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Publication date
2014

Document Version
Final published version

Published in
The making of the humanities. - Vol. 3: The modern humanities

Link to publication

Citation for published version (APA):
Marácz, L. (2014). Root and Recursive Patterns in the Czuczor-Fogarasi Dictionary of the Hungarian language. In R. Bod, J. Maat, & T. Weststeijn (Eds.), *The making of the humanities. - Vol. 3: The modern humanities* (pp. 113-126). Amsterdam University Press. http://www.oapen.org/search?identifier=500288

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Download date:09 Nov 2026

The Making of the Humanities

Volume III:
The Modern Humanities

Edited by
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Jaap Maat and
Thijs Weststeijn

Amsterdam University Press

This book is made possible by a grant from the Netherlands Organization for Scientific Research.

This book is published in print and online through the online OAPEN library (www.oapen.org).

Front cover: Nikolaus Gysis, *München 1892 ... VI. internationale Kunstausstellung, 1892*, 1892, Chromo-lithographed poster, 121 x 68 cm, printed by Chromotypie v. Meisenbach, Riffarth & Cie (Munich), Bibliothèque nationale de France, Paris, Département Estampes et photographie (inv.nr. EST ENT DO-1). The original oil painting is in a private collection in Athens.

Cover design: Studio Jan de Boer
Lay-out: V3-Services

Amsterdam University Press English-language titles are distributed in the US and Canada by the University of Chicago Press.

ISBN 978 90 8964 516 6
e-ISBN 978 90 4851 844 9
NUR 686

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Rens Bod, Jaap Maat, Thijs Weststeijn / Amsterdam University Press B.V., Amsterdam, 2014

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2.3 Root and Recursive Patterns in the Czuczor-Fogarasi Dictionary of the Hungarian Language[1]

László Marácz

The first academic Hungarian dictionary *A magyar nyelv szótára* (*The Dictionary of the Hungarian Language*) was a monumental work compiled by two members of the Hungarian Academy of Sciences: Gergely Czuczor (1800-1866) and János Fogarasi (1801-1878) that was published in six volumes between 1862 and 1874 [Figs. 2 and 3]. Rather than just being a list of Hungarian words, Czuczor-Fogarasi's monolingual dictionary (hereafter, the CzF Dictionary) must be considered a linguistic achievement. It contains 110,784 entries and is structured according to the agglutinative nature of the Hungarian language since it distinguishes roots and suffixes while also referring to interconnections within the root system. Its importance was recognized by one of the leading German linguists of the second half of the nineteenth century, August Friedrich Pott (1802-1887), who referred in his survey of European linguistics to the CzF Dictionary as an outstanding accomplishment on the part of the Hungarian Academy of Sciences.[2]

Czuczor and Fogarasi formulated the following four objectives when writing their dictionary: (1) to make an inventory of Hungarian words and word parts; (2) to determine their grammatical properties; (3) to define their meaning; and (4) to establish the etymology of Hungarian words by comparing the Hungarian roots with those of other languages. The CzF Dictionary is thus an explanatory, comparative and etymological dictionary all in one. From this point of view it is remarkable that the work has fallen into oblivion.[3] By uncovering the patterns of the Hungarian lexicon, the CzF Dictionary provided an interesting step forward in empirical and theoretical approaches to the Hungarian language. In this respect the CzF Dictionary is also relevant to Rens Bod's project detailing the history of the humanities in according with various patterns and rules.[4] The present paper will argue that a discussion of the patterns and rules seen in the CzF Dictionary can contribute to the richness of such a historiographical project and that there is therefore every reason to include such a dictionary in a history of the humanities based on pattern-seeking research.

Fig. 2: Gergely Czuczor (1800-1866)

Fig. 3: János Fogarasi (1801-1878)

The present paper falls into four parts. In the first part, I will discuss the ideas that were responsible for creating a context for the emergence of the academic dictionary project. I shall demonstrate how it was attributable to a mixture of ideas originating from the Enlightenment, state-forming nationalism and Romanticism. The second part of the paper will focus on the incentives behind the lexical project's linguistic research. I will furthermore elaborate on the linguistic traditions the authors relied on when seeking patterns and will argue that both foreign and local traditions played a decisive role. The third part of this paper will give the reader some insight into the nature of the patterns and rules underlying the Hungarian language. Finally, I will assess the discoveries made by Czuczor and Fogarasi. It will be concluded that even if the work on the dictionary is basically empirical it remains a good starting point for pattern-based research into Hungarian lexical structures.

