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PEREGRINUS SUM

Studies in History of Hungarian–Dutch
Cultural Relations in Honour of Ferenc Postma
on the Occasion of his 70th Birthday

Edited by
Margriet Gosker, István Monok

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On the Cover Page

Coccejus' Psalterium, Franeker, 1646
Photo: Jan Schot, Amsterdam 2013

LÁSZLÓ MARÁCZ

János Bolyai in search for the perfect language: Hungarian[1]

The Hungarian mathematician János Bolyai (1802-1860) lived and worked in Transylvania, which was in his age part of the Hungarian kingdom. His father Farkas Bolyai (1775-1856) professor in mathematics at the Calvinist College of Marosvásárhely, introduced János at an early age into the secrets of mathematics. After finishing his matriculation in 1817 János attended the imperial military academy in Vienna where he spent a lot of time studying geometrics.

Bolyai was intrigued by the so-called parallel axiom, the eleventh axiom of the Greek mathematician Euclides (ca. 300 B.C.) which had remained unsolved for thousands of years. In 1823 János wrote in a letter to his father saying that he had solved the problem of the parallel axiom:

[1] This paper is dedicated to my colleague and friend Prof. Dr. Ferenc Postma who has reached the honourable age of seventy years. I truly hope he and his wife Margriet (for us Margit) will enjoy the years to come. Ferenc and I have some interests in common, namely the peregrination of Hungarian protestant students to the Dutch universities, the Hungarian cultural and language heritage in Transylvania, and the book and manuscript collection in the Teleki Téka. The Bolyai's are peregrination students as well, although they visited universities in Göttingen and Vienna instead of the Dutch universities. I guess Ferenc will not be familiar with the manuscripts of János Bolyai in the Teleki Téka, although if it is on Transylvanian libraries you never know. Here Ferenc is at home. However, whether he is familiar with the Bolyai manuscript in the Teleki Téka or not he should be surprised with this contribution. Last but not least, I also want to thank him for his advice and support when my wife Helga Marácz-Kuk, who is a descendant of the Szekler Tsernátoni Waÿda family, and myself started to work on the peregrination of well-known and lesser-known members of this family to Dutch universities. Cf.: MARÁCZ, László, *A Csernátoni Vajda család tagjainak peregrinációja holland egyetemeken a kora újkorban,* in *Történetek a mélyföldről, Magyarország és Németalföld kapcsolata a kora újkorban*, szerk. Réka BOZZAY, Debrecen, 2014, 137-171. This third volume on the Dutch-Hungarian historical contacts could never have been realised without the support of Ferenc.

'I have created from northing a new and other world'.[2] He did this at the age of 21. The Latin manuscript with the solution of the parallel axiom was finally published in 1832 under the title '*Scientiam spatii absolute veram exhibens*' as an appendix of thirty pages in a mathematical textbook of his father entitled '*Tentamen*'.[3]

In 1833, Bolyai who was promoted meanwhile to the rank of captain second class requested for his early retirement on health grounds. He withdrew from the army to live at the property of the Bolyai family in the village of Domáld in the neighbourhood of Marosvásárhely.

The German mathematician Paul Stäckel is the first who has noted in his biography of the Bolyai's that János Bolyai tried to construct a perfect language on the basis of his Hungarian mother tongue.

> Zu den zahlreichen Versuchen, eine solche internationale Sprache zu schaffen, tritt Johann Bolyais Weltsprache hinzu. Als Grundlage diente ihm seine Muttersprache, die er vereinfachen und im besonderen von allen Ausnahmen befreien wollte. Dieser Arbeit hat er sich mit bewunderungswürdigem Fleisse unterzogen; gleichzeitig hat er dabei die von Wolfgang vorgeschlagene verbesserte Schrift zur Anwendung gebracht. In seinem Nachlass finden sich umfangreiche Wörterbücher der neuen Sprache, die wohl genauerer Durchsicht wert waren.[4]

Since János never published his studies of the perfect language, his ideas have not influenced the scientific discussion in this field. Nevertheless the studies of his ideas are important, because they illustrate which European cultural philosophical movements have affected the Hungarian culture, and the study of the perfect language in Hungary. Bolyai's attempt to construct a perfect language fits into a European tradition to promote international communication, including international scientific

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[2] The original Hungarian phrase: "*semmiből egy ujj más világot teremtettem*" has become the most quoted phrase from János Bolyai. Paul STÄCKEL, *Wolfgang und Johann Bolyai Geometrische Untersuchungen, Erster Teil Leben und Schriften der Beiden Bolyai,* Leipzig und Berlin, B.G. Teubner, 1913, 85.

