*Acta Ethnographica Hungarica, 57 (2), pp. 263–284 (2012)*
*DOI: 10.1556/AEthn.57.2012.2.4*

# THE ICONOGRAPHY, DESIGN AND MANUFACTURE OF THE 19TH CENTURY PLAYING-CARDS BY THE UNGER FAMILY FROM GYŐR

Claudia WUNDERLICH

Centre of Excellence for Languages, University of Applied Sciences
Andreas Hofer-Straße 7, A-6330 Kufstein, Tyrol, Austria
E-mail: claudia.wunderlich@fh-kufstein.ac.at

**Abstract:** The present article offers new evidence on the Unger playing-card making family of Győr, Western Transdanubia, as the result of a cross-disciplinary study. Mátyás Unger the Elder (1789-1862) and his like-named son Mátyás the Younger (1824–1878) produced various types of playing-cards from the early to mid-19th century. In particular, their cards, their iconography, design and production process will be analysed. The family is best known for their cards with Sopron (Oedenburg) pattern. Also discussed will be the role of Mátyás the Elder's second eldest son Alajos Unger as a possible designer of the later Unger cards, which were of considerably higher quality than the earlier known ones by Mátyás Unger the Elder. The hitherto little-known Alajos Unger was trained as a draughtsman and painter first at the National Drawing School of his hometown and then, between 1833 and 1842, at the Vienna Academy of Fine Arts, particularly under Leopold Kupelwieser (1796–1862). Finally an innovative outside-in bottom-up method for gaining further, reliable insight into 19th century artisanal playing-card manufacturing will be proposed to determine the size, output and profitability of the Unger workshop based on material-flow simulation.

**Keywords:** 19th century Hungarian playing-cards, Sopron pattern, Mátyás Unger, Alajos Unger, playing-card iconography, artisanal playing-card production, reconstruction of a playing-card workshop, material flow simulation

**Acknowledgement** Special thanks to Dr. Erzsébet Györgyi, Antal Jánoska, Peter Endebrock, Dr. phil. Cornelia Friedrich, Dr. Mária Unger, Dr. Gyula Vadász, István Pozsonyi, my family & particularly my husband Jürgen for their help and encouragement. Last but not least thanks to Professor Gábor Barna for the kind interest expressed in my work.

*[…] former political links, causal events, political or military or social, can be recognized in the contemporary art of the playing-card. […] Collecting playing-cards offers a study of continuity as well as development in national history, traditional fashions and customs and also a picture of, and production methods of, a variable but world-wide industry.*

*(Sylvia Mann 1990:10).*

## BACKGROUND

Probably not entirely unrelated to the 20th century postmodern turns in the humanities, namely the linguistic and the following cultural turn including the pictorial or iconic turn (Bachmann-Medick 2009), the topic of 19th century Austro-Hungarian playing-cards, their making, design and the families producing them has been receiving increased attention, particularly in recent years (cf for example Vienna 2000, Budapest 2005, 2007, Jánoska 1999, 2004, Jánoska & Horváth 2006, Linz 2010, Wunderlich 2009, 2010, 2011). Altogether, we owe much pertinent knowledge about playing-cards to collectors such as Sylvia Mann (1924–94) and Antal Jánoska, playing-card historians like Jenő Kolb as well as art historians like Endre Csatkai (1896–1970) and Detlef Hoffmann (Kolb 1939, Kártyalexikon, Mann 1990, Csatkai 1939, 1958, Hoffmann 1977, 1995), who have made some of the most important contributions to the study of playing-cards in the past. Recently the topic – not only in the context of games and the *homo ludens* – has also received increased attention from the ethnographical perspective (cf for example Örsi 2001, Wörner 2010) as well as from museums in possession of playing-cards and printing blocks, which is reflected in exhibitions held at various Austrian and Hungarian museums since the second half of the 1990s as in Budapest, Vienna, Linz and Győr. In sum, therefore, the topic is cross-disciplinary, comprising many different fields including art history, cultural history, ethnography, linguistics, economic history, local and family history, history of technology. Additionally the research has much benefitted from the new possibilities of inquiry of the Digital Humanities. All these developments are reflected in the present article.

After the Györgyi Giergl family (Budapest 2006), Győr's Ungers have been the best researched Hungarian playing-card making family to date. They have been appearing in the literature on playing-cards since the first half of the 20th century (for example Nagy 1932, Kolb 1939, Csatkai 1958, Kártyalexikon 1993, s.v. Unger Mátyás, Jánoska 2004, Jánoska & Horváth 2006, Reisinger 2004, Wunderlich 2009, 2010, 2011).

Jenő Kolb's (1938, 1939), Endre Csatkai's (1958) and Benő Zoldos' (1976) research into the playing-cards of Sopron yielded much pertinent information on the playing-card makers of Sopron. Since the guild documents are no longer available to us, though, a complete list of playing-card makers from this town is not available to us. Therefore Mátyás (*Mathias*) Unger the Elder was not recognized as a playing-card maker trained in Sopron until recently (Wunderlich 2009). Until that time it had not been known, either, that Alajos (Alois) Unger (1814–48), a painter trained at the Academy of Arts in Vienna between 1833 and 1842, was a son of his.

The present paper also pursues a multidisciplinary approach, which was much encouraged when the academic work on the Ungers began as a microhistorical study at the University of Oxford in 2006/07 (Wunderlich 2010, 2011). In this study, the Ungers were analysed as members of their community in view of the 1857 census of Győr belváros (inner city)[1]. This was the starting point for the recent new insight and new perspective on the

[1] This modern analysis at microscopic level, which has become widespread, has also been applied to museum exhibitions, for example to gain new insight into the life and personality of such a famous artist as Albrecht Dürer in the 2012 exhibition "The early Dürer" at the Germanic National Museum in Nuremberg (Nürnberg 2012).

Unger family. This has enabled a partial reconstruction of their lives despite the fact that literally no ego documents by the playing-card makers Mátyás Unger the Elder (1789–1862) and Younger (1824–1878) themselves were passed down to posterity *(Fig. 1)*.

*Fig. 1* Photograph of Mátyás Unger the Younger with his newphew Alajos Unger (nephew of the like-named painter), and his brother Károly, clerk and archivist of the Diocese of Győr (from left to right), c 1875, Unger-Mürwald-Wunderlich Family Archives, Munich

The aim of the present article is to give a more thorough description of the cards made by the Ungers and their iconography, to address the question of the designer of their later, notoriously well-designed cards as well as the locations and sizes of their workshops and to present a state-of-the-art way of researching how and in what quantities their cards were manufactured.

## THE UNGER PLAYING-CARDS: THEIR DESIGN AND ICONOGRAPHY

The Unger family adopted and adapted traditional patterns of playing-cards and contributed to changes in 19th century playing-card design and to the evolution of new standard patterns in Hungary.[2] The cards they made we know about from different collections and sources: The oldest known cards are the two sets with German Sopron (Oedenburg) pattern from c 1824 kept in storage at the *Technisches Museum* in Vienna (Inv. # 17863, 17860). They were part of the *National Fabriksprodukten Kabinett*, a collection sampling all kinds of goods manufactured throughout the monarchy from roughly the 1810s–1850s. It was founded in 1807 by Emperor Francis I and also comprises a collection of 250 packs and uncut printer's proof sheets of Biedermeier playing-cards, particularly from different makers all throughout the Austro-Hungarian Empire (HOFFMANN 1995b, Wien 2000). The packs have never been played with and are therefore of great value for researchers. These are samples of the best playing-cards the makers there represented made at the time.

Presumably on similar grounds further packs of playing-cards by the Ungers became part of the collection of the Hungarian National Museum. Until WWII there were several decks of cards and a large printer's proof sheet depicting 32 Swiss playing-cards (Inv. # 93–1931. 1–3) by the Ungers there, which appear to have been destroyed in the war (NAGY 1932:135, KOLB 1939: 45, 60, JÁNOSKA 2004: 60). From the depictions of three cards in KOLB (1939: 45,60) we glean that they also included copper engraved cards, ie mirrored "king whist" *(király csitt)* cards and a set of cards hitherto referred to as "Hungarian cards" in the literature. They also bear great resemblance with two cards from a set of a German game called "Krähwinkeliaden" in the collection of the *Technisches Museum* Vienna, which was manufactured and sold by the famous Viennese playing-card maker Johann Gabriel Uffenheimer in 1826 (Wien 2000: 24f, Inv. # TH 17.945, *Fig. 2 a,b*). It had been designed by Matthäus Loder (1781–1828), just like another Tell-game (Jánoska 1999).[3]

Two further single cards of a German game, again with Sopron pattern, in the collection of the museum still today, have also been attributed to the Ungers (JÁNOSKA & HORVÁTH 2006: 52f). Jánoska and Horváth (2006) also presented samples of beautifully designed Biedermeier copper-engraved fortune telling cards by Mátyás Unger the Younger. According to an ad in Győr's German newspaper of the time, *Das Vaterland*, by Mátyás

[2] The term standard pattern was introduced by MANN (1990:11).

