

Angéla Imre

#### ON THE PERSONALITY OF WOLFGANG VON KEMPELEN

Kempelen's mechanical Chess Player and the Speaking Machine are two hotly debated technical sensations which were trumpeted by numerous periodicals throughout the late XVIII century, an age of enlightenment. Because of this many educated contemporaries knew Kempelen, at least by name. The lasting technical fascination with these inventions and his mention in Edgar Allen Poe's short stories ensure that Kempelen is still remembered to this day. Alas, very few are aware that this versatile nobleman was also a talented state official, a scholar, an architect and an inventor. What is behind this person, this genius?

The son of a gentleman court counsellor, Engelbert Kempelen (of Irish origin), was born on the 23<sup>rd</sup> of January 1734 in Preßburg, Hungary (now Bratislava, Slovakia). He attended primary school in this city, but, in 1850, went to Győr for his secondary education. After finishing secondary school, he wanted to study physics, maths, natural sciences, architecture, literature, or even music. The choice was not easy, as many things interested him. Some sources mention studies of philosophy and law in Vienna but the lists of enrolment show no entry. After extensive travel throughout Italy, Kempelen participated in the compilation commission to translate the Codex Theresianus, Maria Theresia's civil law book from Latin to German. (Pompino-Marschall 1991: 184; Felderer/Strouhal 2002: 3) Alice Reininger objects to this; according to her the translation was from Latin to Hungarian. Everybody was satisfied with his prompt and punctual work, and soon he became the Hungarian court's advisor, and later the secretary.

In 1765 he became appointee for salt and settlement matters in the Banat. Mandated under Vienna government at the conclusion of peace with Turkey in 1718, after devastation through wars and natural disasters. The Vienna court carried on an intensive settlement policy to repopulate the provinces at its south east border, to a large extent with Germans (Donauschwaben).

Kempelen was appointed director for security control of the Hungarian salt mines in 1766 and commissioner for the repopulation of the Banat in 1767. He was responsible for the settlement of 37.000 families and organised the communities, and designed the the houses of the settlers. He also managed to introduce a new crop, flax (which makes linen), and built a silk factory. Around Timisoara, he drained the swamps, rebuilt the roads, built schools, and made school compulsory. Banat was reborn. His numerous visits are reflected in three substantial reports to the Vienna court in 1768, 1769 and 1770 in which Kempelen gave account to the repopulation commission, presented a plan for a systematic organization of the Banat and described the local mines and institutions. The Empress was most satisfied and, on March 7<sup>th</sup> 1771, granted 1.000 Gulden for his services and an annuity of the same sum.

In autumn 1769, Wolfgang von Kempelen was invited by Maria Theresia to attend magnetic experiments shown at the Court by a Frenchman, Monsieur Pelletier. He went but said he could invent a machine far more surprising within half a year and commenced work on the chess playing android, an automaton for the enjoyment of the court. Sometime later, the sources provide neither exact date nor location, his masterpiece was first demonstrated to the Empress in Vienna. In a very short time, this machine was world famous, and the whole of Europe wanted to see it. Many people strove to figure out the machine's secret, which Kempelen hinted might include a hidden chess master. No automaton of the XVIII century was so frequently described. After a period out of the public eye, the automaton was first rediscovered by Maria Theresia's son Joseph II, and subsequently toured Europe; followed by its second rediscovery twenty years after the death of Baron von Kempelen when it was acquired by a young Bavarian musician and mechanic, Johann Maelzel.

At about that time, he continued with his engineering work, and in 1770, he designed a pontoon bridge over the river Danube in Preßburg.

When the castle of Preßburg was rebuilt, Kempelen was asked to construct a separate water main for the castle. Taking advantage of a well on the bank of the river Danube, water was transported by copper pipes in a separate tunnel by pressure pumps driven by horses – the altitude was about 70 m and the capacity was one bucket per 1.5 minutes.

In the same year, Maria Theresia decided, with the help of French gardeners, to turn the Schönbrunn wild park into a beautiful garden. Kempelen received this new assignment: he had to provide for the water supply of the garden's jewel, its fountain and the water cascades. In October 1772, the fountain with its self regulating water pump was inaugurated.

Maria Theresia wanted to honour Kempelen for his achievements, but he declined the offer to be nominated a baron.

In 1774, he helped the Preßburg people once more: he established the first pawn shop of the country, which was a popular alternative to the local usurers. In the meantime, Maria Theresia caught small pox, but she still insisted on taking care of her governing tasks; so, she asked Kempelen to design a mobile bed, easy to move from one room to another, in which she could lie, sit, write and read comfortably.

In 1776, he convinced the court, that the University in Nagyszombat had out-grown the city, and had become obsolete. He was successful, and obtained financial help to organise and direct the moving of the University to the Buda castle, and gave special attention to the library.