[3] Compare the introduction of Kiss on the parallel problem and the importance of János Bolyai for the development of mathematics and physics: KISS Elemér, *Mathematical Gems from the Bolyai Chests. János Bolyai's discoveries in Number Theory and Algebra as recently deciphered from his manuscripts*, Budapest, Akadémiai, 1999.

[4] STÄCKEL, *op. cit.* 195.

communication. Moreover his work is important for understanding better the structure of the Hungarian language itself.

In order to construct a perfect language Bolyai largely made use of certain aspects of the Hungarian language, like roots and agglutination, which were discovered only in the first half of the nineteenth century.[5] Bolyai was doing this in the framework of the Hungarian Language Renewal, which was part of a general modernization in Hungary then. Moreover the idea of constructing a perfect language was one of the projects which arose from the cooperation – although not always unproblematic – between father and son Bolyai in the far away Transylvanian town Marosvásárhely.

János Bolyai has left behind a manuscript consisting of a number of hand-written notes. The manuscript is more than 10,000 pages and is archived in the Teleki library in Marosvásárhely. Its critical evaluation is yet far from being finished. Samu Benkő has thematically ordered the manuscripts[6] and has numbered them. In this paper, I will follow Benkő's numbering.

Hungarian Language Renewal

At the end of the eighteenth century the ideas of the Enlightenment reached Hungary. The Hungarian proponents of the Enlightenment were in the beginning not active in Hungary itself but in Vienna, especially in the circles of the Hungarian department of the Imperial Guard, established in 1760 by the Habsburg Empress and Hungarian Queen Maria Theresa. The driving force in the Viennese circle of nobility was György Bessenyei (1747-1811), an admirer of Voltaire and the French encyclopaedists.[7]

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[5] Root words in Hungarian are monosyllabic lexical items that cannot be reduced any further without losing their meaning and form. With the help of suffixes that are attached to the root words new words can be formed. This attachment of suffixes to root words is called agglutination. Cf.: MARÁCZ László, *De Oorsprong van de Hongaarse Taal,* in *Het Babylonische Europa, Opstellen over Veeltaligheid*, red. A. van HEERIKHUIZEN, M. van MONTFRANS, B. NAARDEN, J. H. REESTMAN, Amsterdam, Amsterdam University Press, 2004, 81-96.

[6] BENKŐ Samu, ed., *Bolyai János marosvásárhelyi kéziratai, vol. I*, Kolozsvár, Az Erdélyi Múzeum-Egyesület, 2003.

[7] See the reference work of literary historian BEÖTHY Zsolt ed., *A magyar irodalom története I*, Budapest, Athenaeum, 1899, chapter 41, 547-567.

Bessenyei was convinced, just like his French counterparts, that happiness could be reached only through the sciences. General accession to the sciences was only reached via one's own mother tongue. The Hungarian language, which, at the end of the eighteenth century, had the status of a popular language, was not yet suitable for the practice of science. Bessenyei was of the opinion that the Hungarian language had to be renewed first. 'Each nation had access to science in her own language and never in the language of another nation.'[8] In his essays, Bessenyei forcefully argued for the renewal of the Hungarian language. In 1781 he also launched the idea of establishing a Hungarian Academy of Sciences.

The ideas of Bessenyei were gradually gaining ground. At the end of the eighteenth century a movement surfaces in Hungary that intended to renew the Hungarian language. In their efforts to create new words to cover scientific terms and abstract concepts, the language renewers made use of the structure and the character of the Hungarian language, i.e. of the Hungarian root words and suffixes and the principle of agglutination.

In 1825 the liberal count István Széchenyi forcefully argued at the Hungarian Diet to establish a Hungarian Academy of Sciences. In 1830 this institute was being established with the goal to promote the Hungarian language and sciences in the Hungarian tongue.[9] This scientific society ordered the compiling of Hungarian dictionaries which contained new words. From 1834 also special dictionaries were compiled next to the Great Academic Dictionary.[10] Furthermore the Academy of Sciences published studies on the structure of the Hungarian language, the root words and the suffixes.

