ydem viij d(enar) wienn(er).

¹⁵⁶ Item auch an dem tag (Freitag In die Valentini martiriß) hab wir gehat mer iij aribater dye Snee Im Rathauß wnt darrhauß und von den Rynnen gebarffen hat ydem viij d(enar) wienn(er) facit xxxiiij d(enar) wienn(er).

¹⁵⁷ Item auch an dem tag (Mitichen Am Asschtag) mer j aribater der In der luden gassen Snee fuder geschert hat do hin man Sannd geschut hat zu der Stat mawer, und waß not ist gebesen, dem hab ich geben viij d(enar) w(ienner).

¹⁵⁸ Item auch an dem tag (phincztag noch dem Aschtag) hab wir gehat ginhalben deß armß und In der luden gassen dy Sannd gegraben haben, und Sand auf dy vorgeschriben wagen gefast haben, und In der luden gassen zu dem Sannd gerawmpt haben Snee und stain fuder und dy korib fon dem wegen mit dem Sand umb gewarffen haben xj aribatern ydem viij d(enar) facit iij s(ilber) d(enar) w(ienner) / viij d(enar) wienn(er).

¹⁵⁹ Item auch an dem tag (Sambstag vor Invoca) ij aribatern dy Snee Im rathauß von den Rynnen von dem Tharhauß gebarffen haben xvij d(enar) w(ienner).

¹⁶⁰ Item Am phincztag Dorothee virginiß j poten In posem weg zu Teschler zum Richter kenn wyenn hab ich geben lxxxiiij d(enar) w(ienner).

¹⁶¹ Item Am Erichitag vor Valentini martiriß j poten dem Casperle ken Tirna zum purkgraffen hab ich geben In posem weg lvj d(enar) wienn(er).

¹⁶² Item Am Freitag In die Valentini martiriß j poten kenn Gamorn mit prieffen zum Jorig Scheben und zum Cristan von Raab zu unsern purgern hab ich geben zu lan gar Inn posem weg iij s(ilber) d(enar) wienn(er).

throughout February (Buisman 2000, p. 574). Similar weather conditions prevailed in Western Germany, where the change of weather to hard winter was reported on 21 January (Glaser 2013, p. 80).

Spring weather reports in the Pressburg accounts

As mentioned in the '*Czeancziges Ausgeben zu der Stat notdurft allerlay*', on 12 (GC: 23) March, the town paid two workers for cleaning the snow from the gutters of the Town Hall and the gatehouse (AMB K7, 34).¹⁶³ As documented in the chapter '*Czeancziges ausgeben zu der pruk notdurfft*', on 26 March, the town paid for carpentry work around the ships as the great wind caused damages (AMB K7, 54).¹⁶⁴

In the '*Ausgeben aribatern und Eurlenten zu dem polberich pey dem Alden Tabor*' chapter, on 11 (GC: 20) April there is a payment note that the Danube was small, meaning low water level (AMB K7, 171).¹⁶⁵ As an important possible cause of low water-level conditions, in the German areas, March 1444 was particularly dry (Glaser 2013, p. 86). As reported in the chapter on the wages of messengers, on 20 (GC: 29) May great wind – and the related works on the bridge ships – are mentioned (AMB K7, 124).¹⁶⁶

In conclusion, wintery weather continued into March with at least one significant snowfall and frosts in mid- (GC: late) March. Particularly important is the mid-April report on low Danube water level, which may primarily suggest dry conditions and possibly also that the winter extended into spring in the Upper-Danube catchment, especially in Austria and Bavaria. Late spring is represented by a late May strong wind (storm).

Summer rains in Pozsony/Pressburg

In the chapter '*Czancziges ausgeben zu der Stat notdurft manigerlay*', great rains were mentioned in two payment entries: on 27 July¹⁶⁷ (GC: 5 August) and on 7 (GC: 16) August¹⁶⁸ (AMB K8, 32, 33).

Bad harvest in the north?

A rather interesting analysis may shed more light on the conditions of 1444 and the years before and after. In this study, the salary of the town servants (*Stadtknecht*) in Eperjes (Prešov-Sk) was compared in the period 1443-1452 to the price of oats in the same times (Nógrády 2008; source of analysis: HNA DF 282530). Comparison of the years 1443-1448 and 1453 reveals that 1444 was clearly the worst year with the highest oats prices, while the rest of the years were comparably (much) better. The visibly much higher prices of oats in 1444 might have been the result of a bad harvest but could have partly also been caused by other circumstances (e.g., the second Balkan Campaign). In Bohemia and Bavaria, damages to winter crops and vineyards – probably destroyed by the May hailstorm(s) – were mentioned in this year (Brázdil-Kotyza 1995, p. 131).

Weather events in December, recorded in the Pressburg accounts

According to the entries of the chapter '*Czeancziges ausgeben zu der Stat notdurft*', on 5 (14 December)¹⁶⁹ and 18 (GC: 27 December)¹⁷⁰ December, two and three workers were paid for clearing the

¹⁶³ Item Am phinczttag In die Gregorij pape ij aribatern Im Rathauß dy Snee von den Rynnen und vom Tarhauß ab her gewarffen haben, ydem x d(enar) wienn(er) facit xx d(enar) wienn(er).

¹⁶⁴ Item Am Sambstag noch sannd Jorigen tag Marci ewangeliste, hab ich geben den zymmerleuten und den fischer maistern alß ein Schiff undr waß gangen alß der graß wint waß der grossen schaden tan hat an hewsern und ein pruk schiff zu Scheytert hat, daß man daß gewonnen hat und ein anderß under zogen hat, umb prot und wein auf fy aribater, und chaisß und ayer xl viij d(enar) wienn(er).

¹⁶⁵ Item Am Sambstag Am heiligen Oster obund hab wir gehat xiiij aribater dy Sannd uber dy Tuna ober gepracht haben In ainer zullen alß dye Tuna klain waß und dy morter abgesetzt haben und geraucht haben den mawrern waß not ist gebesen ydem xij d(enar) wienn(er) facit v s(ilber) xvij d(enar) w(ienner).

¹⁶⁶ Item Am Sambstag In vigilia penthecosten hab wir geben ij aribatern In dem grossen wint dy dy prukschiff der warffen haben tag und nacht paiden xxj d(enar) wienn(er).

¹⁶⁷ Item auch an dem tag (Mantag noch Jacobi apostoli) hab wir geben j aribater pey der nacht alß der Regen alß graß waß der dy morin gerawmpt hat x d(enar) wienn(er).

¹⁶⁸ Item auch an dem tag (Freitag vor Sannd Larenczen tag) j aribater In grossem regen der dy morin gerawmpt hat, hab ich geben x d(enar) wienn(er).

¹⁶⁹ Item auch an dem tag (Sambstag vor Sannd Niklaß) hab wir gehat ij aribater Im Rothauß di Snee vom Tarhauß fuder gerawmpt haben und di Rynnen gerawmpt haben ydem ix d(enar) xvij d(enar) wienn(er).