[3] In this game, like in the Tell game, the Dauser represent the four seasons, the Obers and Unters show men clad in costumes representing different ethnicities of the Austro-Hungarian monarchy. The number cards show illustrations derived from two series of caricatures (Wien 2000: 24f and the literature cited therein): the first called "Zerrbilder menschlicher Thorheiten und Schwächen", illustrating the typical deficits of the people of the Biedermeier era. The second series of caricatures were called "Krähwinkliaden oder bildliche Darstellungen doppelsinniger Redensarten". "Krähwinkl" referred to a small town of philistines ("Spießbürger") that took everything too literally. According to MANN (1991: 93) "Uffenheimer was copied by Hungarian card makers" (from Pest) and this seems to have been the case with the Ungers as well.

Unger the Younger from 1846, he manufactured tarot (tarokk), whist and trappola copper engraved cards of high and very high quality (V 15 February 1846).[4]

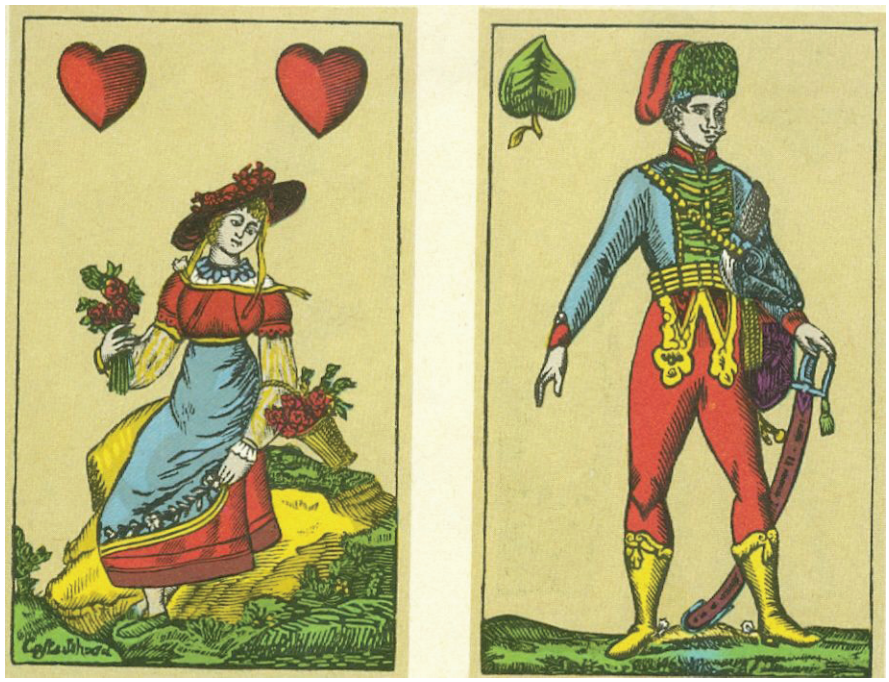


*Fig. 2 (a. & b.)* Unger playing-cards from the 1830s, copper engravings, inscribed by János Koller (engraver)

Evidence of further packs can be gained from the 12 "darab" (pieces, Válogatás 2009: 68) of wooden printing blocks for German and Hungarian cards including printing blocks for card wrappers donated to the collection of the Benedictine grammar school in Győr in the school year 1873/4 by Mátyás Unger the Younger (Jánoska 2004, Jánoska & Horváth 2006, Válogatás 2009: 68, 211). This collection has since become part of the Xántus János Museum in Győr.

This may be no coincidence: The Benedictine monk, archeologist and member of the Hungarian Academy of Sciences, Floris Rómer (1815–1889), one of the founding fathers of Hungarian archeology, who was later in charge of the archeological collection of the Hungarian National Museum, was the first to recommend to Hungarian museums to pay attention to the patterns of playing-cards and to collect wooden playing-card printing blocks (Nagy 1932: 134). He also taught at the Benedictine Grammar School in Győr between 1839 and 1845, which all four sons of Mátyás Unger the Elder had attended (Wunderlich 2010, 2011).

[4] Tarot (tarock) was a game invented at the Court of Milan or Ferrara in 1430–40 (Dummett & Mann 1980, Hoffmann 1995: 175). Trappola, a particularly colourful card type, originates in Venice (Hoffmann 2000: 11). This pattern had reached Prague by 1664 and seems to have spread to other parts of the monarchy, where it became popular in Austria and Czechoslovakia in the 18th and 19th century (Mann 1990: 88).

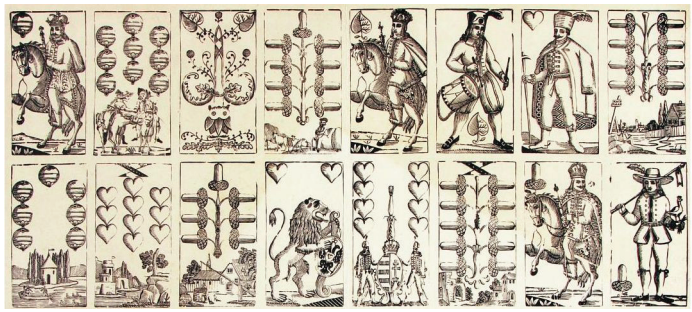


*Fig. 3* Sopron pattern cards c 1850, part 1 (wooden printing block kept at the Xántus János Museum, Győr)

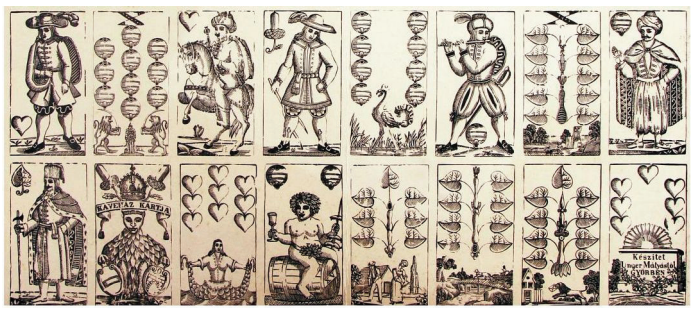



*Fig. 4* Sopron pattern cards c 1850, part 2, (wooden printing block kept at the Xántus János Museum, Győr)

This collection of wooden printing blocks comprises two complete sets of cards, one of another set of 32 cards with Sopron pattern *(Fig. 3–4)* and another one of a mirrored French piquet set (JÁNOSKA & HORVÁTH 2006: 58).[5] The card wrappers – most of them beautifully designed – were for German café cards *(kávéház kártya),* Hungarian cards, fine German cards, mirrored German cards and piquet cards (ibid.: 58–63) *(Fig. 5)*.

Therefore, the Ungers manufactured cards with all three types of four-colour suit systems, which had developed from c 1500 onwards. The oldest among them is the Latin system (depicting Cups, Swords, Coins or Gold and Batons, as found on trappola cards). The German system (sporting Hearts or Rot, Acorns, Hawkbells and Leaves or Grün) probably came next in the evolution of playing-cards (MANN 1990: 12) followed by the French system (featuring Hearts, Spades, Diamonds and Clubs, ibid. 13).

All in all, the playing-cards by the Unger family greatly increased in quality over time, which is also reflected in the quality of their design and they also become increasingly more Hungarian, displaying ever more Hungarian costumes on their cards. The design and who was behind it will be discussed in more detail further down.

[5] This type of French-suited Viennese pattern originated in Lyon (HOFFMANN 1995b: 175). French suited cards only came to German speaking regions from the 17th century onwards (MANN 1990: 61) and "did not flourish in Germany until the early 19thcentury […] most versions were based on some version of the Paris pattern" (MANN 1990: 64).


