Ship mills in historical Hungary

Schiffmühlen in Ungarn

Moulins flottant en Hongrie

Tibor Sabján

History of ship mills in Hungary

The first available written documentation regarding ship mills in Hungary is from the 13th century. This allows us to establish clearly that the mention is made of mills working on the Danube near Pozsony and Buda (*Smoling Somorjay 1934*, 23–24; *Pongrácz 1967*, 106). The earliest archaeological relic, found in the river at Tiszabecs (Upper-Tisza region) dates from the 14th century (*Páll 1993*, 79–81). Hollowed-out tree trunks longer than 12–13 m have been found not only in the Tisza but also in the river Szamos. These are, in my opinion, no remains of boats carrying salt, but carriers of ship mills (*Iuraşciuc 1967*). More information is available about ship mills in Hungary at the beginning of the 1600s. Faustus Verancsics mentions in his work entitled Machinae novae that the smaller ship of ship mills carries only the shaft of the water wheel. He relates that the ship mills on the Danube used to be tied to mill stakes driven into the river bed by using a rope twisted from willow twigs (*Verantii 1616*, XVIII). An early depiction, which is considered to be an authentic representation, dates from 1588: the view of Pozsony shows a ship mill on the Danube (*Soltész 1993*, 12). The view of Győr made in 1597 by Nicolaus Aginelli and Georg Houfnagel shows the town in 1566. One or two ship mills float here on the Danube (*Soltész 1993*, 16). After this time, plenty of data are available. In the 17th century ship mills work on all big rivers, moreover, we know well their construction and ways of mooring. As the population increased in the course of the 18th century, the number of mills multiplied too. In 1750–51 altogether 22 ship mills worked near Szeged, which number increased in 1763–68 to 36, and in 1777–78 to 47 (*Juhász 1960*, 128). This multitude of mills became a hazard to shipping and several regulations tried to control their mooring and locations. Industrial development in the 19th century didn't pass by the mill industry, the more so since the boom in the grain market was one of the driving forces of the development. In a second wave of reconstruction of modern mills in Hungary, being already world-leaders, ship mills were equipped too with new machinery according to the latest technology. The middle of the 20th century was the period of decline of the ship mills. The few mills, which survived the Second World War, were closed down by the communist dictatorial regime.

The structure of the ship mills

Based on historic data and archaeological finds, we establish two methods for building the hull. The carcass of the ship was made of U shaped ribs hewn from timbers. This frame was covered with broad oak planks. The planks were fixed to the ribs with wrought-iron nails, in earlier times with huge wooden nails. The gaps between the planks were filled with moss. The moss was pressed down and held in place by laths. U shaped wrought-iron nails fixed the laths. We recognise this type of ship-building on pictures from the 16th century and the mentioned U shaped nails are well known from archaeological finds of the late Middle Ages. Faustus Verancsics shows such hulls in his book presenting new machines (*Verantii 1616*, XVIII–XIX). Following the older method, huge hollowed-out oak trunks carried the floating mills. 2–3 such trunks supported the bigger ship, and one or two trunks were under the shaft of the water wheel. The length of the trunk was often 13 m, and its diameter might have exceeded 1 meter. (For those interested in linguistics: these trunks had a special name in Hungarian: *tombác or dudu.*) Mills supported by tree trunks were still in use in the 19th century on small rivers, but they completely disappeared by the 20th century (*Kovács 1989*).

Ship mills in Hungary consisted of two ships and had an asymmetric construction (of the katamaran type). The bigger ship (the 'house-ship') was moored near to the banks. The mill together with the machinery was set up on this ship. The smaller one, an open boat ('valley ship' or *tombác*) supporting the end of the shaft of the water wheel, faced midstream. Long timbers connected the two ships. Planks, nailed on the first two timbers, served as a walkway between the ships. The diameter of the water wheel of smaller ships was about 4–5 m, its length was 7–8 m. The diameter of the wheel of a bigger ship could reach 6 m. The water wheel could be stabilized by a wooden lock lowered into water. The thicker end of the shaft of the water wheel entered the mill house. A big cog-wheel was attached to it, which fitted together with the bits of a smaller cog-wheel. The short shaft of the smaller cog-wheel formed a right angle to the shaft of the water wheel. A bigger cog-wheel joint the other end of the short shaft, which turned the spindle. This way, the rotation of the water wheel was sped up by double transmission before reaching the mill-stones. In modern mills, an elevator moved the grain and cylinders ground it. The flour was