In 1834 the Academy of Sciences conducted a competition with the challenge to compile the list of pure roots and their original meaning in

[8] See BEÖTHY Zsolt ed., *A magyar irodalom története II, Budapest,* Athenaeum, 1900, 12: for Bessenyei's adage "*minden nemzet a maga nyelvén lett tudós, de idegenen soha*"

[9] BEÖTHY, *op. cit.* II, 12: "*A magyar nyelvet s a tudományt magyar nyelven mívelni*"

[10] See for the Great Academic Dictionary MARÁCZ, *op. cit.* 2004, 88-89, and MARÁCZ, László, *Root and Recursive Patterns in the Czuczor-Fogarasi Dictionary of the Hungarian Language,* in *The Making of the Humanities, volume III: The Modern Humanities*, eds. R. BOD, J. MAAT, and T. WESTSTEIJN, Amsterdam, Amsterdam University Press, 2014, 113-129.

the Hungarian language.[11] The two winning studies were published in 1839 by the Hungarian Academy of Sciences. These were the studies of József Engel (1807-1870),[12] a doctor and pharmacist in Marosvásárhely and János Nagy (1809-1885),[13] a Roman Catholic priest and a teacher at the secondary school of Szombathely. Both of these studies have been employed by János Bolyai to construct the perfect Hungarian language.[14] In his notes, he often refers to Nagy's *'Tiszta magyar gyökök'* "Pure Hungarian roots". Nagy was a specialist in Oriental languages and closely collaborated with linguists of the Hungarian Academy of Sciences. Bolyai received first hand information of the studies of József Engel. He was in close contact with József Engel over a period of twenty years. Between 1837 and 1857 Engel had a doctor's consulting room in Marosvásárhely before he moved to Kolozsvár in 1857. In that period he was Bolyai's family doctor.[15] It is documented that between 1837 and 1851 Engel wrote out at least five times a prescription for Bolyai to have medicines.[16] The contact between Bolyai and Engel must have been quite intense and intimate indeed, for Engel was one of the witnesses at the wedding of János Bolyai to Rozália Kibédi Orbán on 15 May 1849 in Marosvásárhely.

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[11] NAGY János, A' magyar nyelv' szóalkotó, 's módosító ragainak nyelvtudományi vizsgálata, Buda, A' Magyar Tudós Társaság, 1834 (Nyelvtudományi Pályamunkák, 1), 103-176.

[12] ENGEL János D, A' Magyar nyelv' gyökérszavai, Buda, A' Magyar Tudós Társaság, 1839 (Nyelvtudományi Pályamunkák, 2), 1-122.

[13] NAGY János, *Tiszta magyar gyökök*, Buda, A' Magyar Tudós Társaság, 1839 (Nyelvtudományi Pályamunkák, 2), 125-296.

[14] These are however not the first root dictionaries of Hungarian. The first dictionary of roots was compiled by Ferenc Kresznerics (1766-1832), a priest and philologist teaching at the secondary school of Szombathely (KRESZNERICS Ferenc, *Magyar szótár gyökérrenddel és deákozatta, vol. I-II*, Buda, 1831). In the introduction of his dictionary Kresznerics wrote that his first concern was to determine the root of the words and that his second concern was to determine the suffixes. Kresznerics became a member of the Hungarian Academy of Sciences. His linguistic work was highly respected by Mihály Vörösmarty, one of the driving forces of Hungarian linguistics at the Academy of Sciences.

[15] HINTS Elek, *Bolyai Farkas életmódja, betegségei, halála,* in *Egy halhatatlan erdélyi tudós, Bolyai Farkas*, szerk. GAZDA István, Budapest, Akadémiai, 2002, 617-626.

[16] SARLÓSKA Vince Ernő, *Bolyai János házassága a köztudatban és a dokumentumok*, Budapest, Akadémiai, 1916 (A Magyar Tudományos Akadémia könyvtárának közleményei – Publicationes Bibliotheca Academiae Scientiarum Hungaricae, 23), 6.