*Fig. 5* Unger playing-card wrapper (wooden printing block kept at the Xántus János Museum, Győr)

The German cards with Sopron pattern form the largest group of cards we know of with four packs or pictures of these preserved at least in part. The Oedenburg or Sopron pattern is believed to have been a precursor to the Hungarian or Tell pattern, which has become the standard Hungarian pattern since the first part of the 19th century (Kártyalexikon, s.v. Soproni kép, Tell kártya).[6] The Sopron pattern, which does not contain the colour blue, is derived from the Old Bavarian pattern and Jost Amman's cards with military figures. It thus shares the history of German playing-cards (Mann 1990: 88, Hausler 2010). Apart from the Bohemian or Prague pattern it "can lay claim to being one of the oldest established patterns of the whole Empire" (Mann 1990: 98).[7] The animals on the number cards of the Sopron pattern go back to Hans Schäufelein,[8] Dürer's pupil in Nuremberg and altogether this pattern is based on an eclectic mix of the patterns of Nuremberg, Ansbach, Augsburg, Munich, Regensburg, Bohemia-Prague and Vienna (Reisinger 2004, Hausler 2010: 151) .

Many new standard patterns derived from the Old Augsburg/Bavarian pattern developed in the course of the 19th century as for example the Salzburg and Younger Tyrol

[6] Synonyms used for Tell cards – whose Court cards depict, for figures of the Swiss Tell legend – were Hungarian card, Swiss card, Helvetian Card and Four Seasons Card (magyar kártya, helvét kártya, svájci kártya négy évszak kártya, Kártyalexikon, s.v. Tell kártya; Jánoska 1999). They are not known in Switzerland and there are actually two main types of Tell cards, those in Hungary depicting the four seasons on the Dauser (tavasz, nyár, ösz, tél, Mann 1991: 98, 104f).

[7] Mann (1990: 99), referring to Kolb (1939), states that the pattern is considered to be among the oldest pattern due to Kolb's illustration of two cards with this pattern presumably made by Johann Obermayer in late 18th century Vienna and by Anna Scrusina from around 1800, a century playing-card maker of Vágújhely (ICPS Pattern Sheet #94).

[8] Hans Schäufelein (c. 1485–1539) is sometimes wrongly referred to as Hans Leonhard Schäfelein, but his first name was Hans only (Stadtlexikon, s.v. Schäufelein, Hans).

patterns (ibid.: 200f). The name "Oedenburg / Sopron pattern" first appeared in 1865 according to IPCS pattern sheet #94, the card packs of the time before were usually called "Oedenburger Deutsche" or "Feine deutsche Oedenburger" (Mann 1990: 99). The pattern was in existence for almost exactly 100 years until c 1880s (ibid., Jánoska 2006: 10). A Sopron pattern pack consists of 36 (such as the Unger cards TMV Inv. #17869) or 32 cards (like the Unger cards TMV Inv. # 17865), which do not contain the VI cards (IPCS Pattern Sheet # 94).

The main characteristic is that the Court of the Classic Bavaria pattern is full of Amman military figures and there are very distinctive Daus cards. A little boy perches on a barrel on the Daus of Acorns, there is a Cupid on the Daus of Hearts and a hound attacking a boar on the Daus of Bells. (Mann 1990: 68).

In addition to this: "Both the Sopron pattern and Tell cards feature mounted kings, a main characteristic of Hungarian playing-cards" (Mann 1990: 88). The Sopron pattern furthermore shows a boy on the barrel, who not only sits there but "holds up a skewer with three sausages" (Mann 1990:99). That the Sopron pattern is a variation of the Bavarian family of playing-cards is evident according to Hausler (2010: 146) since:

> *Der Trommler auf der Gras-Ober-Karte und der Pfeifer auf dem Gras-Unter gehören, wie wir wissen, seit der Mitte des 17. Jahrhunderts zu den bayerischen Spielkarten. Sie sind quasi der Ausweis für die Zugehörigkeit zur Familie der Bayerischen Kartenbilder. Seit dem Späten Altbayerischen Bild tragen sie zu ihren barocken Uniformen den Zweispitz als Kopfbedeckung.*

In the Sopron pattern, the musicians oftentimes wear other head gear, ie other types of hats or turbans. The other features of the standard Sopron/Oedenburg pattern, to use the IPCS nomenclature,[9] are according to the IPCS Style Sheet 94:

> *Daus-cards: on Hearts a lion with a coat of arms; on Leaves some foliage sprouts out of a stick, below is a small eagle; on Bells a Bacchus sitting astride of a barrel holds a spit with three sausages; on Acorns a lion (or a bear) holds two or three coats of arms. The kings are sitting on horseback, the Obers and Unters are presented as cavaliers, musicians, Orientals, and a miner. Most peculiar motifs are: on the Ten of Hearts a fox pushes a wheelbarrow with a hedgehog in it; on the Nine of Hearts a woman with two fish-tails; on the Nine of Bells a donkey laden by a sack; on the Eight of bells an ostrich bearing a horseshoe in his mouth; on the Seven of Hearts a rising sun with a human face, and the maker's name written in the sunrays; seldomly an eagle holds a banderol instead.*

Further features that have been identified are that only one king wears a turban in the Sopron pattern; in comparison two kings wear a turban in the Old Bavarian pattern, three in the Regensburg pattern and all four in the Prague pattern (Hausler 2010: 149). The kings also show one colour sign only.

[9] Cf Haas 2012 for a discussion of the pros and cons of this system as well as categorization in general.

The Dauser show the following pictures: The Acorn Daus bears a banner stating the name of the maker, the Acorns form a 45-degree angle, which is a peculiarity in common with the Saxon-northern German tradition (Hausler 2010: 151), the heart Daus shows a lion with a shield depicting a double-eagle, and the Green Daus shows a baton from which the colour signs as well as floral decorations spring and in the centre of the bottom an owl can be made out, which appears to be inherited from the Ansbach pattern (Reisinger 2004).

The two well-described fully preserved packs of Sopron cards at the Technisches Museum in Vienna, show only minor deviations from the standard pattern and other makers' features of the time such as that the Bacchus on the Hawkbell Daus lacks the skewer and sausages (Jánoska & Horváth 2006: TMV Inv. # 17865).[10]

This is different with the pack of café cards consisting of 32 cards whose wooden printing block is kept at the Xántus János Museum in Győr (size of each card: 99 X 53 mm, Inv. #. IP.54.130.1 (Válogatás 2009: 211)), which not only deviate more from the standard Sopron pattern and are more Hungarian in dress, but are also the most sophisticated of the Sopron pattern cards by the Ungers by far:

> *Die Bildkarten zeigen zwar kaum Abweichungen vom Standardbild, die Gestalten sind aber detailreich geschnitten und wirken damit lebendig. Wir können es besonders auf den König- und Dauskarten sehen.* (Jánoska & Horváth 2006: 53).

The bear on the acorn Daus bears human traits and instead of the maker's name the banner says "káveházkártya". It is unclear, though, whether the game was made by Mátyás Unger the Elder or Younger. The number cards feature further non-standard peculiarities like the foundation inscribed "Készitet / Unger Mátyástól / Győrben" (made by Mátyás Unger in Győr), the two Husars holding the Hungarian coat-of-arms and St Stephen's crown on heart VIII, the two horse-back riders greeting each other, while the one donkey happily looks the other into the mouth on Hawkbell IX, the couple engaged in gardening work in front of a typical Hungarian farmer's hut (folk architecture) on Green VII, a horse carriage crossing a river on Green VIII, a wanderer sitting at the roadside, behind him a signpost "nach Raab" (to Győr) (ibid.).

Jánoska & Horváth (2006) call them real masterpieces, reflecting the evolution of the Unger cards as such. The first known cards by them were simple "Volkskarten". These Unger cards, to a certain extent, however, seem to bridge the gap between those Volkskarten and genuine artist cards. The cards Mátyás Unger the Younger became famous for and received an honorable mention for at the industrial fair in Győr in 1846 (Wunderlich 2010: 147), seem to fall more into the latter category. This is also what his above-mentioned newspaper ad suggests. Mátyás Unger the Elder's two packs of playing-cards from c 1824 kept at the *Technisches Museum* in Vienna on the other hand are among the least sophisticated cards of all those presented there, comparable to those of Nyitra's Ferenc Schnell (Vienna 2000). Thus there was a considerable evolution in design, which brings us to the

[10] According to Reisinger, it is an ideosyncracy of the Unger cards that they display unusually large heads (handwritten note with the Unger playing-cards at the Technisches Museum, Vienna):

question of the designer, despite the fact that cards of different quality and made from different kinds of paper had been used for the longest time and that quality was also reflected in the design (Hoffmann 1995b: 174).