Contextualizing the first Hungarian academic dictionary

At the end of the eighteenth century the ideals of the Enlightenment also reached Hungary. At first the Hungarian proponents of the Enlightenment were more active in Vienna than in Hungary itself, especially in circles linked to the Hungarian division of the Imperial Guard that was established in 1760 by the Habsburg Empress Maria Theresa. The driving force within the Viennese nobility was György Bessenyei (1747-1811), a literator and admirer of Voltaire and the French encyclopedists.[5]

Bessenyei was convinced, just like his French counterparts, that happiness could only be achieved through the sciences, general access to which was only possible through one's own mother tongue. According to him, no nation had ever gained access to science in the language of another nation. However, toward the end of the eighteenth century the Hungarian language had gained vernacular status, Latin being the only official language in the country until 1844 and so Hungarian was not a suitable language for the practicing of science. In his essays, Bessenyei forcefully argued in favor of the renewal and social promotion of the Hungarian language. In 1781 he also launched the idea of establishing a Hungarian academy of sciences.[6] The ideas of Bessenyei were adopted by a young member of the high aristocracy who also belonged to the Viennese Imperial Guard, Count István Széchenyi (1791-1860).

The free-thinking Széchenyi and other enlightened Hungarian noblemen strove to modernize Hungary and give it a well-deserved place in the Habsburg Empire. Széchenyi's modernization program focused not only on questions relating to politics and society, but also on putting cultural issues on the agenda. In this cultural program, the Hungarian language occupied a central role.[7] Széchenyi wanted to secure the same status for the Hungarian language as that enjoyed by other national European languages. Hungarian should become the country's official language and in order to prepare for this official function a Hungarian academy of sciences had to be established, just as Bessenyei had asserted.

In 1825, Széchenyi enthusiastically put forward his ideas at the Hungarian Diet.[8] Thanks to his efforts, and financial support, the Hungarian Academy of Sciences was established on November 17, 1830. The Academy immediately launched a number of projects relating to the Hungarian language, including the compilation of a grammar, an orthography, bilingual dictionaries and specialist dictionaries establishing scientific and scholarly terminology. In 1844 the Academy board decided to make a 'great' dictionary covering the entire lexicon of the Hungarian language. Two members of the Academy, Gergely Czuczor (1800-1866) and János Fogarasi (1801-1878), were entrusted with this task. Gergely Czuczor was a monk of the Benedictine Order and János Fogarasi worked as a judge in the High Court of Appeal.

Apart from the ideas originating from the Enlightenment and nationalism, the language renewal movement in Hungary was also influenced by Romantic views. Hungarians strongly believed that they were related to ancient Central Asian peoples, like the Huns and Avars who, like the Hungarians themselves, had entered Europe in the ninth century. Széchenyi and his followers were of the opinion that the most important duty of the Hungarians was to gain an identity as a people in Europe that stemmed from Asia: 'The Hungarian people, being the only European heterogenic offspring, have no smaller role than to represent the

unique talents which were hidden in the cradle in Asia, but never grew to fruition'.[9] This led researchers to believe that the Hungarian language was an Asiatic language which thus had an impact on the research conducted into the roots of the Hungarian language.

At the time, the West paid little attention to Hungarian political and economic reforms and knew little about the research being undertaken by Széchenyi and his group. There was one exception, however. Besides being a businessman, traveler, liberal politician, government official and governor of Hong Kong between 1851 and 1859, the British citizen Sir John Bowring (1792-1872) was also a polyglot literator, who supported the emerging national movements in Europe by publishing anthologies of their literature.[10] Early-nineteenth-century Hungary must have held some special attraction for the British traveler. Indeed, Hungary followed Great Britain in the liberal trend of political and economic reforms that Bowring enthusiastically supported. In addition, Bowring was a member of the Unitarian Church which was one of the Hungarian Protestant churches that played an important role in Hungary's and Transylvania's religious life.

