Electronic lexicography in the 21st century: linking lexical data in the digital age

Proceedings of the eLex 2015 conference

Edited by

Iztok Kosem, Miloš Jakubíček, Jelena Kallas, Simon Krek

https://elex.link/elex2015/

11-13 August 2015

Herstmonceux Castle, United Kingdom

Electronic lexicography in the 21st century:
linking lexical data in the digital age

Proceedings of the eLex 2015 conference, 11-13 August 2015,
Herstmonceux Castle, United Kingdom

Edited by Iztok Kosem, Miloš Jakubíček, Jelena Kallas, Simon Krek

Published by Trojina, Institute for Applied Slovene Studies (Ljubljana, Slovenia)
Lexical Computing Ltd. (Brighton, United Kingdom)

Ljubljana/Brighton, August 2015

CIP – cataloguing-in-publication
National and university library, Ljubljana, Slovenia

81’374:004.9(082)(0.034.2)

ELEX Conference (2015 ; Herstmonceux)
Electronic lexicography in the 21st century [Elektronski vir] : linking lexical data in the digital age : proceedings of eLex 2015 Conference, 11-13 August 2015, Herstmonceux Castle, United Kingdom / editors Iztok Kosem ... [et al.]. – El. knjiga. – Ljubljana: Trojina, Institute for Applied Slovene Studies; Brighton: Lexical Computing, 2015

Način dostopa (URL): https://elex.link/elex2015/proceedings/

ISBN 978-961-93594-3-3 (Trojina, pdf)
1. Gl. stv. nasl. 2. Kosem, Iztok
280722944

CONFERENCE COMMITTEES

Organising Committee

Iztok Kosem, chair
Miloš Jakubíček
Jelena Kallas
Simon Krek
Terka Olšanova

Scientific Committee

Andrea Abel
Špela Arhar Holdt
Nicoletta Calzolari
Frantisek Čermak
Patrick Drouin
Darja Fišer
Thierry Fontenelle
Polona Gantar
Alexander Geyken
Patrick Hanks
Ulrich Heid
Kris Heylen
Ilan Kernerman
Adam Kilgarriff
Annette Klosa
Svetla Koeva
Iztok Kosem
Simon Krek
Margit Langemets
Lothar Lemnitzer
Robert Lew
Nikola Ljubešić
Henrik Lorentzen
Amalia Mendes
Rosamund Moon
Christine Möhrs
Carolin Müller-Spitzer
Hilary Nesi
Vincent Ooi
Magali Paquot
Balint Sass
Kristina Štrkalj Despot
Arvi Tavast
Carole Tiberius
Yukio Tono
Lars Trap Jensen
Agnes Tutin
Tamas Varadi
Serge Verlinde
Piotr Zmigrodzki

TABLE OF CONTENTS

Multiple Access Paths for Digital Collections of Lexicographic Paper Slips

Toma Tasovac[1], **Snežana Petrović**[2]

[1] Belgrade Center for Digital Humanities

[2] Institute of Serbian Language of the Serbian Academy of Arts and Sciences

E-mail: ttasovac@humanistika.org, snezzanaa@gmail.com

Abstract

The paper describes the process of digitizing and annotating some 23,000 lexicographic paper slips compiled by the amateur lexicographer Dimitrije Čemerikić (1882-1960) to document the Serbian dialect from the historic city of Prizren. This previously unpublished dictionary of the Prizren dialect is an important resource not only for dialectologists and linguists, but also for ethnolinguists and ethnologists who are interested in various aspects of popular culture and urban life in the city of Prizren. The alphabetic arrangement of the macrostructure, however, is not conducive to exploratory searches: if users want to find out which dialect word corresponds to a standard Serbian word, or explore a certain type of vocabulary, they need access paths to the dictionary content that go beyond the indexing of the macrostructure. The paper describes an elaborate annotation strategy based on marking up headwords with standardized orthographic alternatives, providing lexical equivalents and assigning semantic fields to entries in order to achieve robust navigability and searchability of the collection without full-text transcription and/or structural data modeling.

Keywords: digitization; dialect dictionaries; navigation; searchability; access paths

1. Introduction

Despite the dramatic impact which corpus linguistics has had on contemporary lexicographic practice (Sinclair, 1991; Fellbaum, 2009), the history of lexicography cannot be understood without considering the tradition of lexicographic citation slips — the hand-picked excerpts from literary and other sources that are an essential component of the lexicographer's toolkit (Landau, 1984; Wandl-Vogt, 2005; Bakken, 2006). Collections of lexicographic paper slips are not only an important part of European lexicographic heritage (Considine, 2008), but are research objects in their own right. In this paper, we discuss the process of digitizing and annotating one such collection created by the Serbian amateur lexicographer Dimitrije Čemerikić (1882-1960). Čemerikić's manuscript, compiled in the middle of the twentieth century using some 23,000 paper slips, contains approximately 16,000 lemmas with definitions and examples that illustrate the variant of Serbian from the historic city of Prizren that is today an endangered dialect (Петровић, 2012; Петровић & Тасовац, 2013).