The history of the German suited Hungarian cards altogether show the long-standing good relationships between Bavaria and Hungary and the transfer of new designs and technologies throughout the German-speaking world due to wandering journeymen. Playing-cards also always reflect social changes (Hoffmann 1977: 20–22, Mann 1990: 10), ie in this case the increasing national consciousness of the Hungarians and the formation of a bourgeoise society after the Reform Era and Revolution of 1848/49, thus abandoning the feudal system, as is symbolized by the Tell cards, despite traditional elements in the cards' iconography. As mass media of the 19th century which they increasingly became in the course of the 19th century, they also helped promote those changes (cf Telesko 2010 on media of the 19th century in general).

One linguistic peculiarity of the cards and their design is that the Ungers were the first and only to sell cards with bilingual Hungarian and German (vernacular) inscriptions during the first decades of the 19th century (Nagy 1932: 135).[11]

## THE QUESTION OF THE DESIGNER

Although we can safely assume that the younger Mátyás Unger received a more thorough education than his father, particularly at the National Drawing School in Győr under Antal Frumann (1801–1869) (Wunderlich 2010: 147), we have good reason to believe that this was not the only explanation for why his cards were of higher quality. The inscription on the fortune telling cards (Jánoska & Horváth 2006: 65) mentioned above indicates that he was trained to engrave copper plates himself. However, although he became so well-known for beautifully designed copper-engraved cards and although we know that the Ungers continued to manufacture cards in their workshop in Győr until c 1860 (Wunderlich 2010; 2011), they were never mentioned again as makers of special cards after 1846. All research so far has also pointed into the direction that Alajos Unger was first apprenticed as a playing-card maker by his father, but then trained to be a painter after his talent had been discovered at the National Drawing School in Győr in 1833 (ibid.). The family opted to sell cards falling more in the luxury category from the 1840s and thus needed a skilled designer. Alajos's oil works also reflect a profound interest in people and costumes as is also strongly reflected in his works, which also depict many figures dressed in typical Hungarian attire (Wunderlich 2010). He also displayed an affinity to the crafts with his picture clock with a View of Venice *(Fig. 6)*.

Artists designing playing-cards have had a long tradition, in fact the oldest preserved cards such as the *Stuttgarter Spiel* and *Ambraser Hofämterspiel* survived because they were artistic collector pieces of an art Wunderkammer (Wörner 2010: 290). Also the

[11] Thus the cards, and particularly those of the younger Mátyás Unger, seem to indicate an environment where code switching, ie switching back and forth between or mixing of two languages, was beginning to be the norm, as is the case in bilingual regions of Canada such as Ottawa, Ontario, today.

so-called *Mantegna tarocchi* – copied and distributed by Albrecht Dürer as an "orfèvre-graveur" (Nürnberg 2012, particularly 22–24). – are artistic masterpieces. Furthermore the famous and influential playing-cards from Nuremberg designed in the course of approximately 20 years in the 16th century were also designed by famous artists: Jost Amman (1539–91), Virgil Solis (1514–61), Hans Schäufelein (1480–1540), Erhard Schön (1491–1542), Hans Beham (1500–1550) and Peter Flötner (ca 1490–1546) (Kolb 1939: 59, Rosenfeld & Kohlmann 1964, Reisinger 2004).

*Fig. 6* Photograph of Alajos Unger's Biedermeier picture clock with a view of Venice, 1847, oil on metal, private ownership

Highly skilled artists also played an important role in the card design of the 19th century. As we have already seen, Matthäus Loder (1781–1828), also trained at the Vienna Academy of Fine Arts designed cards and other games. Another artist is Philipp Otto Runge (1777–1810), who not only designed cards but was the inventor of the proper mirror effect of playing-cards (Hoffmann 1977).

And even the famous painter Julius Schnorr von Carolsfeld (1764–1841), who belonged to the group of religious painters of the "Brotherhood of St. Luke", later referred to as the Nazarenes, designed a type of Happy Families (*Quartett* in German) based on biblical scenes (Brockhaus 1933), ie exactly the opposite of the normal cards aka the Devil's Bible. In the following of Dürer, who was the Nazarenes' great idol along with Raffaello, they also sported a particular interest in copper engravings (Matter & Börner 2007: 225). Alajos Unger was mainly trained by Leopold Kupelwieser (1796–1862), who also belonged to this circle of religious romantic painters and by Anton Schaller (1771/72–1844), a figurine painter, his anatomy teacher (Wunderlich 2010: 143, 2011: 119). Another

playing-card maker from Western Transdanubia, ie Sopron, trained at the Vienna Academy of Arts was János Koller (KOLB 1938: 40). He learned to engrave copper there.

Thus receiving further training at the Vienna Academy does not seem to have been unusual for a fledgling playing-card maker. Kolb (1939: 76) lists some playing-card designers including such a famous painter as Miklós Barabás. Also, Ferenc Markó helped playing-card maker István Giergl design cards in Pest, which were also inspired by other great artists of their time (RÓZSAVÖLGYI 2006). All in all, it was nothing unusual for artists trained at the Vienna Academy to design cards and as playing-card prices dropped as a consequence of industrialization, skilled artistic design became increasingly important to stay in business.

## THE UNGER WORKSHOP AND THE ARTISANAL MANUFACTURE OF PLAYING-CARDS

Playing-cards, originating in the Arab world, were first mentioned in documents in Europe from the last quarter of the 14th century and it is well-documented that already around the year 1380 in Swabia, Old Bavaria and Franconia cards were a popular game (HAUSLER 2010:14). They quickly spread across Europe within a few years. This was the same time that the first paper mills appeared in Europe to make paper become a mass product.[12] Ulmann Stromer, a patrician from Nuremberg, launched the first paper mill north of the Alps in Nuremberg in 1390 (Stadtlexikon, s.v. Stromer, Ullmann). Together with the woodblock printing technique, which also became popular at around this time (KÖGER-KAUFMANN 48f), this enabled the reproduction of images such as saints' pictures or playing-cards on a larger scale and made cards more widely available. Thus playing-cards are a game that depended on a certain level of technological progress, a reason for why they are a fairly young game in the history of games.

The first Hungarian playing-card makers in various Hungarian cities such as Buda, Pozsony, Sopron and Győr appear from the early to mid-18th century onwards (JÁNOSKA 2004: 59). However, playing-card making only began on a larger scale in Hungary from c 1784 onwards (KEESS 1820: 645). The playing-card making process was imported from the German-speaking world and only slightly changed until the 19th century, when new printing techniques began to replace the old printing methods of using wood blocks and copperplates.

The Unger family began producing playing-cards in Győr in 1810/11 after Mátyás Unger had moved there from Sopron, where he had grown up and been apprenticed.[13] There had not been a playing-card maker in Győr since the mid-18th century (JÁNOSKA 2004: 59).

[12] Etymologically the word "card" refers to paper (Wörner 2010: 42 and the literature mentioned there.

[13] Mátyás Unger was a burgher of Győr with full burgher rights *(polgárjog)* from the time he settled there (cf also JERFY 1931: 256). This despite the fact that he is not listed in the burgher list of the Győr city record office, which is incomplete. The complete list is kept at the Hungarian National Archives. For geographic reasons, it has not been possible to study it yet. However, from a linguistic point of view it is beyond any doubt that the terms "civis" or "Bürger", all applied to Mátyás Unger the Elder, were only ever applied to persons with full burgher rights.

The question now is how exactly and in what quantities did he and his son manufacture playing-cards and why did the family stop manufacturing cards in c 1860 and not invest into new printing technologies?

There have been previous attempts at reconstructing the 19th century playing-card making process and descriptions thereof (Endebrock 2000, Linz 2010). These are based on the information provided by various technological encyclopedias that appeared in the 18th and 19th centuries and describe the card-making process rather well: the first seminal work in France from 1751 onwards was the Encyclopédie by Diderot and d'Alembert (Endebrock 2000: 44–46). The most important German one is the one by Krünitz (1773–1858) in 242 tomes. Altmütter in Prechtl (1847) provides the chronologically latest description of the playing-card making process and already marks the technological transition towards industrialization.