Between 1777 and 1780, he built two steam engines. The first one was constructed near to Stubentor in Vienna. Later, this machine was used for building the Franz canal in Hungary. His machine was better than James Watts's machine, but he lacked the money to develop it further.

In 1778, Maria Theresia's god child, Marie-Therèse Paradis, was introduced to Kempelen. The 19 year old pianist and composer could sing beautifully, and she was intelligent, but be-

cause she was blind, she could neither read nor write. The Empress asked Kempelen to help Paradis. First, Kempelen taught her the basic units of reading and writing, with 3D shapes. This young girl was the first ever to study the alphabet with 3D type. In 1779, Kempelen built for her a press with movable type and a letter case. The letter that Marie-Therese Paradis printed on this machine on the 16<sup>th</sup> of August 1779 can still be read until today. These letters demonstrated that it was worth teaching the blind to read and write. Still in that year, at Kempelen's request, the court allowed the publishing of the first Hungarian newspapers.

After Preßburg, he planned two water pumps for Buda. Later, he drew the first version of the steam turbine, and in 1788 or 1789 received a patent from Emperor Joseph II for 10, according to other sources, 12 years (Felderer/Strouhal 2002: 24) for his invention to drive all kinds of mills, and machines. The model can be seen in the National Engineering Museum's collection.

Following his work in Buda, he received another architectural commission – planning the Sava-Adria Canal. The Canal was never realized, but he also took part in the reconstruction of the Buda Castle. On the 25<sup>th</sup> of October 1790, the Buda Castle Theatre was built according to his plans. For the first time in history, Hungarian could be heard on stage in a Hungarian theatre. In 1800, Ludwig von Beethoven gave a concert in that theatre.

Kempelen commenced preliminary work on his mechanical speech machine in 1769, travelling through European capitals from 1782. Possibly to counteract some doubts about the credibility of his ingenious apparatus, he published a detailed description in 1791. Other lectures have already covered this long research in detail. We would only like to emphasize that the machine itself had important scientific value. Some people copied the machine, while others made improvements. The Englishman Wheatstone, the German Posch, and the Austrian mathematician Faber were amongst the first to utilize Kempelen's invention. The latter outperformed him with his much advanced talking machine, minutely recreating the human vocal tract. Joseph Faber even demonstrated his machine in the Buda Natural Science Association.

His book *Mechanismus der menschlichen Sprache nebst Beschreibung seiner sprechenden Maschine*, simultaneously published in 1791 in German and French, summarized 22 years of research. It consists of five large chapters, the last of which deals exclusively with the history, construction and use of the acoustic-mechanical speech machine. The previous chapters deal with language in general (Chapter I.), the question of the origins of languages (Chapter II.), an introduction to the human speech organs and how they function together as a system (Chapter III.), and he writes about the letters/sounds of the European languages (Chapter IV.). His phonetic chapters show a lot of modern and new statements but he mixed up the functions of the sound and the letter – as was common in the Linguistics of that age. However, his book is more than a traditional phonetic text book. By de-

scribing the human speech organs, for example, he dealt also with the questions such as what kind of sounds do we produce when we kiss, what is a cough, what is a hiccup, what is a snort, as well as the causes for poor articulation. As a result of his descriptions, he became Hungary's first speech therapist. In summary, during his research with the talking machine he discovered many linguistic truths that are still accepted today, like the transition phases between speech sounds, or the specific characteristics of human perception.

In 1798, after 43 years of services, he was retired with an annuity of 5.000 Gulden and the title of a Knight of the Holy Roman Empire. (Pompino-Marschall 1991: 189; Felderer/Strouhal 2002: 27; Reininger objects to this)

Outside of scientific life, he also dealt with arts. He wrote poems, epigrams, dramas, and musical plays for which he composed the scores. Moreover, he illustrated his poems. In 1767, his comedy *Das Zauberbuch*, Kempelen's presentation of white and black magic was staged in Preßburg, and his play *Andromeda und Perseus* was publicly performed in Vienna in 1781. In addition, he was also a talented amateur etcher. From 1789, he was an honorary member of the Vienna Academy of Arts.

In his private life, although he had a very good home life, his work often took top priority. His first wife died shortly after their marriage. In 1762 he married once again, but of the five children born from this marriage, only two survived to adulthood.

Just before his death on the 26<sup>th</sup> of March 1804, probably because of his reformist thoughts, Emperor Franz II. cancelled the annuity. To our knowledge, this productive inventor, after a fruitful life abounding in experiences, died highly esteemed 1804 in his 70<sup>th</sup> year in Alservorstadt near Vienna. It is said that written on his grave were the words of Horatio, "Non omnis moriar ..." (I will not die totally)

#### LITERATURE

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Angéla Imre

Eötvös Loránd University, Budapest

[angelai@freemail.hu](mailto:angelai@freemail.hu)