¹⁷⁰ Item auch an dem tag (Freitag noch Lucie virginis) In rothauß ij aribater di Snee von den Rynnen fuder gebarffen haben und von dem

snow from the gatehouse at the Town Hall and from the gutters (AMB K9, 29, 30). On 29 December (GC: 7 January 1445), four workers were paid for, amongst others, clearing away the snow from the gutters of the Town Hall (AMB K9, 30),¹⁷¹ while on 31 December (GC: 9 January 1445), two workers were paid, amongst others, for removing the snow from the gatehouse (AMB K9, 30).¹⁷² Based on the entries in the (mixed) expenses of the bridge, on 29 December, four workers broke/cleared the ice from/around the bridge ships,¹⁷³ while on 31 December, snow and water were removed from a bridge ship (AMB K9, 75).¹⁷⁴ Thus, December was snowy – particularly the second half – with four snow-clearing reports, on 5, 18, 29 and 31 December.

December 1444: Cold winter report from Transylvania

In a charter dated 15 (GC: 24) December, the count of Doboka County in North-Central Transylvania made a decision over a recent debate regarding some sheep from Kisdevecser (Diviciorii Mici-Ro) that were taken by some neighbours. The crux of the problem was that the sheep were penned up because of the great abundance of snow,¹⁷⁵ and certain neighbours could (illegally) take from there as many as they wanted. The decision of the count and the judges was that the neighbours should give back the sheep, and the sheep should stay in the pen until they can be moved. (HNA DF 252955, regesta: W. Kovács 2006, p. 341).

Based on the content of the charter, locking up and then stealing the sheep could have happened only days before, as the sheep were still clearly in the pen when the decision was made on 15 December. Moreover, on the day of the decision, the obstructive circumstance, namely the huge amount of snow, was most probably still there, as the conditions for a movement of the sheep were not adequate (yet). The huge amount of snow had already been present when the neighbours had taken away the sheep. Thus, early December 1444 could be rather snowy (and with prolonged frosts) in North-Central Transylvania. As we could see in the previous case, this December was quite snowy also in the west, and the first snow-clearing report appears in the Pressburg accounts already on 5 (GC: 14) December – this date is in good agreement with the Transylvanian case.

THE YEAR 1445

Late January 1445: ice cover of the River Maros

In his letter written on 25 January (GC: 3 February), János Hunyadi, Duke of Transylvania, amongst others promised to send salt to Bálint Szokoly, the castellan of Gyula, as soon as the ice of the River Maros (Mureş-Ro) disappears, and salt transportation can start. This means that at the beginning of February, there was still considerable, standing ice on the navigable sections of the river (Horváth 1861, p. 150; regesta: Veress 1938, p. 14).¹⁷⁶

darhaus ydem viiij d(enar) facit xxxvj d(enar) wienn(er).

¹⁷¹ Item Erichtag In die Thome Cantueriensis hab wir gehat Im Rothauß iij aribater dy den hof gerawmpt haben und di morin dar Inn daß wasser rint, und Snee vor den Rynnen geworffen haben ydem ix d(enar) facit xxxvj d(enar) wienn(er).

¹⁷² Item Am phinczttag In die Siluestris pape hab wir gehat Im Rothauß ij aribater dy Snee vor dem Tarhauß gebarffen haben und dy kamer gerawmpt haben oredenleich do die puxenstain ligen iglichß In sein stat ydem viiij d(enar) facit xvij d(enar) wienn(er).

¹⁷³ Item Am Erichtag In die Thome Canturiensis hab wir gehat mit dem veit schopper iij aribater di Im Ennsing di pruk schiff der warffen haben und daß eysß von den prukschiffen geslagen haben und hab geben ydem ix d(enar) facit xxxvj d(enar) wienn(er).

¹⁷⁴ Item Am phinczttag In die Siluester pape hab ich gehat Im Ennsing ij aribater di di prukschiff gerawmpt haben von dem Snee mit dem veit Schopper, ydem x d(enar) facit xx d(enar) wienn(er).

¹⁷⁵ "...quonium oues per pnhabundanciam magnitudinem niveij in territorio possessionis Kisdevecher in utensione occupare fuissent..."

¹⁷⁶ "Rogamus igitur Fratemitatem Vestram, quatenus previa ratione nolite nobis aegre ferre, in quibus enim placebimus vestrum ad nutum et commodum parebimus. Postquam eciam glacies dissoluentur, salesque per aquam Morusii descendere incipient, in continenti nostra propria in persona Lippam accedere volumus."

Mid-late winter 1445 in the Pressburg accounts

As mentioned in the chapter of messengers' wages (*Stat poten lann*), on 4 (GC: 13) January, the town paid a messenger for travelling to Nagyszombat (Trnava-Sk) and then to Galicz, and another one who travelled to Kittsee (AMB K9, 59)¹⁷⁷ – both cases in great coldness.

Based on the entries in the chapter of (mixed) expenses of the town (*Czeancziges ausgeben zu der Stat notdurft*), the Town Hall gutters and the gatehouse were cleared from snow on 9 (GC: 18) January.¹⁷⁸ Moreover, there was strong standing ice in the town moat on 21 (GC: 30) January.¹⁷⁹ On 26 January (GC: 4 February), workers were hired again to clean the roof of the Town Hall from the snow and for breaking the ice in the gutters (AMB K9, 31).¹⁸⁰

On 3 (GC: 12) February, the gutters at the Town Hall and also the kiln house were cleared from snow (AMB K9, 32).¹⁸¹ On 15 (GC: 24) February, people freed the bottom of the bridge ships from the (Danube) ice (AMB K9, 34).¹⁸² On 20 February (GC: 1 March), workers were paid for transporting the ice, but on the same day, there was rain, too (AMB K9, 34, 35).¹⁸³ Similarly, ice-related works (e.g. cutting, clearing off, transporting) were carried out on 25,¹⁸⁴ 26¹⁸⁵ and 27¹⁸⁶ February (6, 7 and 8 March; AMB K9, 35).

Based on entries in the bridge-related expenses, on 26 January, snow and water were removed from the bridge ships (AMB K9, 75).¹⁸⁷ On 8 (GC: 17) February, six workers were paid again for cleaning the ships from the ice (AMB K9, 76).¹⁸⁸ On 13 (GC: 22) February, maintenance and de-icing of the bridge ships were mentioned.¹⁸⁹

In January and February, snow clearings were mentioned only in three cases, in early and late January and early February. The weather was milder (or changeable) with rain in the second half of

¹⁷⁷ "Item Am Mantag noch dem Newen Jar j poten ken Tirna zu Pangratz, wo man den findt und den hat man funden zu Galicz und ist auß beliben vj tag, dem hab ich geben In grosser kelten v s(ilber) d(enar) wienn(er) / Item auch an dem tag j pten zum Keppler ken Choczsee In posem weg hab ich geben noch deß purgermaister gescheft xiiij d(enar) wienn(er)."