Playing-card makers like the Ungers made everything themselves except for the paper. Unlike other makers in Budapest, Nuremberg and other places, they even carved the wooden printing blocks themselves (Wunderlich 2011: 128). They also made the colours consisting of soot and glue cooked of cereal starch for black, and of flour and colour pigments that were pulverized by hand for colours (with a hand muller or hand-mill)(Köger-Kaufmann 2001: 50). The main production steps identified were (Wunderlich 2011: 131) (images 7, 8, 9 &10):

A) Sorting of paper sheets
B) Moistening of the paper
C) Printing of the back sheet of the cards[14]
D) Printing of the front sheet of the cards (outlines)
E) Glueing and pasting of the front, back & middle sheets
F) Pressing of paper sheets
G) Drying of paper sheets
H) Cutting of paper sheets
I) Cleaning of paper sheets
J) Colouring of figures with stencils
K) Drying of colour
L) Drying of sheets
M) Soaping of sheets
N) Polishing of sheets on the marble table
O) Cutting of cards
P) Sorting, wrapping and packing of cards

Finally the distribution and sale of the cards also lay in the hands of the playing-card makers, which also cost additional time and money. In 1826 it was recorded that the Ungers also sold their cards at the market of Pest (Nagy 1932: 135).

The manufacturing of the card backs was particularly important, too, as they had to be absolutely identical to make them indistinguishable and their design included marble

[14] There are actually two known methods: either the paper sheets were glued together before or after printing. Here we assume that the Ungers glued them together after printing since this would yield a lower reject due to defects.

effects, little stars or dots. Altogether, playing-card making was a rare craft that needed sustaining a cost intense workshop, different from for example dressmakers, who needed very little equipment.

There have also been estimations of the output of a playing-card making workshop based on various sources including tax books. According to Linz (2010: 15) for example, the output of the Rauchmillers, a well-to-do playing-card making family in Salzburg, was 60 packs of cards per day. Others seem to have manufactured 80 decks on 300 days per year and twelve hours daily (ibid: 16). These estimations are based on figures in tax books. They, however, are known to be notoriously unreliable, there are notable differences recorded between estimates by the city and what people claimed to have made, for example in the tax books of Győr (such as GyVL: Tax books for 1857/58). The city may not always have made the right estimations.

Also, it is different for production sites of different sizes, different qualities, numbers and types (French cards require the least effort in making (Linz 2010: 8)), if they carved/engraved themselves or someone else for them and depended on how much staff they had employed. This also differed greatly, Buda, for example always had between 2-4, the situation in other Hungarian cities in the early to mid-19th century is illustrated in the chart below (data based on Eperjessy 1988: 298, 316, 355, 408; except for Pest: Nagy 1932: 153; Győr 1856: GyVL: Main tax book for 1856):

*Table 1:* Playing-card makers in Hungary (M= Master, J= Journeyman, A= Apprentice)

| | Győr | | | Sopron | | | Pest | | | Pozsony/ Bratislava | | | Temesvár | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1805 | | | | | | | 3M | | | | | | | | |
| 1815 | | | | | | | 7M | | | | | | | | |
| 1822 | 1M | 1J | 1A | | | | | | | | | | | | |
| 1827 | | | | | | | 10M | | | | | | | | |
| 1828 | | | | | | | | | | 5M | | | 1M | 1J | |
| 1829 | 1M | 1J | 1A | | | | | | | | | | | | |
| 1831 | | | | 4M | 4J | 2A | | | | | | | | | |
| 1833 | | | | | | | 8M | | | | | | | | |
| 1836 | 1M | | 1A | | | | | | | | | | | | |
| 1838 | | | | 3M | 1J | 2A | | | | | | | | | |
| 1839 | | | | | | | | | | 2M | 8J | 3A | | | |
| 1842 | | | | 4M | 2J | 1A | | | | | | | | | |
| 1844 | | | | | | | | | | | | | 3M | | |
| 1846 | 1M | 1J | 1A | 5M | 2J | | | | | | | | | | |
| 1854 | | | | | | | 13M | | | | | | | | |
| 1856 | 1M | | 1A | | | | | | | | | | | | |

József Zámbo in Pest had four journeymen (Nagy 1932: 153), 1818-27 (Nagy 1932: 139f) and Maximilian Uffenheimer in Vienna is reported to have employed 40 employees in his factory in the 1820s (Noggler-Gürtler 2000: 55). Therefore there was an enormous difference in workshop size and output between a small workshop like those of the Ungers, where guild restrictions applied, and companies like Uffenheimer that had obtained a spe-

cial royal and imperial priviledge as playing-card manufacturers.[15] This may also explain the seeming contradiction between Czikann & Gräffer (1836: 106) that claim that playing-card makers in Hungary made good business and Prechtl (1824: 140): "Die Fabrikation der *Spielkarten* ist in Ungarn von geringem Belange." They produced few cards, which they were able to sell for good money, however.

Throughout the 19th century the gap between these two types of producers widened (Linz 2010: 16). In order to determine the exact consequences of the various possible variants, a new approach to investigating the historical playing-card production is proposed here.

The important basic information from technological encyclopedias of the 19th century serves as a starting point, but then it needs to be adapted to the situation of the workshop in question, its size, number of employees and types of cards, which were produced.

We therefore propose an outside-in bottom-up approach to further research the playing-card making process of the Ungers and other 19th century playing-card makers. Already in 2010 an outside-in analysis based on a series of empirical experiments was carried out to further illuminate the situation and the basic layout of a small workshop like those of the Ungers in Győr resulted. This already yielded that the minimum size of a small card-making workshop was 60-65m$^2$ and that it had a considerably lower output than the above-mentioned playing-card makers (Wunderlich 2011:130).

Some of the most recent results of intensified research into the family history of the Ungers enabled the address reconstruction of their houses and has yielded that their main playing-card making workshops were located in Apáca utca #323, today's #27 (Google Maps), next to the German Hospital *(Német Ispita)* beween 1816 and c 1841 and in Bástya utca #260 (later #258), today's Dunakapu tér #7 between c 1841 and c 1860 (Wunderlich 2010, 2011; GyVL Tájékozási könyv). This was the time when the playing-card production of the 19th century ended in Győr.[16]

With the address reconstructed and the floor plan of the house in Apáca utca, the next step would be to set up a computer simulation model of the Unger workshop (Wunderlich 2002). This would be a *Plant Simulation* model based on empirical experiments already carried out in part in 2010 by the author and Jürgen Wunderlich to identify process times.[17] This way many questions can be addressed. Especially since this would allow a direct comparison with other playing-card makers whose workshops or factories could also be simulated to compare parameters along Adam Smith's pin factory example and for dif-

[15] Different from the situation in Upper Austria described in Linz (2010), the terms „bürgerlicher Kartenmaler" (*card maker*) and "Fabrikant" *(producer, manufacturer)* seem to have been full synonyms in Győr since both terms were applied to the Unger workshop although the size remained basically constant throughout time (cf inscription "bürgerlicher Kartenmaler" referring to his father on a study drawing by Alajos Unger owned by the Xántus János Museum in Győr, Wunderlich 2010: and "Fabrik" in Mátyás the Younger's newspaper ad in *Das Vaterland* from 15 February 1846).

[16] The family lived in the house in Bástya utca until c 1850 and then moved to the building on Széchenyi tér, which is the main building of the Xántus János Museum today. In 1862 Mátyás Unger died in Győr (Belváros) #444, the Zichy palace (GyVL Tájékozási könyv).