The wedding ceremony was held in private and only close friends were invited.[17] Although Engel did not publish anything on linguistics apart from his 1839 dictionary on the Hungarian root words, we know that until 1859 he had been working on improving his original dictionary. In 1859, he was adopted as a corresponding member of the Hungarian Academy of Sciences and his inaugural address was an improved version of his 1839 dictionary of Hungarian roots. Engel was seriously claiming that Hungarian was the most perfect language in the world and all other languages can learn from it. These claims must have sounded familiar to Bolyai and they probably have been shaped by the cooperation of the two men on the perfect Hungarian language.[18]

Farkas, the pioneer

His father, Farkas Bolyai was also active in the language renewal movement. He made efforts to invent suitable mathematical terms in Hungarian. These were in that time hardly available.[19] In the first dictionary of mathematical terms that was published in 1834 by the Hungarian Academy of Sciences, 145 of the technical terms were invented by Farkas. Some of them are still being used today.[20]

In the second edition of *'Tentamen'* , Farkas writes down his ideas about the Hungarian language.[21] He holds the opinion that a uniform spelling is of the greatest importance, and he states that he will stick to the rules of the Hungarian spelling as proposed in 1832 by the Hungarian Academy of Sciences.[22] Farkas considers the development of one's own mother tongue as a necessary step in the further development of one's own culture and science – completely in the spirit of the Enlightenment – and as a contribution to the general development of the human mind.

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[17] SARLÓSKA, *op. cit.* 5.

[18] SARLÓSKA, *op. cit.* 6.

[19] STÄCKEL, *op. cit.* 19.

[20] GAZDA István, *Bolyai Farkasnak az 1834-es Mathematikai műszótárban szereplő szakkifejezései,* in GAZDA ed., *op.cit.* 2002, 392-395.

[21] BOLYAI Farkas, *A nemzeti nyelvről, köznyelvről és szaknyelvről* (1833), in GAZDA ed., *op.cit.* 2002, 389-391); Cf.: BOLYAI Farkas, *Egy kis toldalék és jelentés. Tentamen 2. kötet*, in GAZDA ed., *op.cit.* 2002, 413-415.

[22] Consider STÄCKEL, op. cit. 193, BENKŐ, Samu, *Nyelv és matematika*, Korunk, 1960, 1314-1324. (hier: 1316) and GAZDA ed., op. cit. 2002, 389.

Furthermore Farkas Bolyai claims that the scientific world should agree on a universal language comparable to Latin in order to absorb scientific results that are proliferated at high speed in the different languages of the world. Hence, it is necessary "to publish everything in this language that has to be equipped with mathematical and musical properties that can endlessly be perfected".[23] According to Farkas, each nation has to cultivate next to this universal language his own language, and everyone has to learn both languages. In this way, all nations would speak the same language, and for mutual understanding such a language "would be a rope which would give everyone a hold and would lead to unity among mankind".[24]

Apart from simplifying the Hungarian alphabet that Farkas already proposed in the first edition of his mathematical textbook *'Az arithmetica eleje'* ("The beginnings of arithmetics"), Farkas did not state anything about the properties such a universal language should have. In 1842 János Bolyai adopted the ideas of his father in order to elaborate a perfect language based on Hungarian.[25]

Language as a sign system

János Bolyai had what we would today call a semiotic view on language. According to him, language is nothing other than a sign system (Ms. nr. 842). Although János considers mathematics also as a sign system, there are certain functional and qualitative differences between mathematics and the study of language (Ms. nr. 620). He wants to reduce these differences by also introducing unambiguous concepts such as geometrics. By using as few signs as possible, language can be simpler and unambiguous (Ms. nr. 659). Bolyai hypothesizes that in the beginning natural language closely matched a mathematical sign system. He refers to this 'Ursprache' in his notes as 'géber' (Gebreew). This is a play of words with the word 'héber' which is the Hungarian word for Hebreew.[26] According to Bolyai, Gebreew was a simple and unambigu-

[23] GAZDA ed., *op. cit.* 2002, 389.

[24] GAZDA ed., *op. cit.* 2002, 390.

[25] KISS, *op. cit.* 1999, 54.