¹⁷⁸ Item Am Sambstag noch der heillign drey kunig tag hab wir gehat Im Rothauß ij aribater dy Snee von den Rynnen gebarffen haben und daß tharhauß gerawmpt haben ydem ix d(enar) facit xvij d(enar) wienn(er).

¹⁷⁹ Item Am phincztag Augnetis virginis hab wir gehat x klain aribater dy die grossen plocher vor dem alden Ekker hinder dem Nicolae Flinß fuder von der Stat mawr gerawmpt haben und daß uber eysß uber den Stat grabn gezcogen haben ydem viiij d(enar) facit iij s(ilber) d(enar) wienn(er).

¹⁸⁰ Item Am Erichitag noch Pauli Conuersioniß hab wir gehat In Rothauß iij aribater dy Snee von den dachern gebarffen haben und daß eysß auß der Rynnen gehawen haben, ydem viiij d(enar) facit xxxvij d(enar) wienn(er).

¹⁸¹ Item Am Mitichen In die Blasij episcopi hab wir Im Rathauß iij aribater di Snee von den Rynnen gewarffen haben, und Snee vom Darhawß fuder gerawmpt haben, ydem viiij d(enar) facit xxxvj d(enar) wienn(er).

¹⁸² Item Am Erichitag noch Inuocauit j furman mit ij rossen der Schintel gefurt hat zum Eckker hinder dem Nicolae Flinß und und laden von den prukschiffen ginhalben der Tuna, und pödem von den prukschiffen di man auß dem eysß gewonnen hat zu den andern laden wo man di hin gelegt hat hab ich geben dem purgermaister iij s(ilber) x d(enar) wy(enner).

¹⁸³ Item auch an dem tag (Sambstag vor Reminiscere) hab wir gehat deß purgermaister wagen mit ij rossen der kot und eyß vor dem platz gefurt hat dem hab ich geben iij s(ilber) x d(enar) wienn(er) / Item auch an dem tag hab ich geben von der Stain puxen under sannd Larentzen thar di man beschossen hat daß man di vor dem Regen under daß tach pracht hat x d(enar) wienn(er).

¹⁸⁴ Item auch an dem tag (pfincztag noch Sannd Mathiaß) tag hab wir gehat vij aribater dye daß eysß auf gehackt haben auf dem platz und daß kot zu samen geschorren haben und auf den wagen geslagen haben ydem viiij d(enar) facit lxij d(enar) wienn(er).

¹⁸⁵ Item Am Freitag vor Oculi deß purgermaister wagen mit ij rossen der kot und eysß von dem platz gefurt hat dem hab wir geben iij s(ilber) d(enar) wienn(er) / Item auch an dem tag hab wir gehat vij aribater dy eysß auf kot auf den wagen geslagen haben und eyß auf dem placz auf gehakt haben ydem viiij d(enar) facit lxij d(enar) wienn(er).

¹⁸⁶ Item Am Sambstag vor Oculi j furman mit ij rossen mit deß purgermaister wagen der kot und eysß von dem placz fuder gefurt hat dem hab ich geben iij s(ilber) x d(enar) wienn(er) / Item auch an dem tag habir wir gehat vj aribater di daß eysß und kot auf dem platz auf gehakt haben und daß kot und und daß eysß auf den wagen geslagen haben zu der zeit alß man ken weingrten giennyg ydem x d(enar) facit lx d(enar) wienn(er).

¹⁸⁷ Item Auch an dem tag (Erichitag noch sannd Paul bekerung) hab wir besunder gehat Im Ennsing iij aribater dye dye prukschiff gerawmpt haben vom See und wasser ydem viiij d(enar) facit xxxvj d(enar) wienn(er).

¹⁸⁸ Item Am Mantag noch Dorothee virginis hab wir gehat vj aribater di ein prukschif auß dem eysß gewonnen haben, und daß zefelt haben und dy laden zehakkt haben zu Strew auf di pruk ydem x d(enar) wienn(er) facit lx d(enar) wienn(er).

¹⁸⁹ Item Am Sambstag Indie Valentini martiris hab wir gehat pey dem Veit Schopper iij aribater di die prukschiff geheft haben Im Ensing und der warffen haben und der gehut haben daß sy di bewart haben fur dem Eyßß, und daß eyßß do von gehakt haben ydem x d(enar) facit xl d(enar) wienn(er) / Item auch an dem tag hab wir gehat iij aribater di der Hannß Kromer gewonnen hat daß sy ein ganczen podem awß dem eyßß von anem prukschif gewonnen haben ydem x d(enar) facit xl d(enar) wienn(er).

February, but as ice-cutting continued, there still had to be notable frosts in that period. No information is available regarding the character of winter in Central Europe this year.

Spring weather in the Pressburg accounts

Documented in the chapter of (mixed) expenses of the town, on 1,¹⁹⁰ 2¹⁹¹ and 4¹⁹² (GC: 10, 11 and 13) March, ice cutting works were paid (AMB K9, 35, 36). Mentioned among the mixed expenses of the town, on 18 March the town again paid four people for fixing the bridge ships at night in the great wind and rain (AMB K9, 76).¹⁹³ On 1 (GC: 10) April, a payment was related to the bridge ships taken by the Danube when the ice jam had moved away (in the past).¹⁹⁴ On 3 (GC: 12) April, works during the great rain were reported,¹⁹⁵ while, similarly, rather strong, prolonged rain – lasting for three days and nights – was mentioned on 13 (GC: 22) April (AMB K9, 77).¹⁹⁶

Thus, it seems that the beginning of March was frosty (or significant ice was still there), but latest by mid- (GC: late) March, the winterly conditions were replaced by milder, spring weather and prolonged rains in April. In Bohemia, there was a flood in early April, and snowfall was recorded on 11 April, and the snow lasted for four days. In Lower Austria, even May could not pass without a snowfall (Brázdil-Kotyza 1995, p. 131).

Summer-rain reports in the Pressburg accounts

On 5 (GC: 14) June, a great rain is mentioned in the (mixed) bridge- and carpentry-related accounts (*Czeanziges ausgeben zu der pruk und auf dy zymmerleut*): people were paid when they worked for pushing or pulling back the bridge ships after the rain. This first, weather-related entry in the year in the accounts refers to pope Bonifacius (would be 25 October) in the dating, but based on the list and also the Saturday dating of the event (in 1445), it should be bishop Bonifacius (5 June).¹⁹⁷ Similar works were paid because of a great rain on both 8¹⁹⁸ and 21 (GC: 17, 30) June,¹⁹⁹ and again on 28 June (GC: 7 July), but this time the works took place during the great rain and not after (AMB K10, 66, 67).²⁰⁰

As mentioned in the chapter on the messengers' wages (*Stat Poten lann*), on 16 (GC: 25) July a messenger was paid for travelling in 'great' (rainy? stormy?) weather from (Wiener)Neustadt to Pressburg/

¹⁹⁰ Item Am Mantag noch Oculi hab wir gehat deß purgermaister wagen mit ij rossen der eyß und kot von dem platz fuder gefurt hat dem hab ich geben iij s(ilber) x d(enar) wienn(er) / Item auch an dem tag hab wir gehat vij aribater di eyß auf gehkt haben und kot und eyß auf den wagen geslagen haben ydem c d(enar) wienn(er) facit lxx d(enar) wienn(er) / Item auch an dem tag hat der her Hannß Eylansunokch gehat j wagen mit ij rossen der Stat dinst pey dem selbigen wagen haben wir gehat vj aribat dy eyß und kot auff den wagen geslagen haben ydem x d(enar) facit lx d(enar) wienn(er).