[17] Jürgen Wunderlich also co-authored the Guideline Series on Simulation and Cost-simulation 3633 by the German Association of Engineers (VDI).

ferent card types from simple to luxury as well as different printing methods. This will then also answer whether the Unger workshop could have sustained two playing-card makers, father and son, how the profitability of the workshop was affected when a family member much involved in the manufacture of cards fell ill. Was this a possible reason for why Mátyás Unger the Elder went bankrupt and had to have his house auctioned off in 1839 (GyVL Hagyatékok 1839 146/191/6033)? For how long was the upgrade of cards towards the luxury category profitable under these conditions?[18]

The younger Mátyás Unger had already started to run a tobacco shop in the Vigadó, today's Lloyd Building on Széchenyi Square, by the 1850s and later – until 1874 – also sold children's toys (WUNDERLICH 2010, 2011 GyLV Mayor's Minutes II 874/34). The possible reasons for this is that with Alajos's untimely death his important design impetus ceased. After he had died no newly designed cards were ever documented. Good design would have become increasingly important to stay in business as a playing-card producer at the time of mass production, however. Thus investment into new technology was not worthwhile in a provincial town in mid-19th century Hungary, since the distribution also lay in the makers' own hands and to penetrate new markets may have seemed too daunting an endeavor. Apart from this, it was less physically strenuous to run a shop. At the time of the Industrial Fair of Győr in 1846 despite the high quality of the industrial products, a rather gloomy picture of the crafts had already been painted. Other craftspeople, too, had started to turn away from their original businesses (BALÁZS 1975). This then seems to have been a more general trend.

The introduction of the Hungarian tax stamp (*m. k. kártyabelyeg*, Mann (1990:94f)) from 1850 onwards, may also have played a role and may have made the production of playing-cards even less profitable. This, too, still commands future investigation. By c 1860 all playing-card makers in Western Transdanubia were gone.

## SUMMARY

The Ungers, Mátyás the Elder and the Younger, produced playing cards in Győr during the span of approximately 50 years between 1810/11 and c 1860. The Ungers are best known for the cards with Sopron pattern, a member of the Old Bavarian pattern family. The Younger Mátyás became famous for his nicely designed cards featuring Hungarian costumes, but ceased to produce playings-cards exclusively by the time he had reached his thirties and turned to selling tobacco and children's toys instead. The possible role as a card designer of his elder brother Alajos, an academic painter, was investigated and an affinity between his art and the crafts including playing-cards demonstrated. Finally a new outside-in bottom-up method to be able to gain more reliable insight into the artisanal playing-card making process was presented. This included the results of a pre-study to a real-time *Plant Simulation* model, currently the world's leading simulation tool for the planning of manufacturing processes owned by Siemens.

[18] The legal situation and changing economic situation in general and how it affected the situation of the Hungarian playing-card makers also still needs to be investigated further.

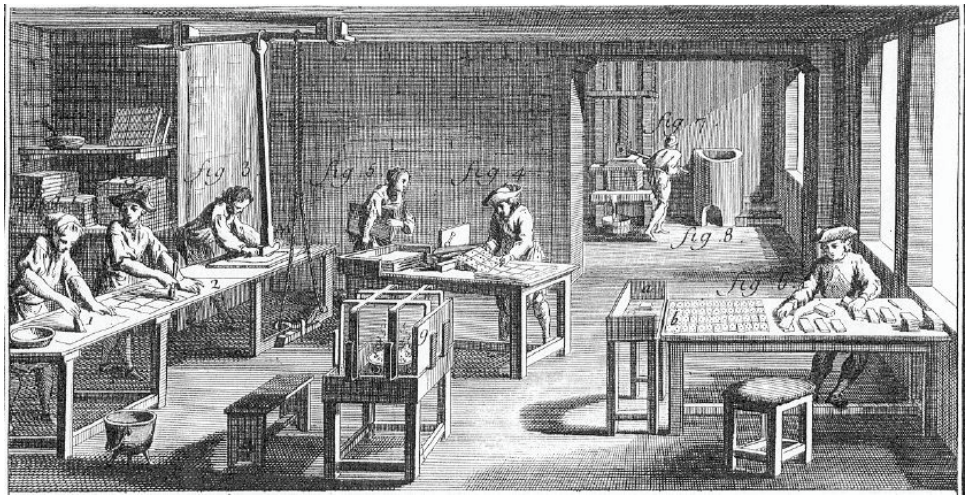


*Fig. 7* Engraving of card-workshop, Encyclopédie Diderot & d'Alembert 1763, Peter Endebrock, International Playing-Card Society (IPCS)

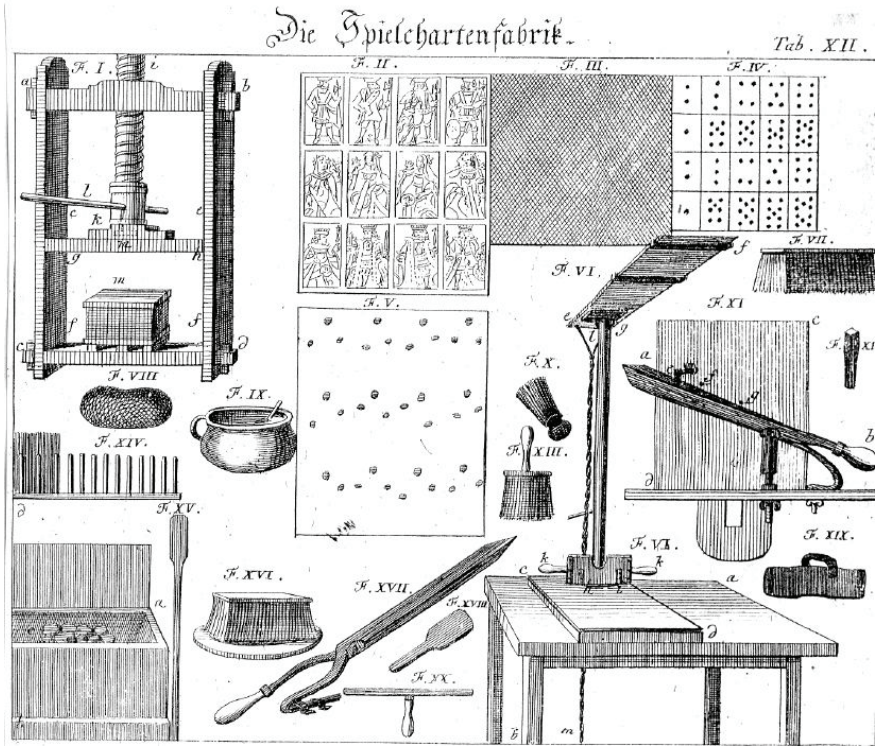



*Fig. 8* Engraving of card-making tools , "Die Spielkartenfabrik", Hartmann Sprengels Handwerke und Künste in Tablellen 1774, Peter Endebrock, IPCS