The main goal we set ourselves for the digital edition of the Čemerikić paper slips was to provide users with improved retrieval possibilities based on multiple access points.

We will show how our decision to implement an elaborate annotation strategy based on marking up headwords, standardizing orthography, providing lexical equivalents and indicating the entry's semantic fields enabled robust navigability and searchability without full-text transcription and/or structural data modeling.

The paper is structured as follows: Section 2 describes Čemerikić's manuscript itself in greater detail. Section 3 explains how different methods of digitization (image capture, text capture, data modeling and data enrichment) influence the kinds of access paths that an electronic resource can offer. Section 4 analyzes the need for access paths beyond the dictionary macrostructure, while Section 5 presents in detail how the annotation of the Čemerikić collection has helped us achieve the goal of providing multiple access paths to the collection.

2. The Manuscript

The Čemerikić manuscript is part of the inventory of paper slips collected over a period of almost 100 years for the compilation of the Речник српскохрватског књижевног и народног говора (Dictionary of Serbo-Croatian Literary and Vernacular Language) of the Serbian Academy of Arts and Sciences (Ристић et al., 2011). It is an accident of history that this collection has not been merged with the rest of the Academy's inventory, but has instead remained physically separate. While a small portion of its valuable content has trickled through to the first 19 volumes of the Academy dictionary that have been published so far, the manuscript contains sufficient interesting material to deserve a publication on its own.

The original of the Čemerikić manuscript is archived at the Institute for the Serbian Language of the Serbian Academy of Arts and Sciences. The digital version has been publicly available since 2013 via *Prepis.Org: The Platform for the Transcription and Digital Editions of the Serbian Manuscript Heritage* (Тасовац & Петровић, 2013). One small part of the manuscript, dealing with 3,848 entries for words starting with letters а, б and в, has survived in typewritten form on sheets of A4 paper. The bulk of the collection, however, consists of entries written in ink and pencil on paper slips of different sizes and quality, torn-out notebook papers and, in some cases, even cigarette paper[1].

Formally, we can distinguish three types of paper slips: those containing only records of individual word forms (cf. џар, џенем, ептен); those containing only citations (cf. басма шиљте), and those, in the majority, which are already formatted as prototypical dictionary entries with highlighted headwords, grammatical information, definitions, citations etc. Čemerikić used various sources for his work: he excerpted words from various trade records and guild protocols (written in the pre-reform Cyrillic alphabet); ethnographic and historical literature, newspapers, travel literature etc. Most

[1] See, for instance, http://www.prepis.org/items/show/19315

importantly, however, the manuscript contains an abundance of examples from colloquial, everyday communication as well as numerous descriptions of local cultural traditions. This previously unpublished dictionary of the Prizren dialect is therefore an important resource not only for dialectologists and linguists, but also for ethnolinguists and ethnologists who are interested, for instance, in various aspects of popular culture (customs, superstitions, witchcraft) and urban life (guilds, social and ethnic relations, etc.) in the city of Prizren (Петровић & Тасовац, 2014). We based our approach to digitizing Čemerikić on the premise that electronic access will benefit both scholars (dialectologists, lexicographers and linguists) and the general public interested in the language and culture of the city of Prizren.[2]

3. Lexicographic Data: From Paper to Screen

Not all digital objects are created equal. We can distinguish four types of methods and activities for creating digital representations of lexical resources: 1) image capture; 2) text capture; 3) (lexicographic) data modeling and 4) (lexicographic) data enrichment. In this section, we will briefly look at these four aspects and their roles in our digitization of the Čemerikić manuscript.

Image capture refers to the process of recording the visual representation of the text by means of digital cameras and scanners and its subsequent delivery to the user as a digital image. Digital images are nowadays quite easy to produce and deliver over the internet but their usability, especially when it comes to lexicographic material, is limited due to a lack of search capabilities. The process of digitizing the Čemerikić manuscript started with the scanning of some 23,000 paper slips. The digital images were made available via the online platform http://prepis.org from the very beginning of the project. Initially, however, the scanned paper slips suffered from some of the same shortcomings as their physical counterparts: identifying and retrieving information about particular words would require browsing hundreds if not thousands of digital images.