¹⁹¹ Item Am Erichtag noch Oculi hab wir gehat deß purgermaister wagen mit ij rossen der eysß und kot von dem platz gefurt hat, dem hab wir geben iij s(ilber) x d(enar) wienn(er).

¹⁹² Item auch an dem tag (phincztag noch Oculi In der Fasten) hab wir gehat pey dem wagen iij aribater die eyß aufgehakt haben und kot und daß auf den wagen geslagen haben ydem x d(enar) facit xl d(enar) wienn(er).

¹⁹³ Item Am phincztag noch ludica hab wir gehat pey dem Veit Schopper als der wint gar groß waß und ser geraigent hat di gantze nacht iij gesellen di dy prukschif der warffen haben und di geheft haben ydem xij d(enar) wienn(er) facit xlvij d(enar) wienn(er).

¹⁹⁴ Item Am phincztag noch Ostern hab wir gehat viij nawferigen di zum obern urfar gefaren sind ainem prukschiff daß fuder gerinnen waß und ander pruk schif dar zu als di Tuna waß gangen mit dem Stosß und daß sy daß auffher gegen dem wasser pracht haben vom abern urfar auffher ydem xij d(enar) wienn(er) facit jlibra d(enar) wienn(er).

¹⁹⁵ Item auch an dem tag (Sambstag noch Ostern vor Quasi modo geniti) hab wir mit dem Veit Schopper gehat iij gesellen di dye prukschif der warffen haben In grossen rügen Im Ensing und nyden auch und di dy laden von den Schiffen gewonnen haben di man zu der wer dar auf gemacht hat ydem xij d(enar) wienn(er) facit xlvij d(enar) wienn(er).

¹⁹⁶ Item Am Erichtag vor Tiburtij et Valeriani hab wir gehat iij Newferigen als eß iij tag und nacht nach einander gerägent hat di dye Schif pey der zymmerhotten zu den prukken der warffen haben in di pruk schif Im Ensing mit dem Veit Schopper der warffen haben, ydem xij d(enar) facit xlvij d(enar) wienn(er).

¹⁹⁷ Item auch an dem tag (Sambstag Bonifacij pape) hab wir gehat iij gesellen di di pruk Schif der worffen haben noch dem grassen raigen und hab geben ydem xij d(enar) facit xlvij d(enar) wienn(er).

¹⁹⁸ Item Am Erichtag noch Bonifacij pape hab wir gehat iij gesellen di nach dem grossem regen di prukschif fer warffen haben und hab geben ydem xij d(enar) facit xxxvj d(enar) wienn(er).

¹⁹⁹ Item Am Mantag vor Johannis baptiste hab wir gehat iij aribater pey dem Veit Schopper noch dem grossem Regen di die prukschif der warffen haben, ydem xij d(enar) facit xxxvj d(enar) wienn(er).

²⁰⁰ Item Am Mantag In vigilia Petri et Pauli hab wir gehat iij aribater pey dem Veit Schopper di dye prukschif haben helffen der werffen und recht heften und stellen Im grossem regen ydem xij d(enar) facit xxxvj d(enar) wienn(er).

Pozsony (AMB K10, 74).²⁰¹ In conclusion, although the frequency of rains mentioned is not unusual, the number of destructive rainfall events in early/mid-summer is comparably larger than in most other years. The summer in Bohemia was characterised by some great destructive stormy rains followed by destructive floods (Brázdil-Kotyza 1995, p. 131), and the mid-June flood of the Odra in Silesia was perhaps caused by similar type of rainfall problems (Malewicz 1980). In the German areas, the summer of 1445 was rainy and wet (Glaser 2013, p 69).

Autumn rain in the Pressburg accounts

As a part of the messengers' wages, on 28 October (GC: 6 November), the town paid a messenger for carrying two letters to Konradstein (Cerová-Sk) in great rain (AMB K10, 77).²⁰²

December 1445 in the Pressburg accounts

As recorded in the general (mixed) town expenses (*Czeancziges ausgeben zu der Stat notdurft manichlay*), on 13 (GC: 22) December two workers were paid for one day's work because they cleared the gutters of the Town Hall from the snow (AMB K10, 42).²⁰³ As mentioned in the chapter on the messengers' wages (*Der Stat Poten lann*), on 17 (GC: 26) December 1445, a messenger – who was paid for going to the Roman (German) king – travelled in great coldness (AMB K11, 80).²⁰⁴

THE YEAR 1446

Mid- and late winter in the Pressburg accounts

As mentioned in the chapter on the messengers' wages, on 17 (GC: 26) January²⁰⁵ and 27 January (GC: 5 February),²⁰⁶ one-one messengers were paid for carrying a letter to Pibersburg (Vöröskő; *Červený Kameň-Sk* or: Schloss Piber in Styria) in great coldness (AMB K11, 81).

Rather exceptionally, weather-related information was included in the chapter on the incomes from the ferry and the toll (*Gelt vom urfar und vor der Maut*) during the winter of 1446. As reported on 22 (GC: 31) January, the Danube was running thick with ice in this and previous weeks, and because of this circumstance, there was no income from the ferry (AMB K11, 16).²⁰⁷ On 29 January (GC: 7 February), workers were paid, amongst others, for making the road for the coaches over the Danube (AMB K11, 26).²⁰⁸ Although there is no direct mention of ice or that the Danube froze over, this entry refers to the fact that the Danube was frozen, and the ice was thick enough to make the road for transportation.

As reported in the chapter '*Czeancziges ausgeben der Stat*', on 8 (GC: 17) February, two workers were paid for cleaning the snow from the Town Hall gutters (AMB K11, 27).²⁰⁹

²⁰¹ Item auch an dem tag (Freitag noch Margarethe) hab wir geben j poten noch deß Richter gescheft und seiner Inbekantnúß den er von der Newen Stat geschickt hat mit j prief zu den herren ken prespurk In grossem weter hab ich geben lxxvij d(enar) wienn(er).

²⁰² Item Am phincztag Symonis et Jude j poten auf den Chunratß stain In grossem Regen mit zwain gelaub priefen do man von herren landa gehabt, und daß ist wissenleich herren Hansen Kluxen lxxx d(enar) wienn(er).

²⁰³ Item In die Lucie virginiß hab wir gehat ij aribater di Snee Im Rothauß von den Rynnen gewarffen haben und waß not ist gebesen, ydem viij d(enar) facit xvij d(enar) wienn(er).