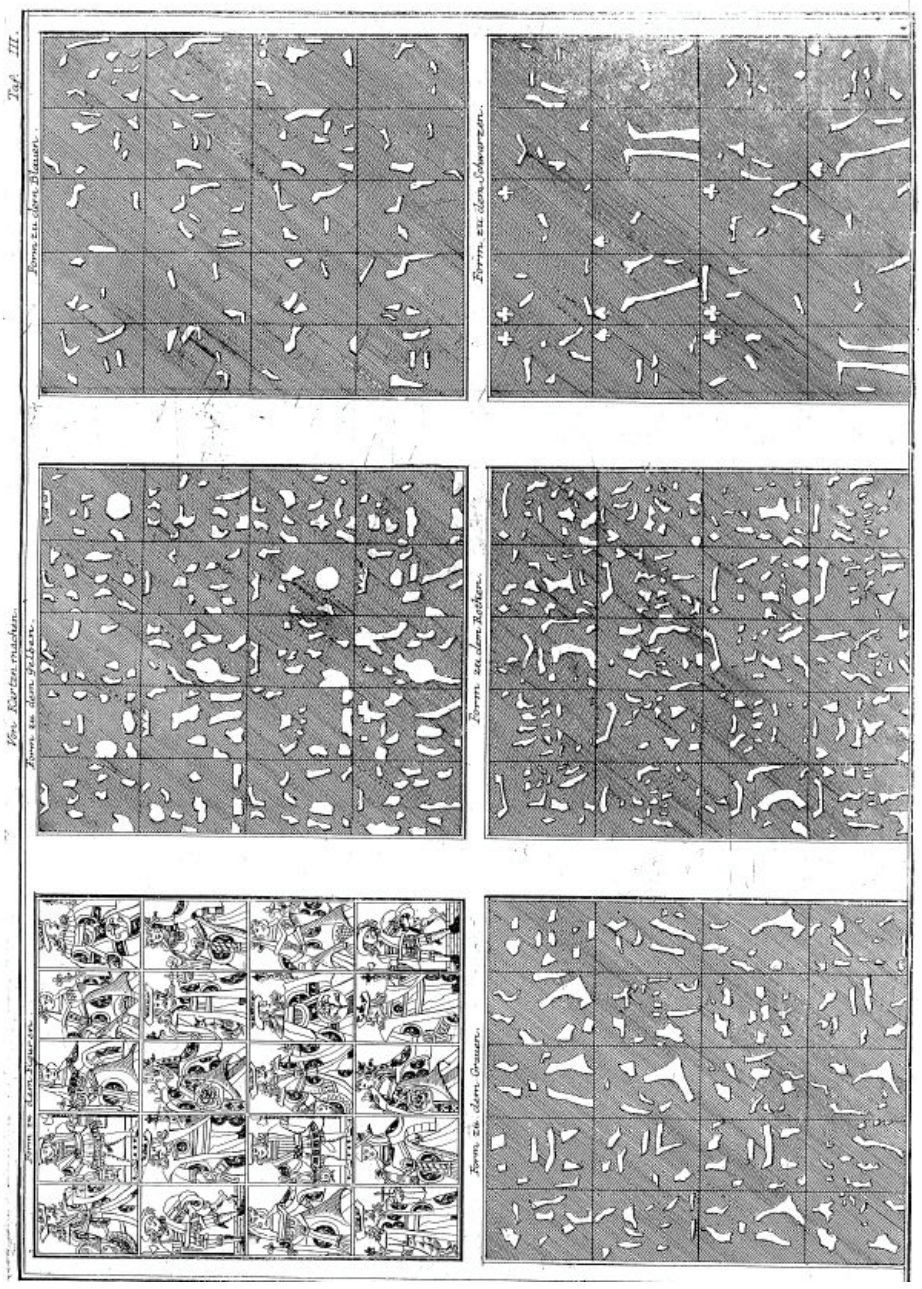
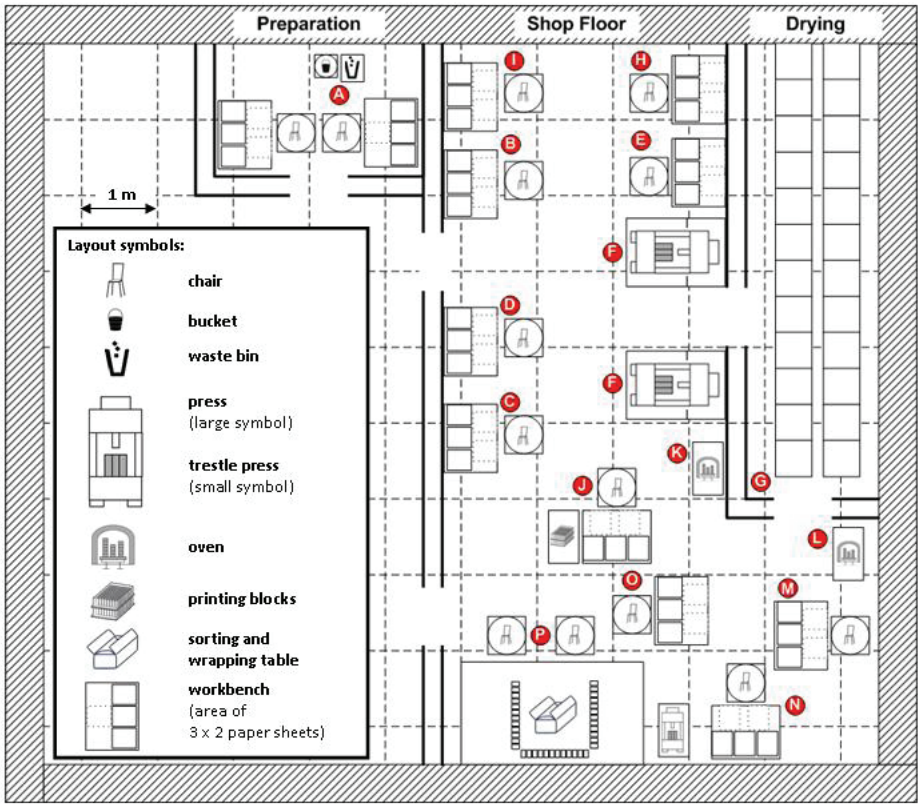



*Fig. 9* Engraving of card-making tools 2, Printed sheet and stencils, Justi: Schauplatz der Künste und Handwerke 1764, Peter Endebrock, IPCS




**Overview of production steps:**

- A Sorting of paper sheets
- B Moistening of the paper
- C Printing of the back
- D Printing of the front (outlines)
- E Glueing and pasting of sheets
- F Pressing of paper sheets
- G Drying of paper sheets
- H Cutting of paper sheets
- I Cleaning of middle sheets
- J Colouring of figures
- K Drying of colour
- L Drying of sheets
- M Soaping of sheets
- N Polishing of sheets (marble table)
- O Cutting of cards
- P Sorting and packing of cards

*Fig. 10* Floor plan of playing-card workshop (outside-in analysis)

# LITERATURE

PRIMARY SOURCES

GyVL Győr Municipal Record Office: Tax records, Tájékozási könyv (Orientation book with old and new house and street numbers, 1879), Mayor's Minutes

V *Das Vaterland* (local newspaper, Győr)

SECONDARY SOURCES

ALTMÜTTER, Georg

1847: Spielkarten. In: *Technologische Encyklopädie oder alphabetisches Handbuch der Technologie, der technischen Chemie und des Maschinenwesens: zum Gebrauche für Kameralisten, Ökonomen, Künstler, Fabrikanten und Gewerbtreibende jeder Art*. Johann Joseph Prechtl. Band 15. Stuttgart: Cotta. 198–266.

BACHMANN-MEDICK, Doris

2009: *Cultural Turns. Neuorientierungen in den Kulturwissenschaften*. (The Problems of Győr's guild system in the first half of the 19th century.) Third revised edition. Reinbeck near Hamburg: Rohwolt.

BALÁZS, PÉTER

1975: A céhrendszer problémái Győrött a XIX.sz. első felében. In: *Arrabona* 17, 279 – 293.

BROCKHAUS, Heinrich

1933: Ein edles Geduldsspiel: Die Leitung der Welt oder die Himmelsleiter. Die sog. Tarocks Mantegnas vom Jahre 1459–1460. In: *Miscellanea di Storia dell'arte in onore di Igino Benvenuto Supino*, Firenze: Olschki. 397–416.

BUDAPEST

2005: *Kártya-Játék-Szerencse. Az Iparművészeti Múzeum játékkártya gyűjteménye: Spielkarten Kartenspiel Spielglück: Die Spielkartensammlung des Ungarischen Kunstgewerbemuseums*. Antal Jánoska. Budapest: Iparművészeti Múzeum.

2007: *Művészgenerációk: a Györgyi-Giergl család három évszázada*. kiállítás a Budapesti Történeti Múzeumban 2006. október 4. – 2007. március 5. (Artist generations: three centuries of the Györgyi-Giergl family. Exhibition at the Historical Museum Budapest. 4 October 2006 – 5 March 2007). Beatrix Basics – Erzsébet Györgyi (eds) Budapest: Budapesti Történeti Múzeum.

CSATKAI, Endre

1939: Ismeretlen soproni kártyafestő a 19. század elején (An unknown playing-card maker of Sopron from the beginning of the 19th century). In: *Soproni Szemle* 3. 178.

1958: Újabb adatok a soproni kártyafestők működéséhez. (New findings on the work of the playing-card makers of Sopron) In: *Soproni Szemle 4*. 351–354.

DUMMETT, Michael – MANN, Sylvia

1980: *The Game of Tarot*. London: Duckworth.

ENDEBROCK, Peter

2000: Die Herstellung von Spielkarten im 18. und 19. Jahrhundert. In: *Das Blatt, 22* / December. 44–51.

GRÄFFER,FRANZ–CZIKANN, Johann J.

1836: *Oesterreichische National-Encyklopädie, oder alphabetische Darlegung der wissenswürdigsten Eigenthümlichkeiten des österreichischen Kaiserthumes: in Rücksicht auf Natur, Leben und Institutionen, Industrie und Commerz, öffentliche und Privat-Anstalten, Bildung und Wissenschaft, Literatur und Kunst, Geographie und Statistik, Geschichte, Genealogie und Biographie, so wie auf alle Hauptgegenstände seiner Civilisations-Verhältnisse*. Tome 5. Vienna: Friedrich Beck.