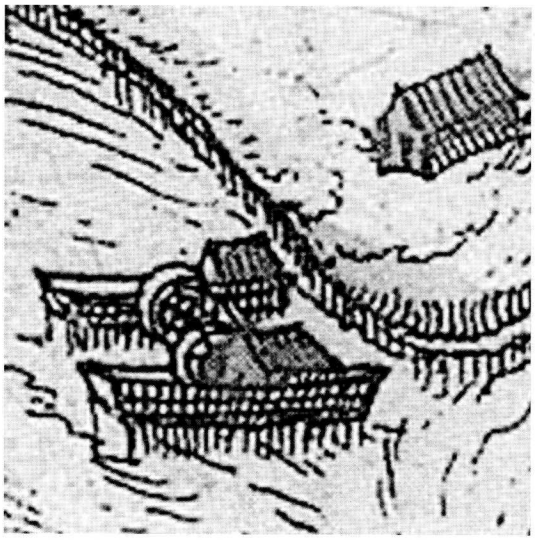
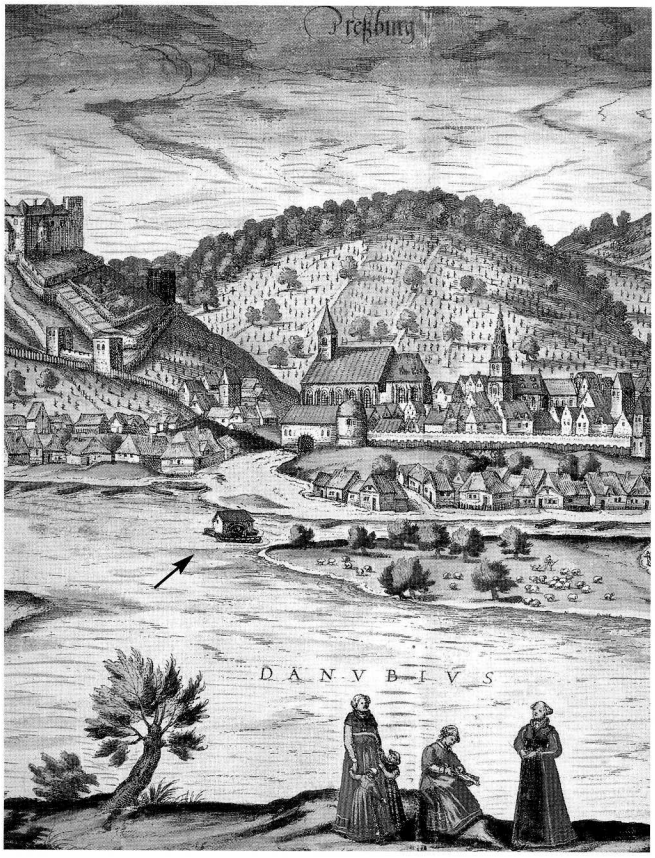


Fig. 1. *The view of Győr from 1566 (N. Aginelli – G. Houfnagel 1597).*



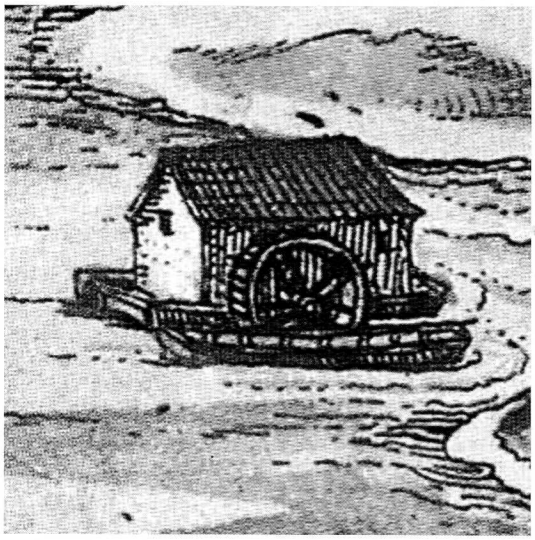


Fig. 2. *The view of Pozsony from 1588.*

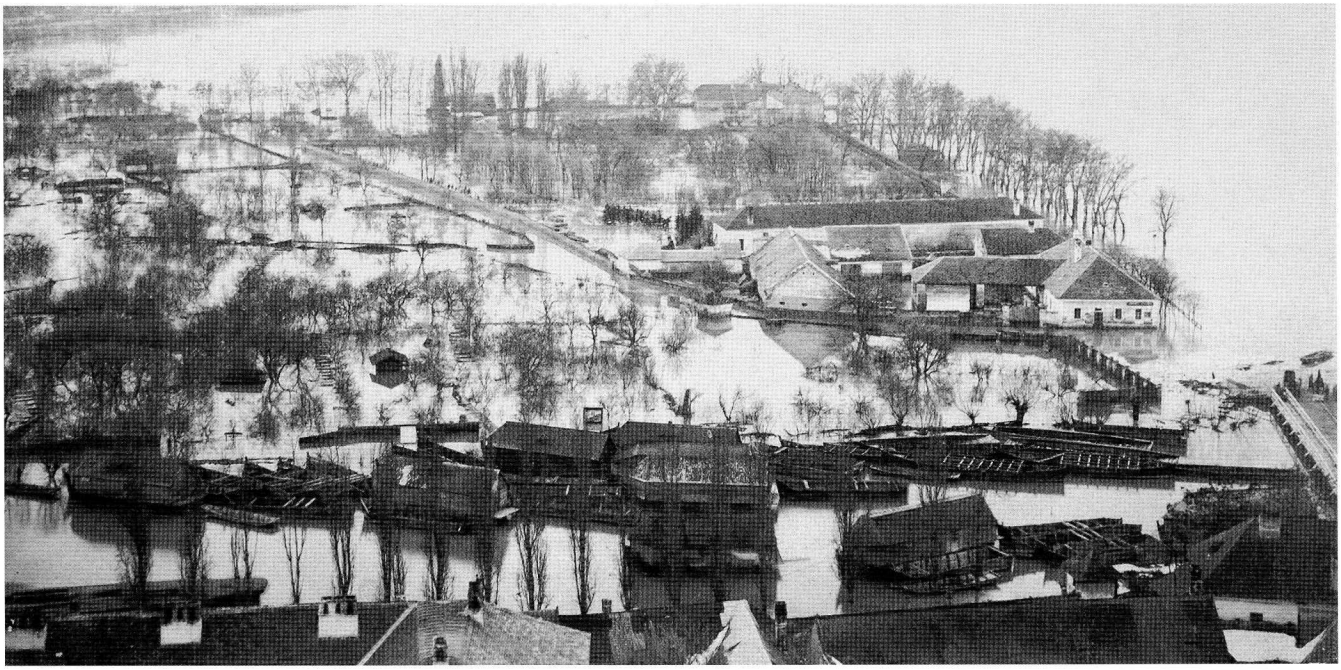


Fig. 3. *Esztergom flood in 1876. Dismantled ship mills on the Little Danube (Esztergom, river Danube, 1876).*