²⁰⁴ Item am phincztag vor Thome apostoli j poten mit der herren prief zu dem Romischen künig und zu dem von krey dem hofmaister und von deß fuxen wegen und In grossen chelden gegangen hat er geben iij s(ilber) x d(enar) wienn(er).

²⁰⁵ Item eodem die (Mantag In di Anthonij abbatiß) j poten mit meiner herren brief auf piberspur zu dem Jacob von Hekendarff Im grossem Snee hat er geben lx d(enar) wienn(er).

²⁰⁶ Item eodem die (phincztag noch Pauli) j poten mit meiner herren brief auff piberspur von herren landa wegen und frideß wegen, und von den auf den Chunrad stain In grosser chelden hat er geben j libra d(enar) wienn(er).

²⁰⁷ Item am Sambstag vor Pauli Conuersionis di selbige vergangen wochen ist di Tuna gar dichk mit eysß geronnen di selbig wochen hab ich von dem urfar nichts emphanen und Maut gelt auch nichts.

²⁰⁸ Item auch an dem tag (Sambstag vor purificacioniß marie virginiß) wir gehat j furman mit ij rossen deß purgermaister wagen der holcz und laden gefurt hat zum urfar ginhalben der ausser Tuna alß daß wasser an der Steten auß prochen hat daß man den wagen weg uber di Tuna gemacht hat, und hat auch pren holcz gefurt von der zymmerhotten gefurt den herren und daß Rothauß dem hab ich geben l d(enar) wienn(er).

²⁰⁹ Item auch an dem tag (Erichtag noch Dorothee virginiß) hab wir gehat Im Rothauß ij aribater besunder di Snee zering umb von den Rynnen fuder gewarffen haben und dy Rynnen gerawmpt haben und hab geben ydem x d(enar) facit xx d(enar) wienn(er).

Snow was mentioned only once in the accounts, and frosts became intense and long-lasting enough only by mid-/late January (late January–early February) to cause the freeze-over of the Danube. However, at least for a while in this winter, the ice was again thick enough to prepare the road over the frozen river surface.

The winter was cold and rich in snow, from early November until the end of January in the German areas (Glaser 2013, p. 80), but only a mild winter with little snow was reported in Silesia (Malewicz 1980, Brázdil-Kotyza 1995, p. 131). In comparison, in Pozsony it was probably around average with only a few snow.

Mid-April: frost destroyed vine in Austria and Hungary

Based on the *Continuatio Claustro-neoburgensis* V, there was a great frost on 14 (GC: 23) April, which destroyed almost all vines in Austria and Hungary. Thus, in this year, wine was expensive (Pertz 1851, p. 741).²¹⁰ Around the same time, similar hard frosts set in most of Central Europe ((Brázdil-Kotyza 1995, p. 131, Glaser 2013, p. 86).

Drought indicator or not? Dried fishponds in the Danube inundation area in October 1446

According to a charter dated 3 (GC: 12) March 1450, a perambulation took place around the landed possession of *Felzekchew* (Felszekcső) on 26 October (GC: 4 November), in 1446. While walking along the boundaries, (re-)settling landmarks and describing the boundaries, the perambulators had just left the River *Wayas* (Vajas) and Lake *Kangyalov* when, after a land of eight ploughs, there were places of fishponds (*loca vero piscinarum*). Nevertheless, the size of these fishponds could not be measured because of the lack of water (*propter carentiam aque estimare non valuissent*; see: Kammerer 1899, pp. 237-239).²¹¹

Due to the fact that the perambulation occurred in late October when temporary fishponds might have no water in their basin any more, the case might be connected to a preceding drier period, but – if these were temporary fishponds – this dry period was not necessarily a deviation from normal conditions. On the other hand, the lack of water of those times was clearly emphasised, rather unusually, in the charter. The fact that the perambulation was completed despite this problem may also refer to the relatively low value of these fishponds that supports the idea of being temporary ones. As the fishponds were mentioned after a Danube branch (Vajas) and a lake (clearly with water in its basin), they were most probably located in the Danube lower inundation area, primarily influenced by the water-level conditions of the Danube. These circumstances altogether may suggest (with a question mark) a contemporary low water level of the Danube.

Little is known about the character of weather in Central Europe, but the autumn was rainy in the German areas until 11 (GC: 20) November, while the weather was snowy after that (Glaser 2013, p. 91).

THE YEAR 1447

Early January 1447: snow and frost in Slavonia

On 3 (GC: 12) January, several men, including Czech and German soldiers, attacked a house of a nobleman and his family in *Pathyakoucz*, Körös County, Slavonia. After taking weapons and clothes

²¹⁰ "1446 venit magnum frigus in Austria et in aliis provinciis feria secunda et tertia ante festum Tiburci et Valeriani, et anichilavit quasi omnes vineas in Austria et in Ungaria, ita quod vinum fuit illo anno in caro foro."

²¹¹ "...debere prope ipsum fluvium Wayas, ubi signum metale fecissent; deinde directo transitu er magnum spacium pervenissent ad prefatum lacum Kangyalov, ibique suam finivisset demonstracionem, per quam ipsum castellum exclusisset. Et quia ipse partes in earum possessionariis reambulacionibus discordes extitissent, idcirco terram contenciosam ad octo aratra, silvam vero dolabrosam in diversis locis existentem ad unum aratrum rgalis mesure estimassent, loca vero piscinarum propter carentiam aque estimare non valuissent, item castellum Sembech, quod pro tunc omnino desolatum extitisset, cum quatuor sessionius populosis et tribus desertis apud manus dicti Ladislai reperissent, in dominio aliter terrarum litigiosarum ambas partes existere conspexissent."

(also of the women), they forced the owner's wife and daughters with the horses to run out of the house naked, into the snow and frost. And then they took everything that they robbed to the castle of *Racha* (Rača-Hr; see: HNA DL 103608).²¹² Although the exact location of *Pathyakoucz* is unknown, most probably it was located in the area of the present-day Berek and Potok, in Northern Croatia. No evidence is yet available regarding the character of the winter in Central Europe.