In 1830, Bowring published a collection of Hungarian poems in English, *Poetry of the Magyars*, in the foreword of which one reads some notable statements concerning the Hungarian language.[11] There Bowring commented on the Hungarian language. In his opinion, the Hungarian language was independent and very old.[12] Having hardly changed over time, it had retained its Asiatic structure.[13] Finally, Bowring claimed that the ancient forms of the Hungarian language, that is to say its root words, were composed of simple, monosyllabic lexical elements. These elements enabled the speakers of Hungarian to create an endless number of new lexical elements with the help of affixes.[14]

Bowring's remarks about the Hungarian language are especially worthy of consideration in view of the fact that they elaborate on linguistic theories developed in Hungary itself. In the *Poetry of the Magyars*, Bowring echoes the opinions that Széchenyi and his group held in the 1820s. Bowring's knowledge of the Hungarian language and literature came mostly from Gábor Döbrentei (1786-1851), the First Secretary of the Hungarian Academy of Sciences with whom he maintained close contact. Döbrentei belonged to Széchenyi's inner circle and was his most influential advisor in the fields of Hungarian language and literature.[15]

The dictionary project of the Hungarian Academy of Sciences was interrupted by the Hungarian Revolution of 1848. Czuzcor was even incarcerated in Kufstein Prison from 1849 until 1851 for his anti-imperial activism. After the crushing of the Hungarian rebellion by the Austrian and Russian armies the Hungarians had to remain under Habsburg rule. Martial law was proclaimed and Hungary started being governed from Vienna. Under this rule, strong Germanizing politics prevailed throughout the country. Moreover, in 1858, a plan was proposed to

make German the official language of the Hungarian Academy of Sciences. The Academy's directorate was replaced by scholars who were loyal to the Austrians, like Pál Hunfalvy (1810-1891), a lawyer who, in 1851, became the chief librarian at the Hungarian Academy of Sciences. His main task was, however, to reorganize the research being conducted into the Hungarian language.

Immediately after his Academy nomination in 1851, Hunfalvy started to attack the dictionary project of Czuzcor and Fogarasi. At an Academy meeting in 1851 he argued that from a methodological point of view the dictionary was inadequate and obsolete: 'The sheer cliffs into which language research runs are mainly the meaning of letters and word roots'.[16] Although Czuczor and Fogarasi were allowed to finish their project, which finally went on to be published between 1862 and 1874, the CzF Dictionary did not play any role in the domain of etymological and historical comparative research into the Hungarian language.[17]

Hunfalvy pushed hard to elaborate on a one-sided genetic relationship between Finnish and Hungarian and cast Czuzcor-Fogarasi's root theory to one side. He entrusted the technical completion of this program to a young German linguist, Josef Budenz (1836-1892) who at the age of twenty-two was invited to go to Budapest to fulfill that task. Budenz was well equipped to do the job. He had read classical languages at the University of Göttingen and had also done comparative Indo-Germanic linguistics and Oriental studies. In 1868, when Budenz was made Honorary Professor of Finno-Ugric Linguistics at the University of Budapest, Hungarian genealogical language research suddenly took a completely different turn moving in a direction completely different to what the authors of the Academy Dictionary had had in mind.[18] Although today's Hungarian linguistics specialists are more positive about the achievements of the CzF Dictionary and regard it as a standard work in the history of the lexicography of the Hungarian language, internal analysis linked to finding the origin of words is still viewed as something 'anachronistic'.[19] In this paper, I will argue against this point of view.

Searching for roots

The direct input regarding the linguistic work on the root dictionary originated from two important traditions. First of all, there were the developments in European linguistics of the end of the eighteenth century. The first to publicize, although certainly not the first to formulate the notion of Sanskrit being the oldest language on earth, the 'mother' of all major Eurasian languages, was the British philologist and scholar on ancient India, Sir William Jones.[20] Hence, Sanskrit was considered to be the ancient Indo-European language from which all other Indo-European languages derived. Jones' program was taken up in Germany and

soon intensive research activities in this field began. Throughout the nineteenth century outstanding linguists, such as Franz Bopp (1791-1867), Jacob Grimm (1785-1863), Max Müller (1823-1900), and August Friedrich Pott elaborated on this research program.[21] At first German linguists hypothesized that the ancient roots of the German language could be found in Sanskrit with the help of linguistic 'reconstruction'. However, from 1870 onwards the importance of Sanskrit in reconstructing Indo-European gradually declined.[22]

Regardless of the precise results what this research was generally to do was to bring to the surface the different cognate roots connecting the Indo-European languages.[23] Max Müller, a German philologist and Oriental scholar who lectured at Oxford University, estimated the number of Sanskrit roots to lie at 1700 and considered them to be the most important linguistic components:[24] 'These roots are definite in form and meaning: they are what I called *phonetic types*, firm in their outline, though still liable to important modifications'.[25] 'They are the "specific centres" of language, and without them the science of language would be impossible'.[26] Note that Indo-European research was also driven by notions of Romanticism that were framed in biological metaphors, such as 'language as an organism', 'mother-daughter languages', 'family of languages' and other biological metaphors, like 'roots', 'trunks', 'trees', 'organic groups', etc.[27]