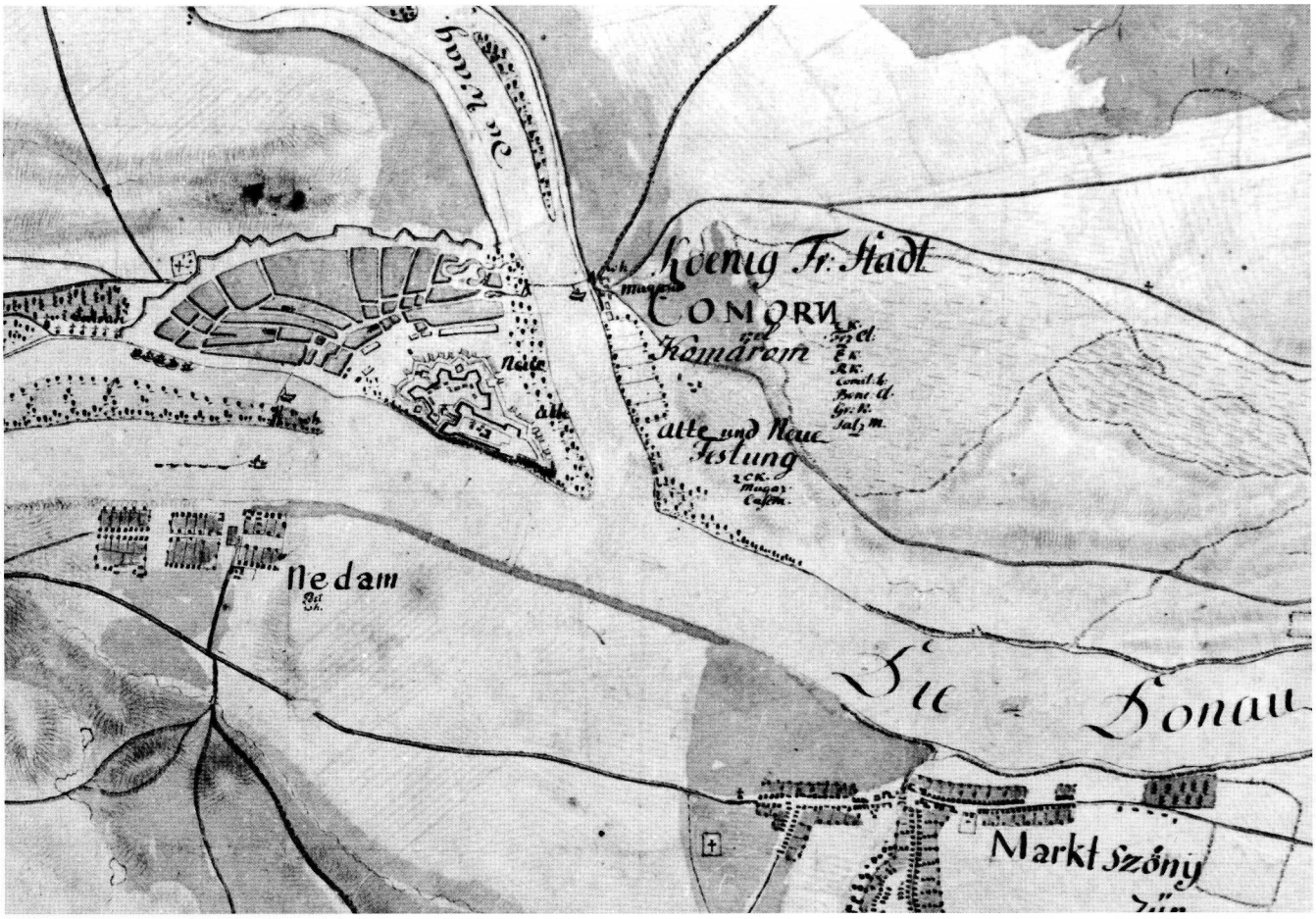


Fig. 4. *Ship mills on the river Danube near Komárom (1782).*

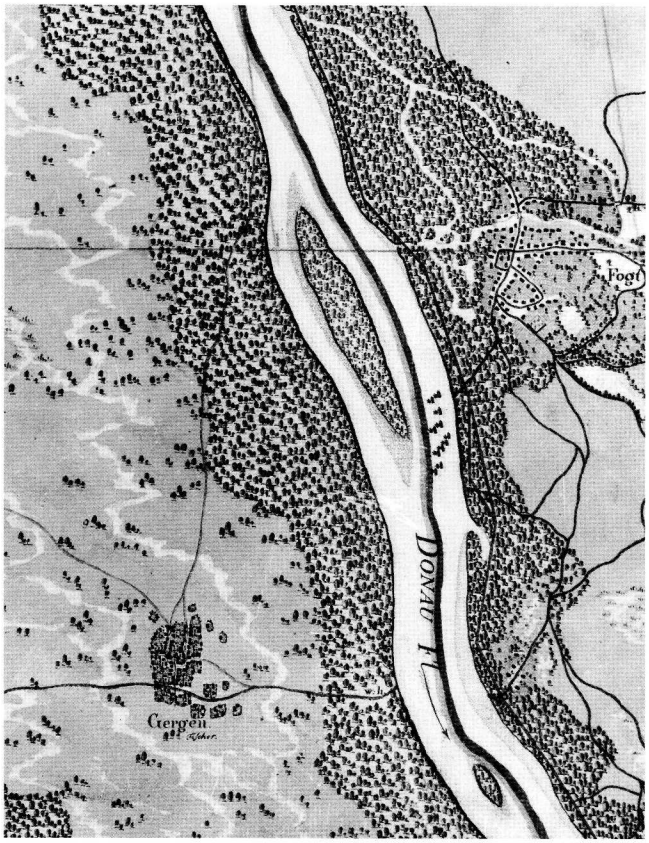


Fig. 5. *Ship mills on the river Danube near the Sárköz (1783).*

graded by bolter systems, different transmissions and belt-gears turned and moved the equipment.