Autumn weather report in the Pressburg accounts

As mentioned in the chapter '*Czeancziges ausgeben allerlay*', on 23 October (GC: 1 November) workers were paid for working in the stone mine (Steinbruch – today between Devín and Bratislava) in the cold weather (AMB K13, 56).²¹³

December 1447 in the Pressburg accounts

As recorded in the chapter '*Czeancziges ausgeben der Stat notdurft*', on 8 (GC: 17) December, the town paid for ice cutting as the town moat at the Fisher Gate was (considerably) frozen (AMB K 12, 26).²¹⁴ On 19 (GC: 28) December, the town paid one worker for clearing away the snow from the gutters of the Town Hall (AMB K12, 31).²¹⁵

THE YEAR 1448

Mid-/late winter in the Pressburg accounts

According to the payments, presented in the '*Czeancziges ausgeben der Stat notdurft*', on 19²¹⁶ and 22²¹⁷ (GC: 28 and 31) January, and on 3,²¹⁸ 4²¹⁹ and 7 (GC: 22, 23, 26) February,²²⁰ the town paid workers for works in a frozen moat of the New Town (AMB K12, 37). On 14 (GC: 23) February, the town paid for ten workers as they prepared the road on the ice over the Danube; another worker was paid on the same day for cutting the ice in the town moat at the Fisher Gate (AMB K12, 39).²²¹ Much later, on 14 (GC: 23) April, a payment refers back to the time when the Danube had been frozen so much that the road over the ice had been used by people (AMB K12, 44).²²²

Based on the entries of the '*Stat poten lann*' chapter, on 26,²²³ 27 January²²⁴ (GC: 4, 5 February),²²⁵ and 9 (GC: 11, 18) February,²²⁶ messengers were paid for travelling to Niederweiden three times and also

²¹² "...et filias ipsius Ladislai per pectora equorum ipsorum enormiter trucidare facient, et estibus earum spoliari et denudari fecissent et sic in niubus ac intenso frigore de predicta domo habitacionis earundem repellere fecissent..."

²¹³ Item (am Mantag vor Symoniß et Jude) und haben gehat Im Stainpruch v rawmer durich der gefrüer willen daß man In der kelten gearibaten mag ydem x d(enar) facit I d(enar) wienn(er).

²¹⁴ Item (am phincztag In vigilia Concepcioniß Marie) und haben geben ainem eyshacker Im Stat graben pey fischer tar der geeist hat viij d(enar) wienn(er).

²¹⁵ Item (am Erichtag vor Thome apostoli) und haben gehat j aribater Im Rohauß der Snee von den Rynnen gewarffen hat dem viij d(enar).

²¹⁶ Item (am Freitag noch Anthonij abbatiß) und hab gehat Im Stat graben j aribater der In der Newen stat geeist hat dem hab ich geben viij d(enar).

²¹⁷ Item (am Mantag Vincencij martiriß) und hab geben j aribater der den Stat graben In der newen stat geeist hat, dem hab ich geben viij d(enar).

²¹⁸ Item (am Sambstag Blasij episcopi) und haben gehabt In der Newen stat Im Stat graben j der geeist hat dem hab ich geben viij d(enar) wien(ner).

²¹⁹ Item am Sontag noch purificacioniß Marie Im Stat graben In der newen stat der geeist hat hab ich geben viij d(enar) wienn(er).

²²⁰ Item am phincztag noch Dorothee virginis hab ich geben aribater Im Stat graben der geeist hat dem viij d(enar).

²²¹ Item am Mitichen In der Quottemmer noch Invoca hab wir gehab wir gehat x aribater di den weg uber daß eyß uber di Tuna gemacht haben ydem x d(enar) facit lxx d(enar) wienn(er) / Item und haben gehat Im Stat graben ein aribater pey dem vischer thar der daß eyß auf gehakt hat viij d(enar) wienn(er).

²²² Item (am Sambstag In die Tyburcij et Valeriani) ij Schapphen di man zum weg uber dy Tuna genutz hat alß dy gefroren waß per vij d(enar) facit xiiij d(enar).

²²³ Item am Freitag noch Pauli Conuersioniß hab ich geben j poten noch deßhanbinanuß(?) Inbechantnüß dem Mawer der dreistund gen Nidern Widen zum Orberger gelauffen ist und auch zum Enczeldarff und ist Im eyß ubergefahren zum lann.

²²⁴ Item auch an dem tag (Sambstag noch Conuersioniß b. pauli) j poten gen Nidern Weiden zum Orberger uber eyß dem hab ich geben xxj d(enar) wienn(er).

²²⁵ Item am Freitag In die purificacioniß marie virginis j poten gen Nidern Weiden zum Orberger uber eyß xxj d(enar) wienn(er).

²²⁶ Item am Freitag Appalanie virginis j poten gen Ebersdarif alß der Wessene Andreasch gefangen ward uber eyß und ist iiij tag

to Enzersdorf (Lower Austria) twice: every time the messenger had to cross the ice of the Danube (AMB K12, 75). One-one messengers were paid on 18²²⁷ and 19²²⁸ (GC: 27, 28) February for going to *Altenburg* (Mosonmagyaróvár) when they, similarly, had to cross over the (Danube) ice (AMB K12, 75, 76).

Although the road preparations over the Danube ice are directly mentioned only in mid- (GC: late) February, the fact that the town messengers crossed the Danube over the ice in late January and early February (GC: early/mid-February) means that at least in late January the Danube froze over and the ice was thick enough to be used for crossing. Apart from data from the northern part of Germany suggesting mild December, no other information is available regarding this winter in Central Europe, but the winter was colder than usual in the Baltic (Retsö-Söderberg 2020, p. 36).

Summer rains in the Pressburg accounts

As reported in the chapter '*Czeancziges ausgebens*', on 22 June (GC: 1 July), two workers were paid, amongst others, for clearing up the stones (and water) under the Fisher Gate that fell because of the great rain (AMB K14, 30).²²⁹ Works related to may have been required due to the same or another great rain that was further mentioned in a payment on 16 (GC: 25) August (AMB K14, 35).²³⁰ Either one or two heavy rain events, it must have been a rather significant downpour or torrential rain that had the power to sweep away stones to the moat.

There was a hot and dry summer in the German areas (Glaser 2013, p. 69), and only a destructive thunderstorm was mentioned in early August in South-east Poland (Malewicz 1980).

Pressburg accounts: Danube froze over in December 1448

As mentioned in the chapter on the messengers' wages (*Stat poten lann*), on 13 (GC: 22) December 1448, a messenger travelled to Komárom while the Danube was running with ice.²³¹ On both 21²³² (GC: 30) and 28²³³ December (GC: 6 January 1449), one-one messengers were sent to Niederweiden (Lower Austria) who had to travel over the (Danube) ice (AMB K14, 123). As referred in the chapter '*Czeancziges ausgebens*', on 30 December (GC: 8 January 1449) people were paid amongst others to prepare the road over the ice of the Danube, as it had been frozen over (AMB K14, 52).²³⁴

Thus, although the preparation of the road over the Danube ice was first mentioned only at the end of December (GC: early January), the river was probably frozen over already one to two weeks before, as the messengers already crossed the ice there, which means that the December had to be already rather cold. The fact that while the ice of the Danube was already crossable on 21 December, but the road preparation was only mentioned on the 30, may raise the possibility of an interim milder period when the ice was hardly or not passable for a while.

December was milder than usual in the German areas (Glaser 2013, p. 80). No other information is available from Central Europe regarding this winter.

ausgeben dem hab ich geben xlij d(enar) wienn(er).

²²⁷ Item Suintag Reminiscere j poten gen Altenburg uber eyß dem hab ich geben xxxv d(enar) wienn(er).

²²⁸ Item am Mantag vor Mathie apostoli j poten zum Graf Jorigen Aldenburg der peter von Stresincz mit meiner herren prief uber eyß und iij tag awß beliben, dem hab ich geben xlij d(enar) wienn(er).