[26] According to the mathematician Elemér Kiss, most of János' mathematical neologisms in Hungarian originate from the textbooks of his father (KISS, *op. cit.* 2005, 227). In the list that is presented in KISS (*op. cit.* 2005, 227-231.) we

ous language that became only complex and ambiguous after writers and poets started to misuse language.[27] According to the mathematician from Marosvásárhely, language should rather be clear, simple (to save time and space) and aesthetical, i.e. it should have a pleasant and beautiful pronunciation.[28]

Bolyai considered the language signs ad-hoc, because they are independent of the objects they denote.[29] In modern linguistics you can find these ideas in structuralism and semiotics elaborated by scientists such as Ferdinand de Saussure (1857-1913). János was also convinced that the system of language signs is suitable for mechanization.[30] In this field the first attempts were already undertaken in his age, like the speaking machine build by Wolfgang von Kempelen who operated as an advisor at the Vienna Court in 1790.[31] From his references to Von Kempelen's publication we know that János was aware of this.

Without a perfect language, science will not be able to guarantee mankind higher welfare. According to Bolyai, such a language does not exist but it is certainly possible to construct it (Ms. nr. 842). He thinks Hungarian will be suitable for that: '(...) the Hungarian language is simple and beautiful. Hungarian can generally be considered as being perfect with a real philosophical mind (…), although the meaning of the words and their pronunciation are not perfected yet, the mind or rather the principles, rules and its essence can certainly be distributed.'[32]

Bolyai mastered Hungarian, German, Latin, French, Italian and Rumanian (Ms. nr. 845). By comparing these languages he concluded that

find the word 'géber' (KISS, *op. cit.* 2005, 230; Bolyai (Ms. nr. 547/2)) as well. According to Kiss, 'géber' means 'algebra'. From this, we might hypothesize that János considered the logical system of the Ursprache a variant of algebra. We will leave the link between the linguistic and mathematical use of the word 'géber' in Bolyai's notes as a topic for further research.

[27] See the manuscripts (649), (659) and (606); and also (606) in BENKŐ, *op. cit.* 2003, 141.

[28] Manuscript (627) in BENKŐ, *op. cit.* 2003, 164-165.

[29] Manuscripts (215), (629), (837) and (979).

[30] Manuscripts (661) and (875).

[31] See Wolfgang VON KEMPELEN, *Mechanismus der menschlichen Sprache nebst Beschreibung seiner sprechenden Maschine,* Wien, 1791. Cf.: KEMPELEN Farkas, *Az emberi beszéd mechanizmusa, valamint a szerző beszélőgépének leírása*, Budapest, Szépirodalmi Könyvkiadó, 1989.

[32] Manuscript (628) in BENKŐ, *op. cit.* 2003, 115.

Hungarian possesses 'effective properties and signs' and it has a high grade of unanimity in contrast to German. Hungarian hardly displays any dialectical variation (Ms. nr. 603), unlike German.

Although still not perfect, according to Bolyai, Hungarian has the best chance to become a perfect language, because this language is simpler than any other language in itself. Bolyai illustrates his claim by comparing the identical sentence with a nominal predicate in Hungarian, Latin and German. He observes that of the three languages Hungarian has the simplest construction, namely 'Péter ember' (Peter human being) "Peter is a human being". Note that the copula and the definite article are being dropped in case of a Hungarian nominal predicate. The Latin equivalent is already somewhat more complex than its Hungarian counterpart. In the identical Latin sentence the copula has to be present, 'Petrus est homo'. In the German variant, both the copula and also an indefinite article have to be spelled out. The indefinite article has to accompany the nominal predicate resulting in 'Der Peter ist ein Mensch'.[33]

Bolyai had an articulated view about Latin being the universal language for the Hungarian state language until 1844. Latin was in some sense functioning as a universal language connecting civilized nations (Ms. nr. 19/1). Bolyai wanted to disconnect the link between Latin and Hungarian only after a thorough preparation (19). According to him, the Hungarian language was too strongly influenced by Latin, but after a language renewal scientific theories could also be formulated in Hungarian.[34] The introduction of neologisms was necessary to refer to newly gained knowledge. According to Bolyai, Hungarian is very suitable for creating new words, especially because of the root words and the agglutinative character of the Hungarian language.