The German research into roots that commenced at the end of the eighteenth and intensified in the early nineteenth century was soon to catch on in Hungary. The first dictionary that was organized along the lines of the 'root' idea was published by the Catholic priest Ferenc Kresznerics (1766-1832) in two-volumes in 1831 and 1832.[28] He was influenced by the theories of Johann Gottfried Herder (1744-1803) on 'roots' (*Stammwörter*) expounded in his 'Abhandlung über den Ursprung der Sprache' (1772), as Kresznerics alludes to this influential work terming it a point of reference in the preface to his dictionary.[29] Kresznerics already started to work on the dictionary in 1808 and his point of departure was that Hungarian is an agglutinative language in which roots can be distinguished from suffixes and other affixes. Hence, under each root entry the total set of 'derivatives', i.e., the roots with all their possible affixes and suffixes are listed. Czuzcor and Fogarasi saw Kresznerics's dictionary as a forerunner, although they went on to considerably elaborate on the subject as will be discussed below.[30] Much of the nomenclature referred to above in connection with Indo-European research also appears in the context of Czuzcor and Fogarasi's dictionary project.

Apart from the European linguistic impulses that reached Hungary at the beginning of the nineteenth century, especially from Germany, which had taken the lead in linguistics, there was a second more local tradition that was influencing the evolution of Hungarian linguistics in that period. This input was also European-based.

From the mid-seventeenth century onwards, Hungarian university students had been visiting Western European universities in the course of their academic formation. At that period there were few opportunities for university education in Hungary. The Habsburgs were not eager to actively support the establishment of academic opportunities in the Hungarian kingdom. Hungarian Protestants, who formed an obstacle to the Catholic Counter-Reformation which was supported by the Habsburgs, were excluded from university education in particular. Students with a Protestant background were therefore more or less forced to go abroad for their academic studies. They traveled to Western Europe, where they were welcomed at universities in Protestant countries like the Netherlands, Switzerland and Britain. In the early modern period these universities became centers of peregrination for students from the Hungarian kingdom.

It appears from the publications of the peregrinating Hungarian students that they were familiar with the concept of the 'radix' (root) that was central to the analysis of classical languages like Greek, Latin and Hebrew. Most of these students had studied these languages because they had registered for theological studies. The radix is relevant to the work of the typographer Miklós Tótfalusi Kis (1650-1702), the translator of the 'Amsterdam Bible', a Hungarian-language edition that was published in Amsterdam in 1685. The Hungarian author Gyula Csernátoni points out that Tótfalusi Kis relied heavily on the 'root' for his Hungarian translation of the Bible: 'When he explains the description of individual words he analyzes them grammatically; he tracks down their roots; and he examines the nature of the suffixes and affixes and gives general rules'.[31] The radix is also frequently referred to in the dissertation on ancient Hungarian history of Fóris Ferenc Otrokócsi (1648-1718) that was defended at the University of Franeker in 1693.[32]

György Kalmár (1726-1782), a Hungarian theologian, linguist and poet who, in the second half of the eighteenth century, played an important part in developing Hungarian linguistics based on the radix (root) theory, also followed in this tradition. As a peregrination student, Kalmár visited a number of important centers of academic excellence in Western Europe, such as Universities of Oxford and Leiden. After his peregrination, he continued traveling in Western Europe and built up an extensive network of connections among scholars, including the outstanding German-Swiss scientist Johann Heinrich Lambert (1728-1777) and the Dutch Orientalist and professor at the University of Leiden, Hendrik Albert Schultens (1749-1782). From his linguistic projects, it appears that he was well aware of the importance of the radix or the root when studying language. Note that the 'Semitic' root does not have the same characteristics as the 'Indo-European' root. It remains to be seen how scholars such as Kalmár interpreted these divergent notions. Kalmár's linguistics projects included a proposal for a universal language, a

hexameter poem and a grammar in Hebrew.[33] A plan for an etymological Hungarian dictionary was also one of his project plans but Kalmár's etymological dictionary was lost. However, we know that it really existed because he refers to it as 'Lexicon Hungaricum' and to its having the explicit character of a root dictionary.[34]

The concept of linguistic roots was clearly an integral part of Hungarian scientific discourse in the early nineteenth century before the issue received further impetus from Germany. The success of the Kresznerics's first attempt to compile a root dictionary was taken up by the newly established Hungarian Academy of Sciences which then passed the project on to Czuzcor and Fogarasi and so the CzF Dictionary was born.