Text capture refers to the transposition of textual content into a sequence of alphanumerical characters, which can be accomplished either by human operators who retype the original text; or, automatically, by using an optical character recognition (OCR) software to convert images into searchable strings. Optical Character Recognition (OCR) is widely used in mass digitization efforts, but its application in the realm of recognizing unconstrained hand-written texts is not as successful as it is in cases of printed documents or constrained hand-written domains such as numbers

[2] We have not conducted specific user surveys with the general public, but our own experience with organizing an exhibition about the Čemerikić manuscript at the Science and Technology Gallery of the Serbian Academy of Arts and Sciences, as well as a previous social media project related to the Serbian Dictionary by Vuk Stefanović Karadžić (1787-1864), which had more than 24,000 followers on Facebook alone, makes us confident that there is a broad interest among the Serbian public for topics related to language history and language diversity.

or postal addresses (Vinciarelli, 2002; Bunke, 2003; Plötz and Fink, 2009). Challenges include low paper quality, ink bleed-thru, line positioning variations (skews), overlapping characters, wide personal variations in glyph formation, and, often, a circular dependency between character segmentation and recognition, sometimes referred to as Sayre's paradox (Sayre, 1973).

Manually transcribing the full-text of Čemerikić's paper slips would be a time-consuming and costly process, not just because of the physical qualities of the slips which have not been preserved under ideal archival conditions, but also because of the nature of the material – a dialect with a large number of nonstandard vocabulary items, multilingual content and even nonstandard Cyrillic graphemes. Even if a team of highly-skilled, linguistically-trained transcribers could perform the job, the full-text transcription would not necessarily be sufficient for the creation of robust search and retrieval possibilities.

Lexicographic data modeling refers to the process of explicitly encoding the structural hierarchies and the scope of particular textual components: in the case of lexicographic data, this usually involves marking up both the macrostructure of the dictionary and the microstructure of individual entries (lemmas, grammatical information, senses etc.) A marked-up text increases the information density of the digital surrogate and paves the way for the implementation of more advanced faceted navigation and targeted search capabilities (for instance, retrieving all nouns whose etymology indicates particular linguistic origins; or retrieving all instances of a particular lexeme when it appears in dictionary examples stemming from a particular author). While it would have been ideal to create, for instance, a TEI-encoded ISO-LMF-compatible edition of the Čemerikić manuscript from the outset of the project, this was not a practical choice. With full-text transcription of the entire manuscript remaining beyond our reach due to financial constraints, the structural modeling was also not an option.

Lexicographic data enrichment, on the other hand, does not necessarily depend on the availability of the full text. By *data enrichment* or annotation, we refer to the process of encoding additional information that specifies, extends or improves upon the information already present in the lexicographic resource. As will be seen in Section 5, entry-level lexical and semantic annotations of the digitized paper slips can increase their use value even without transcription and/or structural modeling of the content.

Before we turn to the analysis of the data enrichment of the Čemerikić collection, one other question remains to be addressed: why do we need multiple access paths in the first place?