Although Bolyai enthusiastically supported the renewal of the Hungarian language, it cannot be said about him that he was a language purist. If the rules of the Hungarian language excluded the derivation of a certain new word, Bolyai argued that it was better to adopt the equivalent from another language and 'to perfect' the loanword in Hungarian. In this way, the universal language would also be constructed faster and more easily.

[33] Manuscript (627) in BENKŐ, *op. cit.* 2003, 159-160.

[34] Manuscripts (19), (193) and (782).

Language renewal

Because, according to Bolyai, the spirit of the Hungarian language is the most easy, natural and original – he thinks the language is maybe older than 4000 years – Bolyai wanted to construct a universal language based on it.[35] Hence, it is important to simplify and rationalize the Hungarian language first. In fact, Bolyai proposed to do this in a rather radical manner. First the Hungarian language has to be broken down before it can be built up as a perfect language. Bolyai was convinced that the process of breaking down and building up the Hungarian language could be realized quite easily. From the analysis of manuscript Ms. nr. 843 containing a list of root words, it appears that this was a much more difficult process than the mathematician from Marosvásárhely thought it would be.

Bolyai proposed simplifications in the domain of the Hungarian alphabet, the root words and the grammar. He designed a new alphabet on the basis of the principle that 'each letter represents one single sound' and that 'each sound is being expressed by one single letter'. Bolyai's own ABC is a modified version of the alphabet that was already proposed in 1830 by his father in the 'The beginnings of arithmetics'.[36] The basis of this alphabet is provided by the Latin alphabet. According to Bolyai, the Latin alphabet is most suitable to serve as the alphabet for Hungarian (Ms. nr. 781). His most important innovations are the simplification of composed characters consisting of two or three letters, the replacement of double consonants expressing the long consonants by using a single consonant with a horizontal score placed over the letter and to drop the accent of accentuated letters which express long vowels.

Bolyai calls his ABC a perfect set of Hungarian letters.[37] He did not use composed characters, like the Hungarian of his day, and also modern Hungarian. An example of a composed character is the 'sz' consisting of two letters 's' and 'z' representing one single sound, the voiceless, dental sibilant. Bolyai simplifies the alphabet by replacing such complex characters with one single letter, an 's' that is crossed by a horizontal score in the middle of the sign.[38]

The Hungarian complex character 'zs', a palatilized z-sound, is represented in Bolyai's system as a 'z' crossed by a horizontal score in the

[35] Manuscript (627) in BENKŐ, *op. cit*. 2003, 164.
[36] STÄCKEL, *op. cit*. 139, 247.
[37] Manuscript (781/4): '*Tökélyes magyar betűtár.*'
[38] Manuscripts (781) and (840).

middle of the sign. The complex character of the affricate 'dzs', that represents a palatalized dz-sound, is represented in Bolyai's system as a 'z' crossed by a double horizontal score in the middle of the sign.[39] The palatalized sounds 'tj', 'dj', 'nj' and 'lj' which appear in the present Hungarian script as the respective complex characters 'ty', 'gy', 'ny' and 'ly' are replaced in the system of Bolyai by respectively 't', 'd', 'n' and 'l' with a vertical punctuation mark placed under it.

Vowels do not have an accent placed over the letter in order to refer to the difference in length or quality, like in the Hungarian script of his age or in present-day Hungarian. Accentuated vowels are long in Hungarian. In Bolyai's system, long vowels are differentiated from short vowels by placing a horizontal score over the letter expressing the long vowel. Of course, the horizontal score over the long vowels may be dropped if the difference between long and short does not cause any confusion in the communication. This is for the sake of 'simplicity, ease and aesthetics' (Ms. nr. 840/1). The short vowels with a trema, i.e. 'ü' and 'ö' are being replaced by respectively an 'y' and an 'o' with a dot in the character itself.

János thought that he would be able to construct a perfect language with the help of the Hungarian root words analogous to mathematical signs which would consist of a very few root words only. According to him, the dictionaries of root words that were published by the Hungarian Academy of Sciences, like the one of János Nagy, are useful, but he prefers a summary of the more extensive Great Academic Dictionary of the Hungarian language. This dictionary had been compiled by the linguists Gergely Czuczor and János Fogarasi at the request of the Hungarian Academy of Sciences. Czuczor and Fogarasi started to edit their dictionary in 1844 but it would only be published between 1862 and 1874[40], long after Bolyai's death in 1860.[41] With the help of this dictionary, János wanted to cleanse the Hungarian language of redundant words, to collect the unambiguous words and to list the words which are lacking from the language. The latter ones could be derived with the help of simple principles (Ms. nr. 212/1).