Patterns in the CzF Dictionary

Czuczor and Fogarasi assumed that Hungarian is an agglutinative language in which words display a synthetic structure consisting of a *gyök* 'root', the basic constituent of the Hungarian lexicon and suffixes attached to it. In order to find the root, a procedure of morphological segmentation comparable to Bopp's *Zergliederung* had to be first applied.[35] Roots are those lexical items which, after having been peeled off all the affixes and suffixes from the word structure, cannot be reduced into further segments without losing their well-identified phonetic structure and meaning.[36] According to Czuzcor and Fogarasi, the Hungarian roots are minimal, monosyllabic lexical elements. Subsets of these roots can also appear as independent words, or 'root words'. The dictionary presents an exhaustive list of the Hungarian roots numbering some 2000 lexical items that display the following basic patterns, including V (19), VC (335), CV (146), and CVC (1500). Observe that the tryadic roots form the dominant pattern in Hungarian with 1500, that is 75% of the total number of roots.

A number of suffixes can be attached to the basic set of roots to form many new words, to form what are termed derivatives. According to Czuzcor and Fogarasi, the Hungarian language distinguishes around 170 suffixes. Seventy of these are simple and monosyllabic, the rest are a combination of the simple ones yielding complex suffixes. Regularly, the Hungarian root does not change its form when being suffixed. Normally, after isolating the root by taking off the agglutinated material (predominantly suffixes), the root will show a well-identified phonetic structure and meaning in its own right. Compare, for example, some of the derived forms of the root word KÖR 'circle':

> (1) KÖR: *KÖR* 'circle', *KÖR-ös* 'circular', *KÖR-öz* 'turn around in circles', *KÖR-ny-ék* 'environment, neighborhood', *KÖR-ny-ez* 'surround'

As can be noted from (1) the root *KÖR* figures in derived words: 'körös', 'köröz', 'környék' and 'környez'. Note that the adjectival suffix *-ös*, the nominal suffix *-nyék*, and the verbal suffixes *-öz* and *-ez* can be attached to the root *KÖR* or to one of its respective derivatives. The derivatives of the root modify, accentuate, highlight or focus on an aspect of the basic meaning. In most of the cases, however, these meanings, discussed in the CzF Dictionary only in Hungarian, cannot easily and satisfactorily be translated into English due to the subtle connotations that Hungarian suffixes add to the core meaning.

Czuczor and Fogarasi further observe that by vocalizing the K-R consonant frame with other vowels, like A, E, O, U, and Ü new K-R root alternatives can be generated. With the help of suffixing these structures yield their own set of derivatives.[37] Compare:

> (2) KAR: *KAR* 'arm', *KAR-aj* '(pork)chop' , *KAR-éj* 'slice', *KAR-ika* 'ring' , *KAR-ima* 'brim', *KAR-ing* 'make small movements in circles'
> KER: *KER-ek* 'rounded', *KER-ék* 'wheel', *KER-ül* 'to go around', *KER-ít* 'to ring around', *KER-ing* 'keep circling around', *KER-ge* 'bark (tree)'
> KOR: *KOR-ong* 'disk', *KOR-ona* 'crown', *KOR-lát* 'fence', *KOR-mány* 'wheel'
> KUR: *KUR-kál* 'search around'
> KÜR: *KÜR-t* 'horn'

Czuczor and Fogarasi refer to the 'horizontal' groupings as *szócsalád* 'word family' and collectively to the set of all the cognates with their derived forms as *szónemzet*, i.e., 'word nation'. Note that in this 'organic' word group a fixed K-R sound pattern corresponds to a conceptual structure, a semantic field covering 'a line that is curved into itself or a motion that follows such a line'.