4. Access paths

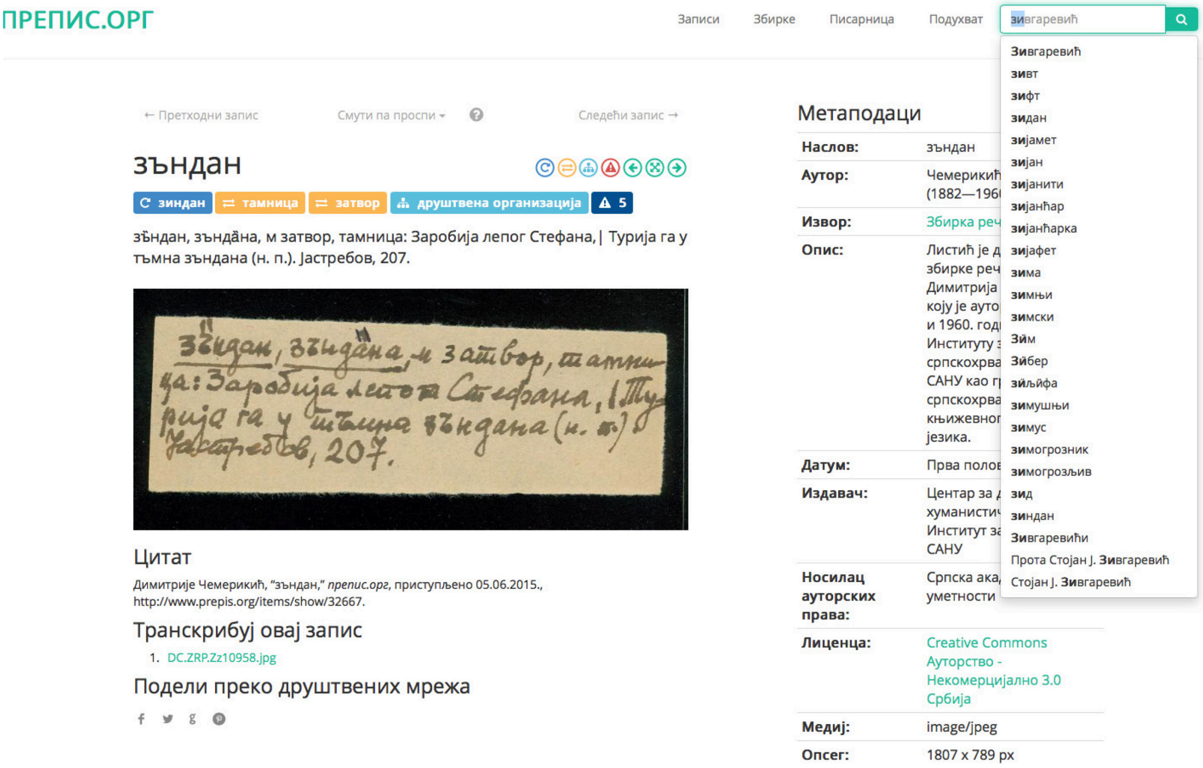
The alphabetical arrangement of entries in a print dictionary functions as a type of *index* — a retrieval mechanism connecting a known order of symbols to an unknown order of information (Hass Weinberg, 2010). The user can access dictionary content by consulting the dictionary macrostructure, i.e. the arrangement of lemmas in a given order (see Hausmann & Wiegand, 1989). While alphabetic dictionaries are relatively easy to consult, they are also efficient randomizers of meaning. By grouping lexemes according to their orthography, rather than their sense, standard dictionaries adhere to the abstract convention of alphabetical order, scattering words with similar or related meaning across unpredictable distances. The "psychologically quite unmotivated tyranny of the alphabet" (Makkai, 1980: 127) is both a blessing and a curse. Looking up entries is easy, if one knows precisely what word one is looking for. Discovering unfamiliar words and exploring semantic concepts, however, is considerably more difficult (Tasovac, 2012).

In electronic dictionaries users access lexicographic content not based on a single wordlist but through a search engine: "it may be more appropriate to say that the macrostructure has been replaced by what may be called a data presentation structure." (Nielsen, 2011: 201; see also Nielsen & Almind, 2011). The lexicographic concept of accessibility needs to be "narrowed down to cover *quick and easy access* to the specific types of data that can cover a specific type of user's specific types of need in a specific type of extra-lexicographical situation" (Tarp, 2008: 101). What constitutes *quick and easy access*, however, depends as much on a particular situation of use as it does on the type of the dictionary being accessed.

Users resort to historical dictionaries, for instance, in roughly three types of situations: (1) when they have difficulties in the reception of historical texts, (2) when they have difficulties in the production of modern translations; and (3) when they have general questions about linguistic and cultural tradition (see Reichmann, 2012: 54). The first two types of situations are text-related: they arise out of the user's engagement with a particular text. The user can, when reading texts, experience all sorts of semantic difficulties (encounter unknown lexical units; discover gaps in word meaning; raise questions of morphological, syntactic or pragmatic nature). In these cases, the user will use the macrostructure (or the search engine, in the case of an e-dictionary) to locate a specific entry containing the information that he or she needs.

Reichmann's third situation of use is *texttranszendierend* [text transcending] (2012: 64). What this means is that lexicographic texts can also be used to study the lexical materialization of cultural and historical relations, processes and transformations. Dictionaries, after all, are not only information-extraction tools: they also serve as texts, models of language and cultural objects deeply embedded in the historical and ideological matrices of their time (Tasovac, 2010). The main difference between the use of dictionaries in specific text reception and text production situations, on the one hand, and more general research situations on the other hand, is the question of initial focus and ultimate scope. In specific, text-related situations of use, the initial focus and ultimate scope are usually the same: extracting the definition of a particular sense of a particular word is usually accomplished by consulting one dictionary entry. In text-specific situations, the dictionary is used as a look-up tool. In text-transcending situations, it is used as an exploratory tool.

To make the digital edition of the Čemerikić manuscript available in text-specific situations, the images were first digitized and uploaded to *Prepis.Org: The Platform for the Transcription and Digital Editions of the Serbian Manuscript Heritage*, which uses Omeka, an open-source digital collection management system in its backend (Kucsma et al., 2010; Tomás, 2011). After merging entries that are written on both sides of individual slips or across several paper slips, we arrived at 16,626 entries. The headwords for all entries were then transcribed and a search plugin implemented with an autocomplete dropdown menu, allowing users to gain a view of the scope of the entire entry list.