²²⁹ Item am Sambstag In vigilia Johannis baptiste hab wir gehabt under vischer thar ij aribater di dye stain fuder gerawmpt haben von der mawr di von dem grossen Regen nyder waß gefallen und dy wasser awß gescheppt haben ydem xij d(enar) facit xxiiij d(enar).

²³⁰ Item am Freitag noch Assumpcioniß Marie virginis gloriose hab wir gehabt ij aribater pey dem vischer thar noch dem grossen Regen dy dy morin gerawmpt haben ydem xij d(enar) facit xxiiij d(enar).

²³¹ Item Freitag In die Lucie virginis j poten gen Gumern dem hab ich geben alß dy tuna mit eyß ran vj tag aws iij s(liber) d(enar).

²³² Item eodem die (Sambstag Indie Thome apostoli) mer j poten auf cuntschaft gen Nydern Weiden dem hab ich geben uber eyß xxiiij d(enar).

²³³ Item eodem die (Sambstag aller kindlein tag) j poten gen Nider Weiden auf kuntschaft uber eysß dem hab ich geben xxxiiij d(enar).

²³⁴ Item am Mantag vor Siluenstri pape hab wir gehabt pey dem Stat wagen j aribater der mist auf den wagen gefast hat den man gefurt hat auf dy Tuna zum weg alß dy Tuna gestossen waß dem hab ich geben viij d(enar) / Item eodem die hab wir gehabt auf der Tuna x aribater dy an dem weg gemacht haben alß dye Tuna uberfrozen waß ader gestossen In allen xlij d(enar).

GREAT (UNINTENTIONAL) FIRES BETWEEN 1401 AND 1450

Because of their usual connections with prevailing weather conditions (e.g. dry period, very frosty winter, strong winds), in this chapter, great fires of the period are described with special emphasis on the events known or presumed to be unintentional fires of settlements, especially towns, large building complexes such as castles, churches or chapter houses. Fires of individual urban (or countryside) houses are not listed among these fire events. Although much more fire reports are available from the first half of the 15th century, the fires reportedly caused by violent attacks and conscious combustions of settlements or castles are not mentioned here. There is only one exception: the particularly devastating urban fire of Lőcse (Levoča) is also discussed even though it was most probably the consequence of a particularly violent Hussite attack. The list of (unintentional) fires is most probably not complete yet, and the fire database will be extended with further reported events in the future.

1411: when part of Libicze (Leibic?) burnt down

Responding to the application of the town judges, on 6 (GC: 15) April, the king granted 17 years of free stay (as free town hospites) to those citizens of Libicze (Leibic?; L'ubica-Sk) town whose houses had burnt down in the near past, and the to the rest of the citizens of the town 15 years years (HNA DF 266963; regesta: Mályusz-Borsa 1993, p. 137).

1414: the St. Mark monastery in Visegrád burnt down

With many other charters included in a charter dated to 1424, a charter from 1414 states that on 24 December 1414 (1 January 1415), the prior of the Augustinian St. Mark monastery in Visegrád sold a land – previously donated by a lay landowner to the monastery in his last will – to the castellan of Esztergom, because their monastery had burnt down. As the purchase was made at the end of the year, presumably due to the urgent necessities of the monastery, the fire most probably did not occur long before this date, and definitely still in the same year (HNA DL 11458, regesta: Neumann-C. Tóth 2009, p. 138).

1424: 'burnt' houses in Eperjes

In the short unbound and to some extent fragmentary account book on the expenses of Eperjes (Prešov-Sk) town dated to 1424 (occasionally with pages from the 1490s), several 'burnt' houses are mentioned (clearly in the 1424 part), suggesting that a fire affected a significant part of the town in the near past, maybe still in 1424 or shortly before (HNA, DL 43621). The town was also granted a reduction of royal taxes because of this fire. Based on the accounts, the fire affected the square of the Slavs (*Plathea Sclavorum*) and the cloister there – some expenses were covered from the royal tax reduction. The fire also affected the quarter of *Johannis Sartoris* and the Hungarian quarter, and the quarter of the 'Nyderlender': (some of the) expenses were similarly compensated from the royal tax. Moreover, the name of a further affected quarter remained unfinished in the accounts. However, based on the available information, it is clear that the combustion affected a large part of the town, and the destruction was extensive enough to gain a significant royal tax reduction for the town in 1424.

When the town of Szöllős burnt down: sometime before 1428

According to a royal charter dated 14 (GC: 23) February, the king ordered the tax collectors of Ugocsa County not to collect more than 50 (Golden) Floren royal tax (*lucrum camerae*) per year from the town of Szöllős (Nagyszőlős; Vinohradiv-Ua). In the past, the town and its villages did not pay more, and the town used to possess the relevant legal documentation to prove that. However, when the town completely burnt down, these charters also perished (HNA DL 70845). The charter does not provide any direct information when the fire occurred, but – because of losing all their legal documents – it was a basic interest of the town to get a replacement of these (or at least the most important) documents soon. The case with the tax collectors clearly showed only an official document (or the king) could prove their rights.

The exception: Lőcse mainly burnt down again in 1431

According to the Georgenberger Chronik, most parts of Lőcse (Levoča-Sk) burnt down in 1431, around Easter (Szentpétery 2000, p. 285: '*Anno dni MCCCCXXXI am ostertag ist dy stat Lewtscha daz meiste teil verprant*'). The source does not provide any information on whether this fire was an unintentional, accidental event or it was caused by any enemies. However, from another source we can gather some information regarding the probable reason of this fire. On 19 July 1432, the parish priest, while reporting on the fire of the town (and that of the church) to the pope, blamed this unfortunate event on the Hussites who themselves intentionally set fire on the town (Lukcsics 1938, p. 64: '*Hussitarum facere totaliter fuerat igne consumpta*'). Therefore, most probably, this was not an unintentional fire event. This finding also increases the probability that the town fires mentioned in the north, without giving the reason for the fire, had some connections to the repeated Hussite (and then the civil-war) attacks, particularly in the 1430s and early 1440s. In Germany, the summer of 1431 was dry and warm (Glaser 2013, p. 68); if similar conditions prevailed in the north-eastern part of the Carpathian Basin, this could be a favourable background to the spread and a factor increasing the magnitude of a fire event.

1434: Léva castle burnt down by accident

A charter from June 1435 states that the castle of the Duke of Macho, Léva (Levice-Sk), burnt down. A vassal of the Duke of Macho, Jakab Alsóbelegi, lost all his charters proving his ownership over the family lands. Therefore, he asked the king for help in this matter, and the king – considering his faithful personal services – issued a donation charter that proved his ownership rights on two of his former landed properties. Moreover, the king gave him two more lands in addition (HNA DL 12723). Merely based on this charter, one could suggest that the fire must have happened in 1435. However, based on the next charter, the fire event most probably happened earlier. A very important circumstance is also stated in this charter: this huge fire event happened by accident (*casu inopinabili accidente*).