The beaks of ships working on big rivers (Danube, Tisza) were built high. The end of the timber was normally decorated either by a spiral ornament or by a carved head.

Mooring of the mills

In the Middle Ages ships used ropes twisted from willow twigs for being fixed. New ones replaced the ropes every spring. The ropes were tied to stakes driven into the riverbed (*Takáts 1907*). Before sinking them into the river, a cut was made by a saw in the thick oak stakes to mark the desired length. A transversal timber was also fixed to it. People drove the stake into the soft riverbed from two boats tied to each other. Once the stake stood firmly in the ground, a ship hit its end emerging from the water and broke it off there where the cut was made, under the water, some distance above the riverbed (*Czigány 1962*, 98). The mooring line of the ships could be hooked onto the transversal timber. Where the riverbed was rocky, millwrights wove a kind of very large wicker basket and filled it with stones and earth. The line was attached to a timber placed in the middle of the basket. The empty basket was tied between two ships and after filling up, the fixing ropes were suddenly cut off at the same time, so that the basket sunk fast. The baskets were damaged

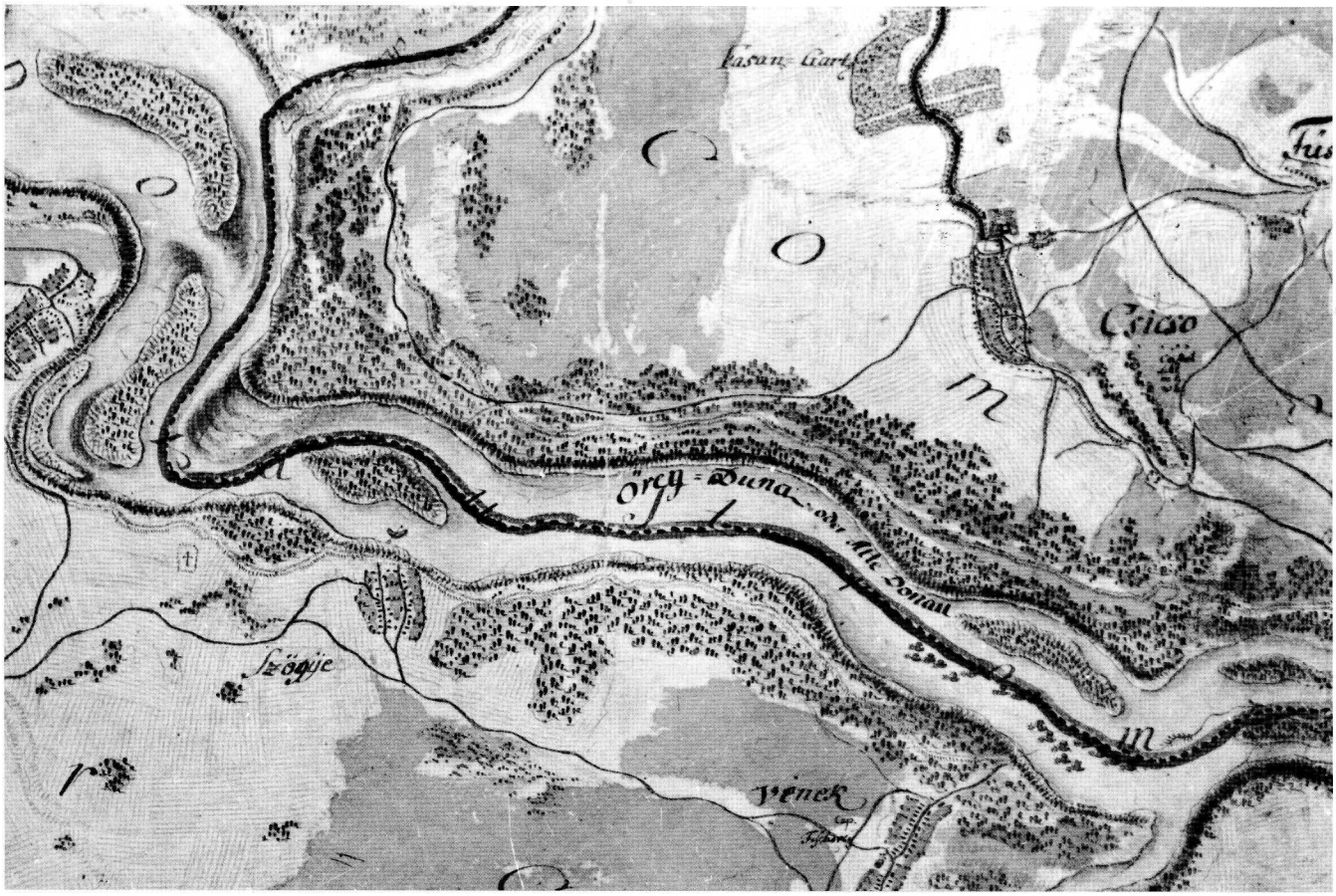


Fig. 6. *Ship mills on the river Danube (1784).*

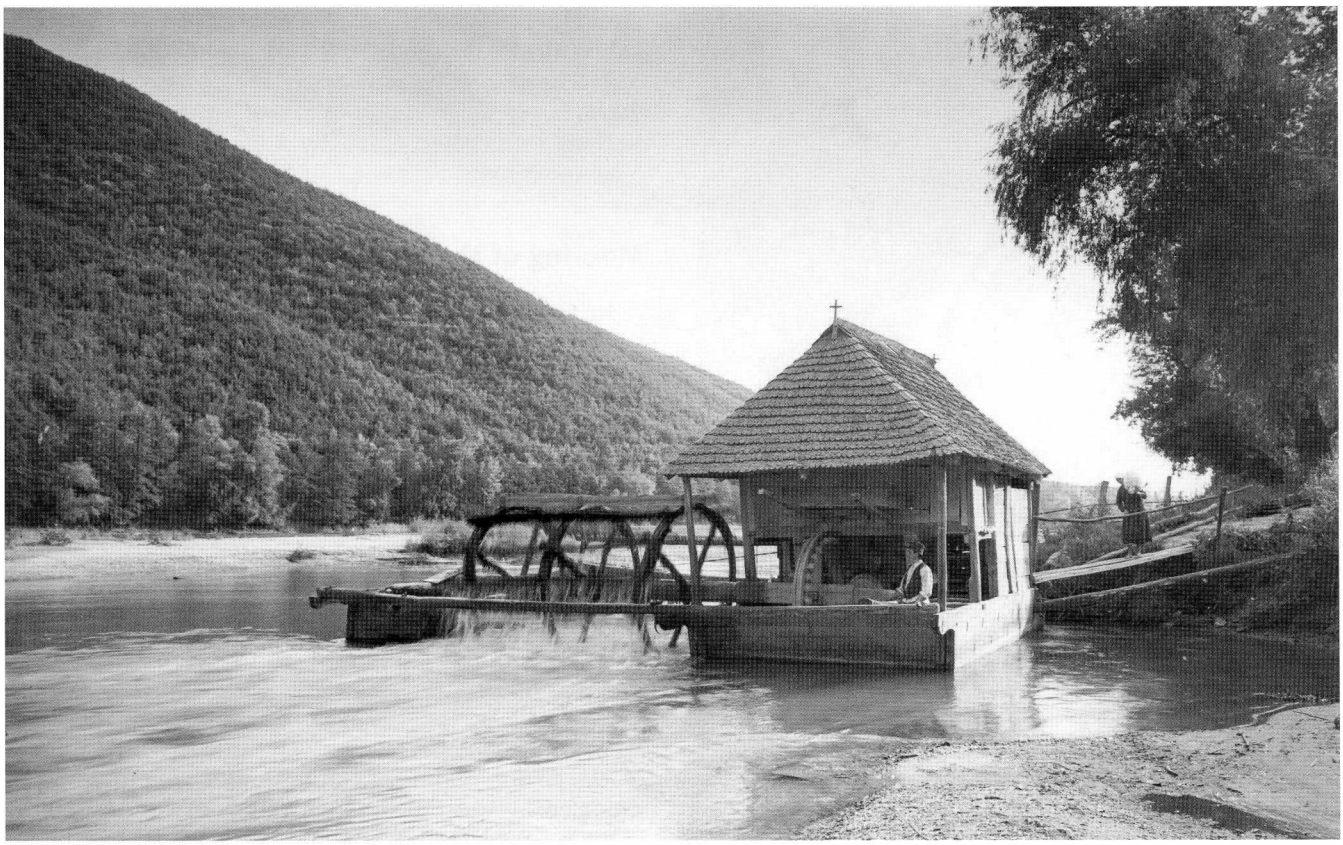


Fig. 7. *Little ship mill on the river Szamos (Sülelmed – Kelence 1942)*

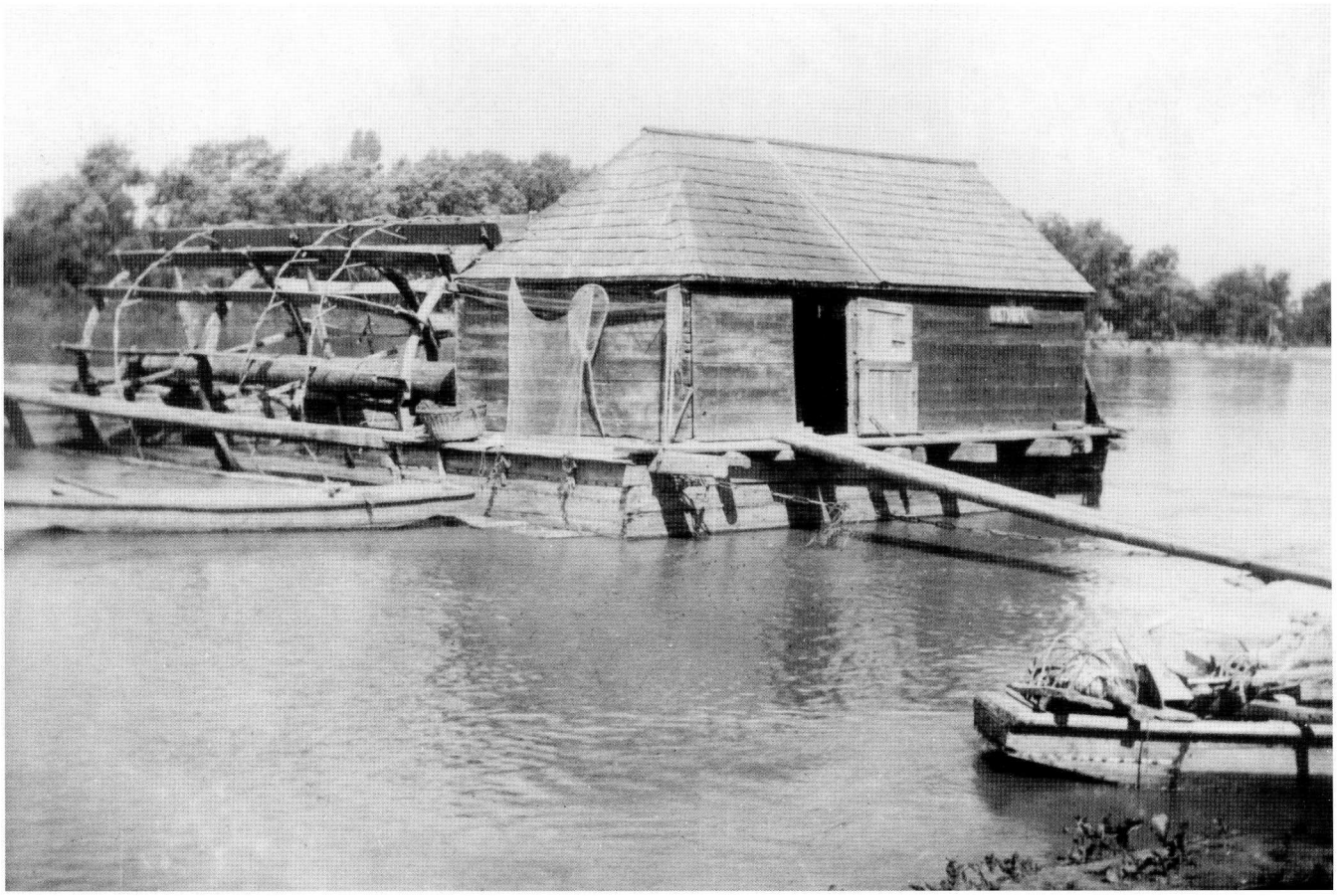


Fig. 8. *Ship mill on the river Vág (Szimő 1903).*

Fig. 9. *Little ship mill on the river Szamos (1961).*

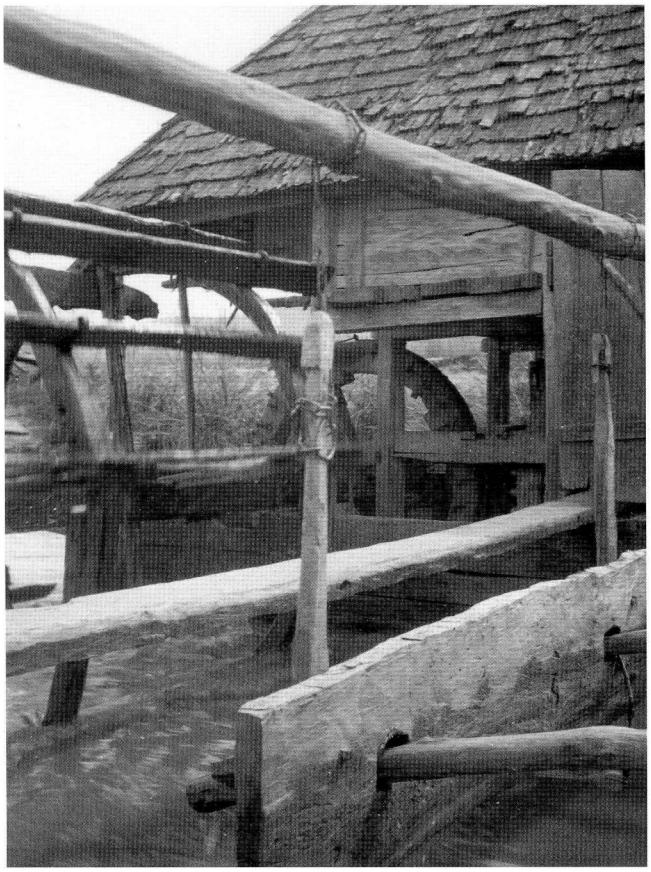


Fig. 10. *Wooden lock to stop the water wheel (Sülelmed – Kelence 1942).*

after a year and the millers looked for a new place. The abandoned baskets became a hazard to shipping. The sinking of the baskets used to be a festive spring ceremony of the millwrights (*Kovács 1989*, 192) Maria Teresa forbade in 1772 the usage of these ways of mooring and ordered that iron chain and anchor be employed instead. The mills had to be pulled ashore before winter or to be protected from ice drift in a harbour.

The big number of ship mills disturbed shipping seriously by the end of the 18th century. In the 19th century engineers worked out mooring plans for the big rivers, which defined the place and alignment of the mills. Some milling societies allocated the standing places of the mills in a draw. The first mill stood near the to the banks, the others followed towards mid-stream, one somewhat behind the other so that the power of the stream could reach all of them. The plans considered the interest of shipping too. The right of mill keeping became a personnel right, which the widow could inherit after the death of the miller, but it couldn't be assigned to anybody else. – Less mills worked on the smaller rivers, neither was shipping going on here, therefore mills looked themselves for suitable places for mooring. Workers carried the grain into the mills near to the banks by walking on a wooden plank and mills farther from the shore were approached in boats. When the mill stood far from the villages, a small centre of warehouses was set up: grain to be carried to the mill or flour to be taken home was stored here.