зъндан

зъ̏ндан, зъндâна, м затвор, тамница: Заробија лепог Стефана,| Турија га у тъмна зъндана (н. п.). Јастребов, 207.

Цитат

Димитрије Чемерикић, "зъндан," *препис.орг*, приступљено 05.06.2015., http://www.prepis.org/items/show/32667.

Транскрибуј овај запис

1. DC.ZRP.Zz10958.jpg

Подели преко друштвених мрежа

Метаподаци

Наслов:	зъндан
Аутор:	Чемерикић (1882—196
Извор:	Збирка реч
Опис:	Листић је д збирке реч Димитрија коју је ауто и 1960. год Институту з српскохрва САНУ као г српскохрва књижевног језика.
Датум:	Прва полов
Издавач:	Центар за д хуманистич Институт за САНУ
Носилац ауторских права:	Српска ака, уметности
Лиценца:	Creative Commons Ауторство - Некомерцијално 3.0 Србија
Медиј:	image/jpeg
Опсег:	1807 x 789 px

Figure 1: Autocomplete search

The entries are marked in terms of priority for subsequent full-text transcription: priority 1 is given to entries that contain Čemerikić's citations of spoken sources. These are given the highest priority because of the scarcity of spoken dialectological data for the Prizren dialect, especially from the middle of the century. Editors are also given the freedom to mark with priority 1 entries that are particularly interesting from the point of view of cultural history. Priority 2 is given to entries that contain citations from previously published written sources, more often than not from historical literature; and priority 3 to all other entries. By default, all entries are marked with priority 3 and then manually upgraded to levels 1 or 2 where required. As of this writing, of the 6820 manually prioritized entries, 3261 were given priority 1; 1826 were assigned priority 2; and 1724 remained priority 3. Priority 4 is given to transcribed items, and priority 5 to transcribed entries that have been proofread and approved by the senior editor. Due to financial constraints, only entries with priority 1 are currently being transcribed in full.

Direct access to the macrostructure of the Čemerikić collection, while being a *sine qua non*, would not have been sufficient for a text-transcending, exploratory use. If a user wants to find out which dialect word corresponds to a standard Serbian word, or explore a certain type of vocabulary, or certain ethnolinguistic or historical topics, the alphabetic arrangement of the macrostructure will not be able to provide the answers. In these types of situation, the user needs access paths to the dictionary content that go beyond the indexing of the macrostructure.

5. Annotating for multiple access paths

5.1 Standardized Lemmas

The main access structure for the entries in Čemerikić's manuscript is the headword, which is usually underlined on the paper slip. In creating our lemma index, we use the headword, preserving Čemerikić's original spelling. For each graphemically non-standard lemma, however, we provide a standardized spelling alternative. For instance: зъндан > зиндан (semivowel ъ > и); тъмън > таман (semivowel ъ > а); зъмба > зумба (semivowel ъ > у); чадър > чадор (semivowel ъ > о); ди ̈бек > дибек (non-standard Cyrillic i-umlaut representing the Turkish vowel ü). The standardized spelling variants are displayed on the page, bellow the lemma (see Picture 1), and automatically added to the search index so that they appear in the search autocomplete dropdown menu and point to the original entries.

5.2 Near-Synonyms

The entries are furthermore annotated with standard Serbian lexical equivalents. The addition of standard synonyms greatly improves the searchability of the collection because synonyms are also automatically added to the index list. The user can access the entry зъндан, as aforementioned, by searching for the original spelling, the standard orthographic representation of the dialect lexeme (зиндан) as well as its modern standard equivalents затвор or тамница (jail, dungeon).

5.3 Semantic Fields

The collection is furthermore enriched by the application of semantic fields adapted from Buck (1949) in consultation with the questionnaire of the Serbian Dialect Atlas

(Милорадовић, 2012). These top-level semantic fields were chosen specifically to reflect the semantic categories most prevalent in Serbian dialect dictionaries. They have been tested on a wide range of dialect dictionaries to ensure wide coverage and cross-dictionary applicability.