Preserved as a summary in a later charter, as part of a land ownership debate within the family (lasting for years in the 1430s), a charter dated to 16 December 1434 also mentions the great fire event in the castle of Léva. In December 1434, three brothers – Mihály, György and László Szendi – applied to the king for support, because all their charters, crucial in the protection of their ownership rights, perished in Léva Castle. As a remedy of their losses, the king gave the two noblemen the royal rights in numerous landed possessions in Nógrád, Gömör and Pest counties (HNA DF 247962).

Léva was the centre of Bars County, and its well-fortified castle – as was usual in the counties – provided the opportunity to the landowners of the county to preserve their most important documents there in safety. In those years, the most valued legal documents of the noble families were kept in this castle because of the uncertainties and attacks related to Czech Hussite armies, particularly violent in the northern, north-western parts of the country. Since the first charter explicitly refers to an accident, and none of the two charters mentions any Hussite (or other) intervention at that time, the fire was most probably unintentional. As the summary in the second royal charter refers to fire as a recent event, it most probably happened in the same year, in 1434.

1440: chapel fire in Veszprém

According to an application summarized in 1440 in the papal supplication register, the St. Ladislav chapel in Veszprém was hit by fire so severely that all the documents kept there perished. The documents of the founder and donator family were also there (Lukcsics 1938, p. 193). As the information was documented at the beginning of October, the fire event probably happened still in 1440. No information is available on the cause of the event and, in fact, the fire in one single building might be more the consequence of human ignorance, but the causes can also be partly or entirely natural (e.g. strong wind brought fire, or thunder struck the building).

August 1442: when half of Bártfa burnt down

According to the town account books of Bártfa (Bardejov-Sk), on 25 August (GC: 3 September), half of the town burnt down (Fejérpataky 1885, p. 557: '*Die sabbati post Bartholomaei combusta est media civitas*'). No information on the origin of this fire is directly indicated in the documents. Since in spring, the town of Eperjes (Prešov-Sk), similarly in the north-eastern part of the country, was also set on fire as part of the conflicts of the civil war, we cannot be absolutely certain that the great fire in Bártfa had nothing to do with war activities. Nevertheless, it is unlikely, as the civil war was about to end at that time: after June, no significant military activities were reported any more. As this was already the time of negotiations, there is a good chance that the fire was not directly related to military activities.

1447: when charters perished in castle fire in the north-west

Reported on 17 October 1447, the castle of Szklabinya (Sklabiňa-Sk) in Turóc County burnt down, and the charters related to the landed possession of the parish church of (Turóc)szentmárton (Martin-Sk) also perished (HNA DL 44487). As the charter was an order sent to the Convent of Turóc for the local inspection of the case, the fire event most probably happened not long before, still in the same year.

OVERVIEW AND SOME CONCLUSIONS

Over 90% of the weather reports are known from contemporary domestic sources. The source clearly richest in weather reports is the Pressburg accounts – this fact explains the unproportional temporal distribution of weather information from the first half of the century, in favour of the last approximately one decade. Most of the data are related to winter conditions: in the period between 1401 and 1450, for most winters some information is available at least about a part of the winter and, to a lesser extent, this is also true for the period prior to the accounts. The Pressburg accounts mostly contain daily or weekly information, which also influences the structure of evidence in the entire database, but there is often some (or complete) overlap with narrative or another type of evidence. It is, however, rather clear from the distribution of the daily/weekly accounts that, even if almost all years are covered by the accounts after 1439, in most years not all account books of the year preserved. Consequently, sometimes, some weeks of weather reports are missing, either the first or the second part of winters (e.g. 1443-1444). For the rest of the seasons, occasionally, some data are available. In a few cases there is enough evidence to make any statement about the character of the season. No weather data are yet available in contemporary documentation regarding the years 1449 and 1450.

Based on the available sources, the hard winters of the first half of the 15th century detected in contemporary sources are 1408, 1417, 1427, (1432), 1433, 1435, 1437, 1440, 1441, 1442, 1443 and 1444; except for, perhaps, 1437, the hard winters were usually also rich in snow, and particularly early (firm) freeze-over of the Danube was reported in 1426 (early-/mid November) and 1440 (beginning of December). In most cases, winter was not only severe but also long, and covered the later part of the autumn as well as early spring. In the 1440s, when already full account books are available, the Danube froze over, and the road over the ice of the Danube was made practically every winter when reports are available.

Strong winds appear predominantly in the Pressburg accounts and particularly during harder winters (e.g. 1440), but, for example, great winds were also mentioned in the summer of 1440 or the springs of 1444 and 1445. Although one-one destructive rains are often mentioned in all seasons of the summer half-year (e.g. 1422, 1436, 1442, 1444), wet summers with a higher number of destructive rainfall reports – and with rainy summer parallels in Central Europe – were only documented in 1443 and 1445. Destructive mid-/late April frosts were mentioned only in two cases: in 1434 and 1446.

Drought and/or low water levels were reported in three (or four) cases, (spring-)summer drought was also mentioned in 1439 when even marshland(s) dried up. Low water levels of the Danube – reflecting dry conditions in the Upper-Danube catchment – were mentioned in the Pressburg accounts in September 1443 and April 1444. Drought and dried-up marshlands were mentioned in the south-

east, while another, rather indirect and uncertain case with dried-up fishponds along the Danube was recorded in October 1446.

Especially in the (Pressburg) town accounts, numerous physical indicators – e.g. river running with ice, moat ice cutting, river/Danube freezing over, road making over the river etc. – were listed regarding winter temperature, phenological indicator of late spring–early summer temperature is yet only available in one case (1402) suggesting around average conditions.

The developing fire database (potentially reflecting preceding dry or very cold and windy conditions) currently contains eight, most probably unintentional, great fire events that occurred in 1411, 1414, 1424, 1428 or earlier, (1431–not unintentional), 1434, 1440, 1442 and 1447. High prices and food shortage problems related to bad harvest(s) – usually caused by unusual/unfavourable weather conditions, especially in the May-June periods, and/or prolonged winter extremes – were reported in (1414-)1415-1416, 1428 and before, 1433(-1434), late autumn 1440 and early 1442, but in 1444 most probably bad oats harvest hit the north-east, too. At first sight, rather striking is the good overlap with most of the major fires and mostly also with the bad harvest/food shortage incidents.

Although any overall conclusions are somewhat biased by the source distribution – caused by the overrepresentation of the 1440s with the mass appearance of weather reports in the Pressburg accounts –, based on objective reports and also the Central European parallels, we can state that the 1430s and 1440s were rather rich in weather extremes in the Carpathian Basin. However, we gain a rather detailed picture only of the unusually high frequency of cold, long and snowy winters, practically in the early/mid-1440s, also covering late autumns and early springs in these years. Finally, it should be emphasised that due to the great increase of contemporary documentary evidence compared to the previous centuries (see e.g. Kiss 2019a, p. 268), the present paper is only a first overview, and most probably more weather-related source evidence will be discovered in the future.

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