EPERJESSY, Géza

1988: *A szabad királyi városok kézművesipara a reformkori Magyarországon*. (The handicraft industry of the free royal towns in Reform Era Hungary) Budapest: Akadémiai.

HAAS, Walter

2001: On types, patters and standards. In: *The Playing Card* – Journal of the International Playing-Card Society, 40/4227-39.

Hausler, Manfred
2010: *Trommler und Pfeifer – Die Geschichte der bayerischen Spielkarten*. München: Volk.
Hoffmann, Detlef
1977: *Die Kartenspiele Philipp Otto Runges. The playing-cards of Philipp Otto Runge*. München: Heimeran.
1995: *Kultur- und Kunstgeschichte der Spielkarte*. Marburg: Jonas.
1995b: Die Spielkartensammlung des Fabriksproduktenkabinetts. In: D*as k.k. National-Fabriksprodukten-Kabinett : Technik und Design des Biedermeier*. Helmut Lackner – Thomas Werner. Vienna: Technisches Museum. 173-179.
IPCS Pattern Sheet
1994: International Playing Card Society, consulted at http//i-p-c-s.org/pattern/ps-94-Sopron.html, 12 July 2012
Jánoska, Antal
1999: A magyar kártya története, ikonográfiája, készítői (The history, iconography and makers of the Hungarian playing-card). In: *Aetas 1–2*., consulted at http//www.lib.jgytf.u-szeged.hu/aetas/1999_1-2/1h-08, 12 July 2012
2004: Kártyafestők Győrben (Playing-card makers in Győr). In: *Magyar Grafika* 6. 59–61.
2006: Die Spielkarten des Iparművészeti Múzeum. In: *Talon – Zeitschrift des österreichisch-ungarischen Spielkartenvereins*, Wien/Budapest. 4–46.
Jánoska, Antal–Horváth Ferenc
2006: Kartenmacher in Raab / Győr. In*: Talon – Zeitschrift des österreichisch-ungarischen Spielkartenvereins, Wien/Budapest*. 15, 48–69.
Jerfy, Géza
1931: Győr város utolsó országgyűlési követe a pozsonyi diétán (Győr city's last parliamentary envoy to the last Hungarian Diet convened in Bratislava). In: *Győri Szemle*. *8-10*. 247–317.
Kártyalexikon
1993: *Kártyalexikon* (Playing-card encyclopedia). Mihály Berend – Antal Jánoska. Budapest : Akadémiai.
Keess, Stephan von
1820: *Darstellung des Fabriks- und Gewerbswesens im österreichischen Kaiserstaate: vorzüglich in technischer Beziehung. Beschreibung der Fabricate, welche in den Fabriken, Manufacturen und Werkstätten des österreichischen Kaiserstaates erzeugt werden. 1. Band: mit einem vollständigen Grundrisse der Technologie*. Vienna: Strau.
Köger-Kaufman, Annette
2001: Kelch, Schelle, Karo–Geschichte des europäischen Kartenspiels. In: *Kultur- und Technikgeschichte der Spielkartenherstellung*. Silvia Werfel (ed.). Mainz / Darmstadt: Internationaler Arbeitskreis Druckgeschichte, 37–55.
Kolb, Jenő
1938: Régi játékkártyák és kártyafestők Sopronban (Old card games and playing-card makers in Sopron). In: *Soproni Szemle*. *1–2*. 38–50
1939: *Régi játékkártyák. Magyar és külföldi kártyafestés XV.–XIX. század*. (Old playing-cards. Hungarian and foreign playing-card making from the 15th–19th century). Budapest: Hungaria Nyomda.
Krünitz, Johann Georg
1833: Ökonomisch-technologische Encyklopädie, oder allgemeines System der Staats-, Stadt-, Haus- und Landwirthschaft, und der Kunst-Geschichte: Welcher die Artikel Spiel (Istmisches) bis Spinnen und Spinnerey enthält. Tome 158. Berlin: Pauli.
Linz
2010: *Diese Karden seind zu finden bey ..., Spielkarten aus Oberösterreich*. Sonderausstellung im Schlossmuseum Linz, 16. Juni bis 14. November 2010. Dagmar Ulm. Linz: Oberösterreichisches Landesmuseen.
Mann, Sylvia
1990: *Alle Karten auf den Tisch: Geschichte der standardisierten Spielkarten aller Welt – Sammlung Sylvia Mann*. Leinfelden-Echterdingen und Marburg: Deutsches Spielkarten-Museum und Jonas.
Matter, Stefan–Boerner, Maria-Christina
2007: *Kann ich vielleicht nur dichtend mahlen?: Franz Pforrs Fragment eines Künstlerromans und das Verhältnis von Poesie und Malerei bei den Nazarenern*. Köln: Böhlau.

NAGY, Lajos
1932: Régi pesti és budai játékkártyák (Old playing-cards from Pest and Buda). In: *Tanulmányok Budapest Múltjából* 1. 134–140.
NÜRNBERG
2012: *Der frühe Dürer. Ausstellung im Germanischen Nationalmuseum*. Daniel Hess–Thomas Eser. Nürnberg: Germanisches Nationalmuseum.
NOGGLER-GÜRTLER, Lisa
2000: Die Wiener Kartenmacher Hofmann und Uffenheimer. Eine Feldforschung. In: *Spielkarten aus dem Biedermeier*. Vienna: Technisches Museum. 52–57.
ÖRSI, Zsolt
2001: A kártya a magyar néprajzban. (The playing-card in Hungarian ethnography.) In: *Tisicum*. 12. 2001. 247–255.
PRECHTL, Johann Joseph (ed.)
1824: *Jahrbücher der technischen Hochschule*. Band 5. Vienna: Gerold.
REISINGER, Klaus
2004: Ödenburger-Deutsche. In: *Herz, Schelle, Laub, Eichel*. Vol. 3. Vienna: self-publication. 9–52.
ROSENFELD, Hellmut – KOHLMANN, Erwin
1964: *Deutsche Spielkarten aus fünf Jahrhunderten*. Frankfurt-on-Main: Insel.
RÓZSAVÖLGYI, Andrea
2006: Giergl István és Markó Ferenc, pdf-document, Budapest. www.giergl.hu/docs/rozsavolgyi.pdf, consulted 12 August 2011
STADTLEXIKON
1999: *Stadtlexikon Nürnberg*. 2nd edition. Michael Diefenbacher–Rudolf Endres. Nürnberg: Tümmels.
TELESKO, Werner
2010: *Das 19. Jahrhundert – Eine Epoche und ihre Medien*. Köln: Böhlau.
VÁLOGATÁS
2009: *Válogatás a javából. A 150 éves győri Xántus János Megyei Múzeum gyűjteményei* (Selection of the best: collections of the 150 year-old Xántus János County Museum). Zoltán Székely. Győr: Museums of Győr-Sopron-Moson County.
VIENNA
2000: *Spielkarten aus dem Biedermeier – Sonderausstellung vom 18. Juni bis 20. August 2000*, Technisches Museum Vienna, ed. Klaus Reisinger, Vienna: Technisches Museum.
WÖRNER, Ulrike
2010: *Die Dame im Spiel: Spielkarten als Indikatoren des Wandels von Geschlechterbildern und Geschlechterverhältnissen an der Schwelle zur Frühen Neuzeit*. Münster: Waxmann.
WUNDERLICH, Claudia
2009: Die Győrer Spielkartenmalerfamilie Unger – Im Spiegel neuer Erkenntnisse. In: *Talon – Zeitschrift des österreichisch-ungarischen Spielkartenvereins*, 18/2009, Vienna/Budapest, 78–81.
2010: Eine ungarische Kartenmaler- und Künstlerfamilie des 19. Jahrhunderts: Die Győrer Unger. In: *Arrabona* 48/2. 139-158.
2011: The Ungers: A 19th century playing-card making family in Győr, Hungary. In*: The Playing-Card – Journal of the International Playing-Card Society*, 40/2. 112–138.
WUNDERLICH, Jürgen
2002: *Kostensimulation. Simulationsbasierte Wirtschaftlichkeitsregelung komplexer Produktionssysteme*. Bamberg: Meisenbach.
ZSOLDOS Benő
1976: A ”soproni kartya” (The Sopron playing-card). In: *Soproni Szemle* . 62–65.