Fig. 11. *Ship mills on the river Száva (1963).*

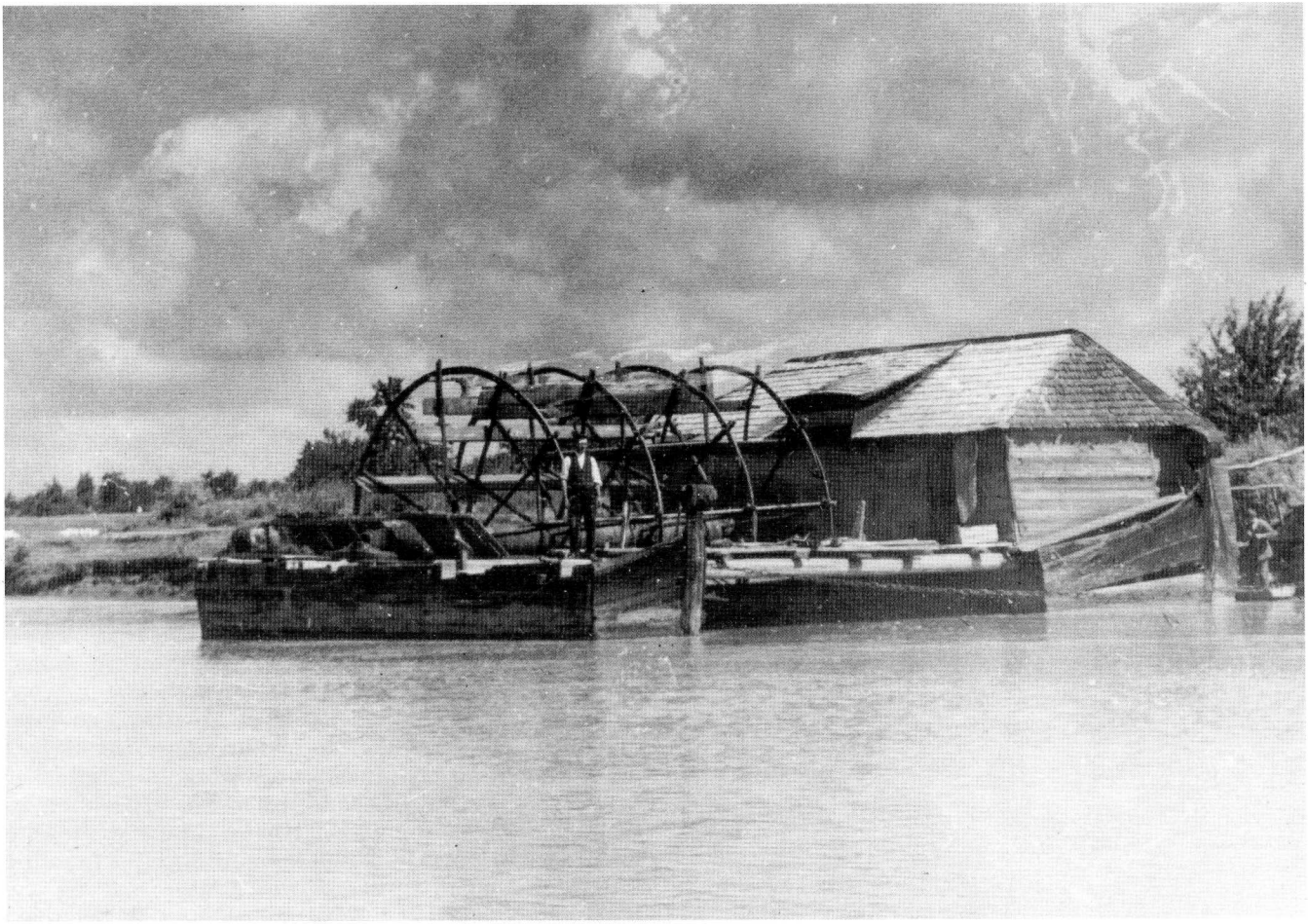


Fig. 12. *Ship mill on the river Maros (Apátfalva 1929).*

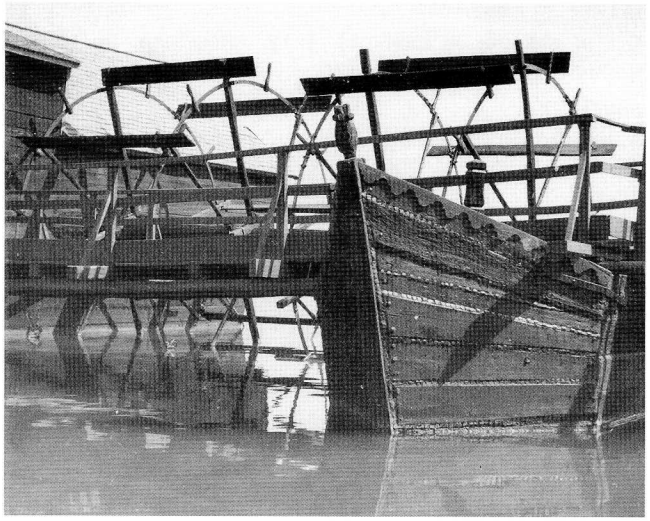


Fig. 13. *The water wheel of a ship mill (Ráckeve, river Danube).*

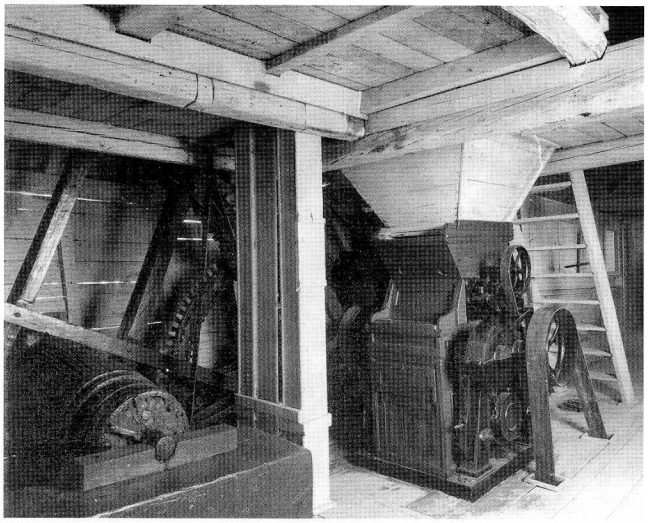


Fig. 14. *Equipment of a modern ship mill (Ráckeve, river Danube).*

During the 18th–19th century ship mills worked on the rivers Danube, Tisza, Száva, Szamos, Maros, Körös, Vág, Mura and Dráva, but some could be seen on the Bodrog and Garam too.

The life of the ship millwrights

Millwrights depended on each other in the hard work. Their lives were regulated by a rich system of customs and rules of the guild. Guilds were organised from the first half of the 17th century and they put in writing the older customs. The charter of incorporation of the millwrights of Győr was edited in Hungarian by the bishop in 1632. German millers settled later and founded their own guild. Millers were experienced carpenters too, since they used to build their mills and constructed bridges whenever necessary (*Czigány 1962*).

The miller or his helpers had to stay permanently in the mill because grinding went on without interruption but also they had to prevent danger. The water wheel of the mill had to be protected from floating trunks, and – after steamers began plying – from the sudden strong waves. Shipping caused anyway a lot of difficulties for the millwrights. Animosities went so far that millers throw stones or even shoot at passing ships. A light had to be put on the midstream-side of the mill in order to show its position to the passing ships. When the mill leaked, water had to be baled out or pumped out from the mill's bottom. Fire was a big hazard, since mills were made of wood. But the biggest danger was coming loose. A mill broken adrift could carry away the next mills in the line and cause immense damage. The water had to be observed: when flood came suddenly, there was a danger of sinking or coming loose, and when the water level felt fast, the mill could run aground.

10 % of the grain brought for grinding was due to the millwright. This quantity was removed in older time with the help of a measure, but in the 20th century a weighing scale was used.

Millers did not remain idle in the winter. Maintenance and repair work was done on the mills pulled ashore. Mills left on the water could not be abandoned neither: twice a day leakage had to be checked and water had to be pumped out if necessary. When water was falling, the mill was pushed midstream, and when flood came, the mill was pulled nearer to the banks.