The authors of the CzF Dictionary discovered not only interconnected, vocalized root patterns but also connections between roots. These connections result in new clusters of roots used to express a common idea.[38] Compare:

> (3) GÖR: *GÖR-be* 'curvilinear', *GÖR-cs* 'round, hard knot on tree', *GÖR-dül* 'roll (intransitive)', *GÖR-dít* 'roll (a heavy object)', *GÖR-nyed* 'bend (as in old age)', *GÖR-hes* 'person who is bent, rugged'
> (4) GUR: *GUR-ba* 'used together with *GÖR-be* as the twin word *görbe-gurba* meaning 'curvilinear', *GUR-ul* 'roll (intransitive)', *GUR-ít* 'roll (a round object smoothly)', *GUR-iga* 'round, wooden toy for children to play with, they roll it'
> (5) GOR: *GOR-nyad* 'droop'

(6) GYÜR: *GYÜR-ű* 'ring', *GYÜR-ke* 'crust (of bread)', *GYÜR-emlik* 'crumbled cloths, wrinkles' ('Gy' is the orthographic sign of a palatalized 'd' sound, i.e., 'dj' in Hungarian.)
(7) HOR: *HOR-og* 'hook', *HOR-ony* 'hollow dent', *HOR-gas* 'hooked', *HOR-gadt* 'curved', *HOR-paszt* 'dent'

Note that 'K' in the K-R frame is related to the 'G' in the G-R frame which is then again vocalized with 'Ö', 'U' and 'O' to yield various alternatives in (3) to (5); the 'G' in its turn is related to the 'DJ' in the DJ-R frame and to the 'H' in the H-R frame. The plosives 'K', 'G' and 'DJ' are related sounds that can be transformed into a fricative 'H'. Note that such phonetic changes mimic the sound laws of Grimm thereby bearing out the diachronic divergences in Indo-European languages. Czuzcor and Fogarasi did refer to the Grimm brothers' achievements in lexicography but failed to mention their linguistic work.[39]

To conclude, Czuczor and Fogarasi observed the following patterns and rules:

(8)
1. A set of monosyllabic roots and suffixes in Hungarian
2. A rule of vocalization connecting roots
3. Agglutination connecting roots and suffixes
4. Application of (2) and (3) yield recursive patterns
5. Roots can also be connected by 'sound law-types' of rules
6. A close connection between a specific basic sound pattern and a core meaning

Discussion and outlook

Let us compare the Kresznerics Dictionary with the CzF Dictionary in order to determine the progress made. The Kresznerics Dictionary is a more empirical and less theoretically inspired dictionary in which only organic groupings are listed. Due to the interconnections Czuzcor-Fogarasi's dictionary has more the structure of a reference dictionary. Under each root entry the interconnections within the dictionary are given as well. This yields a much more coherent structure of sound patterning and core meanings. Kresznerics only operated with 8(1) and 8(3). The interconnections within the root system, either by means of vocalization 8(2) or through the 'sound law-type rules' 8(5) are lacking in his dictionary. As a result, he also missed the important correlation 8(6), the relationship between a specific sound structure and a core meaning. Czuzcor and Fogarasi went well beyond the simple concepts of basic primitives and the rule of aggluti-

nation. Progress was made because Czuzcor and Fogarasi were searching for new patterns and rules. Note that this fits in well with Bod's approach to writing a history of the humanities in terms of patterns. The CzF dictionary provides clear support for such an approach on the basis of pattern-seeking.[40]

Although in theoretical writings, Czuzcor and Fogarasi operated with levels of abstraction, by giving, for instance, the consonant frames with open positions for vowels, the K-R frame discussed above being a representative example, they displayed a predominantly empiricist attitude.[41] Nevertheless the patterns and rules detected by Czuzcor and Fogarasi are impressive and open up the possibility for further formalizations, although it must be admitted that some of the rules listed in (8) are not always well understood and require much more research.

Marácz and Montvai is a first attempt to formalize rules like 8(5).[42] Such rules have to comply with morphophonological and semantic conditions and obey the formation rules restricted on such grounds. Basic roots may be linked if and only if (i) they have a related meaning and (ii) only one of the two basic consonants is replaced, such as 'G' supplanting 'K' in *KÖR* (1) and *GUR* (4). In this way, it can be guaranteed that the mappings are recoverable. Marácz and Montvai proposed the following context-sensitive rule linking 'minimal pairs' of roots:[43]

> (9) Linking of roots: C(x)_C(y) > C(x)_C(z) or C(z)_C(y),
> in which all roots have a related meaning.