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[39] STÄCKEL, *op. cit.* 247.

[40] CZUCZOR Gergely, János FOGARASI, *A magyar nyelv szótára, vol. I-VI*, Pest, 1862-1874.

[41] MARÁCZ, *op. cit.* 2004, 88-89.

The retired captain had however no time to consult the material of the Great Academic Dictionary in Budapest and remained for his research dependent on Nagy's dictionary of root words. He wanted to perfect the list of root words on the basis of this dictionary; he wanted to make a survey of the 'living' root words which could also be used to track down affinities with other languages for determining language families and to extend the list of Nagy with root words that were still lacking from the Hungarian language.

Bolyai adopted the hypotheses of Nagy that Hungarian root words consist at most of three sounds, and that Hungarian acknowledges a perfect alternation of vowels and consonants from which consonant clusters and diphthongs are lacking. [42] According to Bolyai, the pinning down of root words is not difficult at all. Common sense is quite often enough. Problems only arise if root words and their meaning are vague (Ms. nr. 781). Bolyai liked the idea that Hungarian root words are monosyllabic. According to him, the language that has the most simple root words and rules affecting roots is the oldest and also the most natural language. His claim that Hungarian is a so-called 'primigena language' that originates from itself and has root words that cannot be derived any further was shared by highly respected literators in his age, like Mihály Vörösmarty (1800-1855) and János Arany (1817-1882) who were both affiliated to the Hungarian Academy of Sciences.[43]

In order to construct the perfect language Bolyai also wanted to simplify the Hungarian grammar. Complex grammatical constructions had to be dropped and only the present tense of the verbal conjugation was allowed.[44] He also wanted to get rid of the declention schemes in Hungarian.[45]

Manuscript (843)

In the manuscript numbered 843, the root words of the first four letters of the Hungarian alphabet 'A', 'Á', 'B' and 'CZ' (in modern Hungarian C)

[42] Manuscript (627) in BENKŐ, *op. cit*. 2003, 161, 164, 168.

[43] See for this view VÖRÖSMARTY Mihály, *Gondolatok a' magyar nyelv' eredetéről*, Tudományos Gyűjtemény, 2(1828), 25-36. (hier: 28.); and KERESZTURY Dezső ed., *Arany János prózai müvek, vol. 1*, Budapest, Akadémiai, 1962, 450-452.

[44] Manuscript (99) in BENKŐ, *op. cit*. 2003, 189.

[45] Manuscript (627) in BENKŐ, *op. cit.* 2003, 197-198.

from Nagy's dictionary of root words are being listed. Bolyai refers to Nagy's list of root words as *'Tökélyes magyar gyökszók'* "Perfect Hungarian root words". János used his own alphabet and spelling system and sometimes used abbreviations that matched roots, for example 'tök' instead of the full form, the derived adjective 'tökélyes' "Perfect".

Bolyai accepted the principle that each root word has a single, unique meaning and that each meaning is only represented by a single root word or word. From his list it appears that Hungarian is still a long way away from his ideal. He extended the list with synonyms illustrating that one single meaning can be represented by several, different words.[46]

Bolyai's principles are also being violated by homonyms which he added to his list. Homonyms are (root) words that have the same sound structure but represent different meanings. János was aware of the problems and tried to get rid of homonymy to assign to each of the roots another, even non-existing form. The word 'seb' "wound" for example (Ms. nr. 207) has in principle the same root as the derived independent noun 'sebesség' "speed" (Ms. nr. 210), namely 'seb'. To 'seb' the adjectival suffix '-es' and the nominal suffix '-ség' are attached resulting in the noun 'sebesség'. The two concepts "wound" and "speeds" are however not related. From this it follows that 'seb' and 'sebesség' cannot be derived from the same root. Bolyai circumvented this unwanted case of homonymy by assigning to 'sebesség' the root word 'söb' instead of 'seb'. However, the root word 'söb' does not exist.