One of the most difficult tasks was to refloat a sunken mill. Strong chains were pulled through under the mill and people tried to lift the mill with the help of timbers. As soon as the edge of the mill came up, many people started to bale out the water. With less and less water, the mill emerged by itself. Refloating was a common work, free of charge.

The patron saint of millwrights was St. John of Nepomuk, whose festive day was the day of St. John. Tradition wanted in the southern part of the Danube to place a garland on two planks fixed crosswise. Putting a burning candle in the middle, the planks were released on the water.

Zusammenfassung

Der Autor stellt in seiner Studie die kurze Geschichte der Schiffmühlen in Ungarn dar. Aufgrund der schriftlichen Quellen beginnt in Ungarn die Verbreitung der Schiffmühlen im 13. Jahrhundert. In das 14. Jahrhundert ist der früheste Befund zu datieren. Es handelt sich um einen riesigen, ausgehölten Baumstamm, der als Träger des Mühlenoberbaues diente. Im Spätmittelalter und in der Neuzeit verbreiteten sich die Schiffmühlen an den ungarischen Flüßen in einem so großen Maße, daß die Schifffahrt durch ihre Anwesenheit gestört wurde. Ab dem 18. Jahrhundert wurde die traditionelle Anlandungsweise der Schiffmühlen verboten und die Benutzung von Ankern verordnet. Vorher wurden die Schiffmühlen an riesige, in das Flußbett eingetiefte Pfosten angelandet. Oder aber, wo das Flußbett mit Steinen bedeckt war, wurden große, mit Steinen gefüllte Körbe in den Fluß versenkt, um die Schiffmühlen daran zu binden. Die Seile wurden aus Weidenästen geflochten. Unseres Wissens nach wurden die Schiffmühlen im Spätmittelalter und in der Neuzeit auf ausgehölten Baumstämmen gebaut. Dieses Verfahren wurde aber durch den Bau der Schiffe mit Spanten aufgelöst, die mit breiten Eichenplanken bedeckt waren. Die Lücken zwischen den

Planken wurden mit Moos ausgefüllt. Im 19. Jahrhundert wurden die Schiffmühlen durchgehend modernisiert. Der größte Teil dieser Anlagen wurde mit einem Walzenstuhl ausgerüstet, um der neuen Mahltechnik entsprechen zu können. An der Donau und an der Theiß wurden riesige, mehrere Stockwerke hohe Schiffmühlen gebaut, an den kleineren Flüssen blieben aber einige Mühlen mit der älteren Konstruktion des Mahlsteines im Gebrauch. Diese Schiffmühlen representieren die frühere Bauweise der betrachteten Anlagen.

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