Formalizations like (9) and the embeddings in the theoretical frameworks of the CzF Dictionary patterns are crucial to making further progress. In recent years, dictionaries have been studied in terms of network theory. There is currently a true explosion of research in this field. What characterizes this research is its interdisciplinary nature and the fact that the study of language networks targets all the different modules of language, including also phonology, morphology and semantic-cognitive structures.[44]

The Czuzcor-Fogarasi Dictionary should be studied in conjunction with these theories of language networks and the basic topic of research in Hungarian and other agglutinative languages should not only operate at word-level but also at root-level. Indeed taking the root as a 'hub' will make it possible to carry out significant lexical-statistical research. Different questions can then be posed relating to, for instance, the functional and distributional load of the individual roots in the Hungarian lexicon and the lexical-statistical distribution and load of individual roots, such as K-R, across languages. Such typological patterns might also have some interesting repercussions for genealogical language research. Czuzcor and Fogarasi started to compare Hungarian roots with the roots of other language families or groups. They were convinced that individual roots cross the

boundaries of established language families. Czuzcor and Fogarasi were in fact forerunners of the 'one proto-language' approach that figures on the 'nostratic' research agenda. With modern digital resources these and related linguistic puzzles can be elaborated much more easily and effectively than in the time of Czuzcor and Fogarasi.

Notes

1 I am indebted to an anonymous reviewer for critical comments on this paper and valuable suggestions for improvements.
2 See August Friedrich Pott, *Zur Litteratur der Sprachenkunde Europas* (Leipzig, 1887), 23.
3 In Anna Morpurgo-Davies' recent, authoritative study of the history of linguistics in the nineteenth century there is no reference to this dictionary. See Anna Morpurgo-Davies, *Nineteenth-Century Linguistics*, vol. 4 of Giulio Lepschy (ed.), *History of Linguistics* (London, 1998).
4 Consider Rens Bod, *De vergeten wetenschappen: een geschiedenis van de humaniora* (Amsterdam, 2011).
5 Tomasz Kamusella, *The Politics of Language and Nationalism in Modern Central Europe* (London, 2012), 438.
6 For a more detailed discussion, see László Marácz, 'János Bolyai and Hungarian as the Perfect Language', *Octogon Mathematical Magazine* 16.1A (April 2008), 41-56.
7 Kamusella, *The Politics of Language and Nationalism in Modern Central Europe*, 441.
8 *Ibid*., 441-442.
9 István Széchenyi, *A' Kelet Népe* (Pozsony, 1841), 16.
10 See Alpita de Jong, *Knooppunt Halbertsma: Joast Hiddes Halbertsma (1789-1869) en andere Europese geleerden over het Fries en andere talen, over wetenschap en over de samenleving* (Hilversum, 2009), 25, for an overview of his activities in Europe.
11 Sir John Bowring, *Poetry of the Magyars, Preceded by a Sketch of the Language and Literature of Hungary and Transylvania* (London, 1830).
12 *Ibid*.,vii.
13 *Ibid*.,viii.
14 *Ibid*., iv.
15 See László Marácz, 'The Origin of the Hungarian Language', in László Botos (ed.), *Selected Studies in Hungarian History* (Budapest, 2008), 564-565.
16 Pál Hunfalvy, 'Kis gyülés', *Magyar Akademiai Értesítő* (1851), 110.
17 László Marácz, *Origin of the Hungarian Language*, 566-568.
18 Gyula Décsy, *Einführung in die Finnisch-Ugrische Sprachwissenschaft* (Wiesbaden, 1965), 1.
19 See Ferenc, Bakos, 'Die Lexikographie der uralischen Sprachen I: Ungarisch', in Franz Josef Hausmann, Oskar Reichmann, Herbert Ernst Wiegand and Ladislav Zgusta (eds.), *Wörterbücher/Dictionaries/Dictionnaires: Ein internationales Handbuch zur Lexicographie/An International Encyclopedia of Lexicography/Encyclopédie international de lexicographie* (Berlin, 1991), vol. 3, 2377.
20 See Peter Rietbergen, *Europe: A Cultural History* (New York, 2006), 407-408.
21 There are a number of studies that present an excellent introduction to the development of historical comparative linguistics and the role of German linguists in this research pro-

gram, including Morpurgo-Davies, *Nineteenth-Century Linguistics* (an authoritative overview of the topic), Olga Amsterdamska, *Schools of Thought: The Development of Linguistics from Bopp to Saussure* (Dordrecht, 1987), Reinhard Sternemann, 'Franz Bopp und die vergleichende indoeuropäische Sprachwissenschaft: Beobachtungen zum Boppschen Sprachvergleich aus Anlass irriger Interpretationen in der linguistischen Literatur', *Innsbrucker Beiträge zur Sprachwissenschaft* 33 (1984), and a more recent paper by Bart Karstens, 'Bopp the Builder: Discipline Formation as Hybridization: The Case of Comparative Linguistics', in Rens Bod, Jaap Maat, and Thijs Weststeijn (eds.), *The Making of the Humanities, Vol. II: From Early Modern to Modern Disciplines* (Amsterdam, 2012), 103-127.