Физички свет (рељеф и метеорологија)	**Physical World**
Човек (делови тела, физичке и психичке особине)	**Man** (body parts, physical and psychological features)
Родбина (крвно, бескрвно и духовно сродство, називи за обраћање)	**Kinship** (consanguine, affinal and spiritual; terms of address)
Медицина (болести, телесни и душевни недостаци, лекови, ветеринарска медицина)	**Medicine** (illnesses, physical and mental impairments, medicines, veterinary medicine)
Животиње (и сточарство)	**Animals** (and animal husbandry)
Исхрана (храна и пиће)	**Food** (and drink)
Одевање (одећа, обућа, накит, нега, дотеривање)	**Clothing** & Adornment
Кућа (покућство, окућница)	**Dwellings & Furniture**
Биљке и земљорадња	**Vegetation** & Agriculture
Кретање (и превоз)	**Motion** (& Transportation)
Глас (говорење, оглашавање, ономатопеје)	**Voice** (speech, including onomatopoetic sounds)
Занимања (занати, алати, предмети везани за занимања, материјали, оружје)	**Professions** (crafts, tools, objects related to professions, materials, weapons)
Поседовање (имање, трговина)	**Possession & Trade**
Простор (односи у простору, положај нечега, место, облик, величина)	**Spatial Relations**
Мере (укључујући новац и бројеве)	**Quantity & Number** (including money)
Календар (од секунде до века; доба дана, године, месеци, дани у недељи)	**Calendar** (from second to century; time of the day, seasons, months, days of the week)
Чулна перцепција	**Sense Perception**
Осећања (све везано за субјективни, морални	**Emotion** (everything related to the subjective,

или естетски осећај)	moral or esthetic sense)
Ум (интелект, читање и писање; народне умотворине)	**Mind & Thought** (including reading and writing, folkloric literary expression)
Друштвена организација (територија, институције, право)	**Social Organization** (territory, institutions, law)
Друштвени живот (све врсте међуљудских односа, игре)	**Social Relations** (all kinds of interpersonal relations, games)
Веровања (религија, сујеверје, обреди, обичаји)	**Beliefs** (religion, superstition, rituals, customs)
Ономастика (топоними, антропоними, хидроними, етници, ктетици...)	**Onomastics** (toponyms, anthroponyms, hydronyms, ethnonyms etc.)
Тајни језици (нпр. бошкачки, гегавачки, слепачки...)	**Cant** (secret languages meant to exclude or mislead people outside the group that speaks them)