Bolyai was clearly using the list of Nagy as a reference list. Sometimes he left out material from the list. According to Bolyai, Hungarian as a perfect language can do without the following phenomena, (1) root words that are no longer used or cannot be recognized easily; (2) adverbs expressing uncertainty; (3) variants of the suffixes because of the vowel harmony; (4) suffixes with an unclear meaning and interjections and exclamations. He also plugs material into the list of Nagy, like (root) words that have been overlooked by Nagy. Sometimes he assigns root words a new meaning if the original meaning is not determined or no longer in use. Sometimes he also coins new root words or words.

According to János, the root of the Hungarian word 'pont' "point" (Ms. nr. 294) is 'pon-' without making it clear whether 'pont' derives from the Latin 'punctum' or the Hungarian verb 'pon-ít' "to make a

[46] STÄCKEL, *op. cit.* 1913, 194.

point". The latter had been coined by Bolyai himself.[47] Contrary to Nagy who included only pure Hungarian roots and who excluded foreign and loanwords, Bolyai did allow foreign or loanwords from other languages. In his approach, however, these words were assigned a Hungarian root. The Hungarian word 'cédula' "short note" (Ms. nr. 335) is assigned the root 'céd', although Bolyai was fully aware of the fact that this word originates from the Latin 'schedula'.

From the row of synonyms János picked out one, and continued with a new row of root words or words. This same process he sometimes applied to words that are semantically related to one of the synonyms. Sometimes he continued with a word that has a comparable sound structure to a word that is already being listed. The consequence of all these additions is that the well arranged ABC order of Nagy was, in Bolyai's attempts, turned into a chaotic enumeration.

It is clear that this cannot be the complete definite list of all root words. Bolyai realized this, since in the course of the listing he started to reorder the root words again. In contrast to Nagy's dictionary that stuck to the ABC-order, Bolyai renumbered the entries. As a result, the root words and the words that are derived from these with the help of suffixes were not marked separately.

International Auxiliary Languages

The attempt of János Bolyai to construct a perfect, universal language with the help of Hungarian fits into the category of 'a posteriori' languages. The goal of constructing these languages is to make easier the communication between different nations that have no common mother tongue, and also between scientists world-wide.[48] Constructed languages

[47] According to Bolyai, the verb 'pon-ít' consist of the root word 'pon' and the verbal suffix '-ít' that makes the verb active.

[48] In the second half of the eighteenth century the Hungarian language philosopher György Kalmár (1726-1781) already undertook an attempt to construct a universal 'a priori' language with the help of Hungarian. Consider György KALMÁR (*Praecepta grammatica atque specimina linguae philosophicae sive universalis, ad omne vitae genus adcommodatae*, Berlin/Leipzig, 1772) and also Umberto ECO (*The Search for the Perfect Language*, London, Fontana Press, 1997, 302). Although János Bolyai was occupied with cognition without sign or language system (BENKŐ Samu, *Bolyai János vallomásai*, Budapest, Mundus, 2002) it is unclear whether Bolyai was familiar with the work of Kalmár.

as Esperanto and Volapük belong to this category of languages, referred to as International Auxiliary Languages (IAL). According to Eco (1997: 318), the starting point of 'a posteriori' languages is the simplification and rationalization of the grammar which takes into account the models of natural languages, and also to create a lexicon that resembles as much as possible the lexicon of natural languages. These languages should be used in addition to one's own mother tongue.

Bolyai's attempt to construct a perfect language from Hungarian matches Eco's starting points concerning 'a posteriori' languages. His proposal is also comparable to the construction of *Latino sine flexione* of the Italian mathematician Giuseppe Peano in 1903.[49] Peano conceived a simplified Latin that could be used for international scientific summaries and was exclusively a written language. The idea was to construct a lexicon of a very well known natural language based on root words with almost no grammar. The *Latino sine flexione* has however not spread, so this language has become a historic relic. Although *Latino sine flexione* died with its inventor Peano, Bolyai's proposal to make Hungarian a perfect language has lived on, but only (unfortunately for the genius of Marosvásárhely) inside the archive of the local Teleki library.

[49] Consider the interesting paper of Daniele GOUTHIER, Nico PITRELLI and Ivan PUPOLIZO on this subject: *Mathematicians and the perfect language: Guiseppe Peano's case*, Ms., University of Trieste, 2002.