22 See Manfred Mayrhofer, *Sanskrit und die Sprache Alteuropas: Zwei Jahrhunderte des Widerspiels von Entdeckungen und Irrtümern* (Göttingen, 1982), for further discussion.

23 Bart Karstens, *Bopp the Builder*, 108.

24 See Max Müller, *Lectures on the Science of Language* (New York, 1865), 92.

25 It remains to be seen whether the concept of 'root' in Müller's sense is comparable to the concept of 'radix' that predates nineteenth-century linguistics. See below for the importance of the radix in Hungarian cultural history.

26 *Ibid.*, 331.

27 See the papers on biological metaphors in nineteenth-century linguistics in Henry H. Hoenigswald and Linda F. Wiener (eds.), *Biological Metaphor and Cladistic Classification* (Philadelphia, 1987).

28 Ferencz Kresznerics, *A magyar szótár gyökérrenddel és deákozattal* (Buda, 1831-1832), was actually a bilingual dictionary. All the Latin equivalents of the Hungarian roots and derivatives are listed.

29 *Ibid.*, xliv, xlv.

30 See Czuczor-Fogarasi, *Vol. VI, végszó*, 7.

31 Gyula Csernátoni, *'Erdély fényksze'* (Kolozsvár, 1894), 28.

32 Fóris Ferenc Otrokócsi, *Origines Hungaricae* (Franequera, 1693).

33 Georgius Kalmár, *Genuina linguae Hebraica grammatical, sive vetus illa sine masoretharum punctis Hebraisandi via* (Geneva, 1760).

34 József Kelemen, 'Kalmár György szótártervének és szótártöredékének nyomairól', *Nyelvtudományi Közlemények* LX. Kötet 2 (1958), 439-446.

35 On Bopp's *Zergliederung*, see Morpurgo-Davies, *Nineteenth-Century Linguistics*, 131, 267.

36 Czuzcor-Fogarasi, *Vol. 2*, 1215.

37 Gergely Czuczor, 'A magyar nagyszótár ügyében', *Akadémiai Értesítő* I, no. 4 (1861), 403-445.

38 This process of accretion where roots differ from each other through one or two additional sounds was also observed by Max Müller for Sanskrit (*Science of Language*, 330).

39 See Czuczor-Fogarasi, *Vol. VI, végszó*, 6.

40 On this issue, see also the progress linked to the pattern-seeking approach of Bart Karstens: 'Recursion, Rhythm and Rhizome: Searching for Patterns in the History of Humanties', *Beiträge zur Geschichte der Sprachwissenschaft* 21 (2011), 156-157.

41 Gergely Czuczor, *Akadémiai Értesítő*, 403-445.

42 See László Marácz and Attila Montvai, 'Quantitative Exploration of the Conceptual and Semantic Structures of Contemporary Hungarian', in László Komlósi, Peter Houtlosser, and Michiel Leezenberg (eds.), *Communication and Culture: Argumentative, Cognitive and Linguistic Perspectives* (Amsterdam, 2003), 143-154.

43 See *Ibid.*, 146-150, for a detailed discussion of such chains and networks of roots due to transformations.

44 Here are a few relevant references to give the reader an impression of this: Peter Csermely, *Weak Links: Stabilizers of Complex Systems from Proteins to Social Networks* (Berlin, 2006), 219; Erzsébet Ravasz and Albert-László Barabási, 'Hierarchical Organization in Complex Networks', *Physical Review* E 67, 026112 (2003), 1-7; Christopher T. Kello and Brandon C. Beltz, 'Scale-Free Networks in Phonological and Orthographic Wordform Lexicons', in François Pellegrino, Egidio Marsico, Ioana Chitoran, and Christophe Coupé (eds.), *Approaches to Phonological Complexity* (Berlin, 2009), 171-190; HaiTao Liu and WenWen Li, 'Language Clusters based on Linguistic Complex Networks', *Chinese Science Bulletin* 55.30 (October 2010), 3458-3465; Ricard V. Solé, Bernat Corominas-Mutra, Sergi Valverde, and Luc Steels, 'Language Networks: Their Structure, Function and Evolution', *Complexity* 15.6 (2010), 20-26.