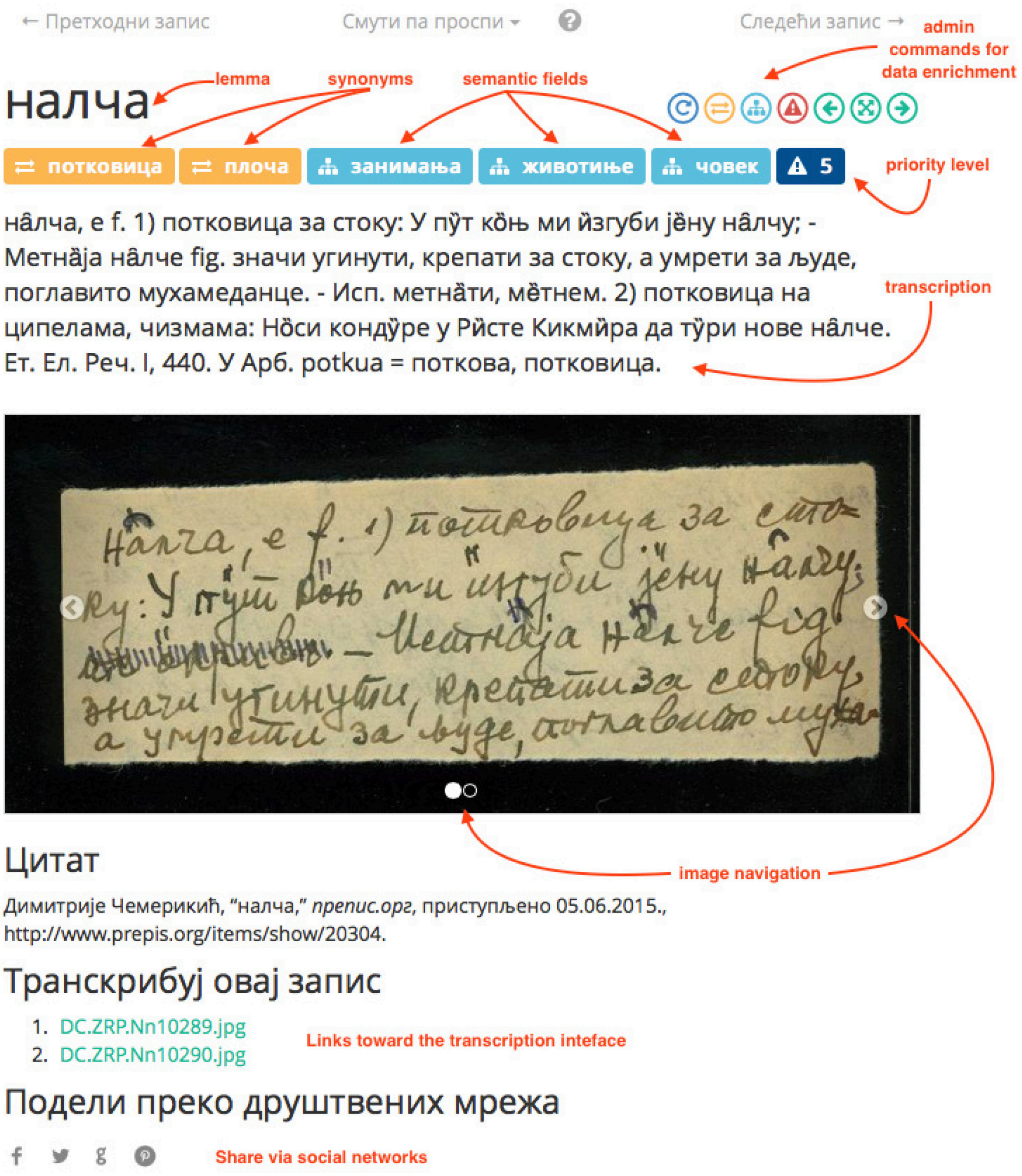
Table 1: Semantic fields

The labels for the semantic fields in each entry can be used as a navigational tool to display a list of all entries from the given field, enabling thus a kind of thematic browsing through the collection.

6. Conclusion and Further Work

The agile approach to digitization of the Čemerikić manuscript allows us to deliver rapidly and annotate incrementally, continuously increasing the use value of the collection by providing new access paths for searching and navigation (lemmas, standardized lemmas, synonyms, semantic fields). Since the work on the collection is ongoing, it would be difficult to provide a reliable quantitative overview of the elements added at this point. Once the current process of annotation is complete, however, we will be able not only to assess our own annotations statistically, but also to quantify the distribution of semantic fields across Čemerikić's collection as a whole.

In addition to the semantic fields, which offer a closed set of choices for tagging entries in the Čemerikić collection, we are planning to implement a free-text tagging option as well, to allow for even more flexibility in the tagging process. The multiple access paths will be especially useful in a future iteration of the project, in which we will also open API access to the collection in order to facilitate the integration of the digitized paper slips with other electronic dictionaries and/or multi-dictionary portals.



← Претходни запис Смути па проспи Следећи запис →

налча

нâлча, е f. 1) потковица за стоку: У пӯт кȍњ ми йзгуби јѐну нâлчу; - Метнӓја нâлче fig. значи угинути, крепати за стоку, а умрети за људе, поглавито мухамеданце. - Исп. метнӓти, мѐтнем. 2) потковица на ципелама, чизмама: Нȍси кондӯре у Рйсте Кикмйра да тӯри нове нâлче. Ет. Ел. Реч. I, 440. У Арб. potkua = поткова, потковица.

Цитат

Димитрије Чемерикић, “налча,” *препис.орг*, приступљено 05.06.2015., http://www.prepis.org/items/show/20304.

Транскрибуј овај запис

1. DC.ZRP.Nn10289.jpg
2. DC.ZRP.Nn10290.jpg

Подели преко друштвених мрежа

Figure 2: Entry for налча

7. Acknowledgements

This article is the result of research on the project Nr. 47016 “Interdisciplinary Research of the Cultural and Linguistic Heritage of the Republic of Serbia and the Development of the Web Lexicon of Serbian Culture” which is fully financed by the Ministry of Education and Science of the Republic of Serbia. Further financing for the advanced annotation of the manuscript has been provided by the Ministry of Culture and Information of the Republic of Serbia.

8. References

Bakken, K. (2006). The Dictionary and Its Sources: The Ideal of Integration and the Example Norsk Ordbok. *Atti del XII Congresso Internazionale di Lessicografia*: Torino, 6-9 settembre 2006, pp. 117-22.

Buck, C. D. (1949). *A Dictionary of Selected Synonyms in the Principal Indo-European Languages: A contribution to the History of Ideas.* Chicago: University of Chicago Press.

Bunke, H. (2003). Recognition of Cursive Roman Handwriting: Past, Present and Future. In *Document Analysis and Recognition: Proceedings of the Seventh International Conference*, pp. 448-59.

Considine, J. (2008). *Dictionaries in Early Modern Europe: Lexicography and the Making of Heritage.* Camebridge: Cambridge University Press.

Fellbaum, C. (2009). *Idioms and Collocations: Corpus-Based Linguistic and Lexicographic Studies.* London: Continuum.

Hass Weinberg, B. (2010). Indexing: History and Theory. In Bates, Marcia J. and Mary Niles Maack (eds.), *Encyclopedia of Library and Information Sciences, Boca Raton*, FL: CRC Press.

Hausmann, F. J. & Wiegand, H. E. (1989). Component Parts and Structures of General Monolingual Dictionaries: A Survey. In F. J. Hausmann, O. Reichmann, & H. E. Wiegand (eds.) *Wörterbücher: ein internationales Handbuch zur Lexikographie.* Berlin/New York: W. de Gruyter.

Kucsma, J., Reiss, K. & Sidman, A. (2010). Using Omeka to Build Digital Collections: The METRO Case Study. *D-Lib Magazine,* 16(3): np.

Landau, S. I. (1984). *Dictionaries: The Art and Craft of Lexicography.* New York: The Scribner Press.

Makkai, A. (1980). Theoretical and Practical Aspects of an Associative Lexicon for 20th-Century English. In L. Zgusta (ed.) *Theory and Method ln Lexicography: Western and Non-Western Perspectives*, Columbia, S. Carolina: Hornbeam Press.

Nielsen, S. & Almind, R. (2011). From Data to Dictionary. In P. Fuertes Olivera & H. Bergenholtz (eds.), *E-Lexicography: The Internet, Digital Initiatives and Lexicography.* London and New York: Continuum, pp. 141-167.

Nielsen, S. (2011). Function- and User-Related Definitions in Online Dictionaries. In Карташкова, Ф. И. (ed.), *Ивановская лексикографическая школа: традиции и инновации: сб. науч. ст, посвященный юбилею научного руководителя школы, заслуженного работника Высшей школы РФ, доктора филологических наук, профессора Ольги Михайловны Карповой.* Иваново: Ивановский Государственный Университет, pp. 197-219.

Plötz, T. & Fink, G. A. (2009). Markov Models for Offline Handwriting Recognition: A Survey. *International Journal on Document Analysis and Recognition (IJDAR),* 12(4), pp. 269-298.

Reichmann, O. (2012). *Historische Lexikographie: Ideen, Verwirklichungen, Reflexionen an Beispielen des Deutschen, Niederländischen und Englischen.* Berlin; Boston: De Gruyter.

Sayre, K. M. (1973). Machine Recognition of Handwritten Words: A Project Report. *Pattern Recognition*, 5(3), pp. 213-228.

Sinclair, J. (1991). *Corpus, Concordance, Collocation.* Oxford: Oxford University Press.

Tarp, S. (2008). *Lexicography in the Borderland Between Knowledge and Non-Knowledge: General Lexicographical Theory With Particular Focus on Learner's Lexicography.* Tübingen: Max Niemeyer.

Tasovac, T. (2010). Reimagining the Dictionary, or Why Lexicography Needs Digital Humanities. *Digital Humanities 2010*, http://dh2010.cch.kcl.ac.uk/academic-programme/abstracts/papers/html/ab.

Tasovac, T. (2012). Potentials and challenges of WordNet-based pedagogical lexicography: The Transpoetika Dictionary. In S. Granger & M. Paquot (eds.) *Electronic Lexicography.* Oxford University Press, pp. 237-258.

Tomás, S. (2011). Exposiciones digitales y reutilización: aplicación del software libre Omeka para la publicación estructurada. *Métodos de información*, 2(2), pp. 29-46.

Vinciarelli, A. (2002). A survey on off-line cursive word recognition. *Pattern Recognition*, 35(7), pp. 1433-1446.

Wandl-Vogt, E. (2005). *From Paper Slips to the Electronic Archive. Cross-linking Potential in 90 years of Lexicographic Work at the Wörterbuch der bairischen Mundarten in Österreich (WBÖ).* Budapest: Linguistic Institute, Hungarian Academy of Sciences.

Милорадовић, С. (2012). Лингвистички атласи – „централни инструмент" савремене дијалектологије. *Зборник радова Етнографског института САНУ: Теренска истраживања – поетика сусрета*, 27, pp. 141-51.

Петровић, С. (2012). *Турцизми у српском призренском говору: на материјалу из рукописне збирке речи Димитрија Чемерикића.* Београд: Институт за српски језик САНУ.

Петровић, С. & Тасовац, Т. (2013). *Призрен - живот у речима.* Београд: Институт за српски језик САНУ.

Петровић, С. & Тасовац, Т. (2014). Збирка речи Димитрија Чемерикића као извор за етнолингвистичка и етнолошка истраживања. *Гласник Етнографског института*, LXII(2), pp. 171-179.

Ристић, С., Самарџић, Т., Јакић, М., Марковић, А. & Ивановић, Н. (2011). Значај дигитализације језичких ресурса Речника српскохрватског књижевног и народног језика САНУ за развој науке и очуване културне баштине. In *Дигитализација културне и научне баштине*, 4, pp. 79-108.

Тасовац, Т. & Петровић, С. (eds.) (2013). *Препис.орг: платформа за дигитална издања и транскрипцију српског рукописног наслеђа*. Београд: Центар за дигиталне хуманистичке науке.