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**ACQUISITION OF 'SMALL' FINNO-UGRIAN LANGUAGES  
AND THE MARI WEB PROJECT**

The teaching of Uralic languages has traditionally been the task of Uralic (Finno-Ugric) university departments, which from their beginnings in the 19<sup>th</sup> century have seen this as one of their core functions. A major part of their curriculum has always consisted of language courses offering students the opportunity to acquire knowledge of one or more Uralic languages. The way these courses have been conducted and the importance they have had in various curricula have,

however, always been determined by one important factor: Is the Uralic language in question a 'large' or a 'small' one? In the past the 'large' languages were always Hungarian and Finnish, but nowadays they are Hungarian, Finnish, and also Estonian. The 'small' ones are all the other languages. Depending on whether they are categorized as 'large' or 'small', the individual languages are taught in completely different ways – with varying degrees of intensity, different goals, and thus ultimately, completely different results.

#### Teaching and Learning 'Large' Uralic Languages

Uralic (Finno-Ugric) departments have traditionally been linguistic departments, dealing for the most part with the synchronic and diachronic description of the various Uralic languages as well as the language-family as a whole or subdivisions thereof. Knowledge of the 'large' languages has always been felt to be the backbone of Uralic Studies as well as a worthy goal in and of itself, apart from the necessary role this plays in the study of comparative Uralic linguistics. Thus, it is common to find separate university departments and curricula devoted to Hungarian, Finnish, or Estonian, and these are not exclusively linguistic departments or courses of studies, but comprise linguistics, literature, history, culture, etc. of Hungary, Finland, or Estonia, as the case may be. Often, as is true at the University of Vienna, it is no longer possible to study comparative Finno-Ugric linguistics at the bachelor level; the path to this field of study begins with a bachelor's program in either Hungarian or Finnish. These bachelor programs emphasize language acquisition and offer the basics in Hungarian/Finnish linguistics, literature, history, and cultural studies. Graduates are then well equipped to continue in the broader world of Finno-Ugric linguistics.

Recent years have seen a very welcome development in the teaching of the 'large' Finno-Ugric languages. This is reflected in (a) the number of hours (per week) devoted to language acquisition, (b) the methods and materials used in the classroom, and (c) the quality and training of teachers.

1. Number of Hours: It is now accepted that the active acquisition of a language requires more than a minimal number of hours of instruction. In recent years there has been a substantial increase in the number of hours devoted to the acquisition of 'large' Uralic languages. The figures for Hungarian, Finnish, and Estonian language acquisition at the University of Vienna are typical of this trend. Since 1978 the number of semester hours offered throughout the course of studies for Hungarian and Finnish has risen from 16 to 32, whereas the number for Estonian has increased from 0 to 16.

2. Methods and Materials: The methods and materials (textbooks, etc.) used in the instruction of Hungarian, Finnish, and Estonian no longer lag behind the materials used for learning more widely spoken foreign languages, but cover the same spectrum and reflect the same trends regarding the teaching of a foreign language. That the number of textbooks available is not as high as is the case for say, English, French, or German, is only natural.

3. Quality and Training of Teachers: In the past teachers of Hungarian, Finnish, and Estonian at the various departments of Uralic/Finno-Ugric linguistics were typically younger graduates of these departments in their home countries of Hungary and Finland. They spoke these languages as their mother tongue, had a university degree (often in Finno-Ugric linguistics), but usually had no prior experience or training in the teaching of these languages to foreign students. It was also felt that such teaching positions were transitory at best and primarily gave these young teachers an opportunity to work on their careers as linguists. This is no longer the case. The demands placed on language teachers have become much greater and it is considered necessary to have university-level training in the teaching of Hungarian/Finnish/Estonian as a foreign language.

#### Teaching and Learning 'Small' Uralic Languages in the Past: Why?

In the past teaching and learning 'small' Uralic languages had one major purpose: to acquaint students with the basic structure of a language, enabling them to work with it as the subject of research or as a point of reference within the field of comparative Finno-Ugric

linguistics. Thus no attempt was made to promote active acquisition of the language, the goal being a passive command of grammar that would make analysis of written texts possible. The texts analyzed were for the most part folklore texts included in chrestomathies (see below) or in text collections consisting of folklore texts dating from the late 1900s and the early 20<sup>th</sup> century that had been translated into another language, usually German. The existence of a literary language in the case of the ‘larger small languages’ (see below) was tacitly acknowledged, but not exploited, i.e., it was not the starting point or subject of language acquisition. There was a general feeling that the ‘modern languages’ were somehow corrupted by the influence of Russian and were thus no longer ‘pure’ like those of the older folklore texts. Apart from this, it was very difficult, if at all possible, to actually travel to the Soviet Republics where the languages were spoken and only a very few researchers had the opportunity to do this.

#### Teaching and Learning ‘Small’ Uralic Languages in the Past: How?

In the past teaching and learning ‘small’ Uralic languages was done with the help of so-called chrestomathies, small books containing at a minimum: (a) a grammatical survey, (b) texts, and (c) a glossary for the texts. The texts included represented various dialects and genres of folklore. The first generation of chrestomathies [17; 20; 19; 14] was written by Finnish scholars and the grammatical surveys were short and succinct, consisting for the most part of paradigms. Despite the venerable age of these works, they were used at some universities as the basic classroom texts well towards the end of the 20<sup>th</sup> century, when they were replaced by a newer wave of chrestomathies. The newer ones [8; 7; 6] were written by Hungarian scholars, were much more extensive, and contained sections on the Uralic peoples in question and bibliographies of linguistic materials. The texts in these newer chrestomathies were once again from various dialects and folklore genres, although they now typically had a short section on the literary language and one or two examples of the latter in text form. It must be said that for the purposes and goals stated above, the chrestomathies, particularly the newer ones, offered adequate support.

#### Teaching and Learning ‘Small’ Uralic Languages Now: Why?

The goal stated above, namely to acquaint students with the basic structure of the (small) language, enabling them to work with this language as the subject of research or as a point of reference within the field of comparative Finno-Ugrian linguistics is as valid as it was before. There is, however, one major difference. Apart from the very smallest of the Uralic languages, such a thing as a codified literary language does exist, and in the case of the ‘larger small languages’ – i.e., Mari, Komi, Udmurt, Erza-Mordvin and Moksha-Mordvin, and Saami – these literary languages are viable, are widely used in journalism and publishing, are taught in schools, and are a natural subject of linguistic research for native speakers. The view has become widespread that it is possible and indeed desirable to learn these literary languages – just as in the case of Finnish, Hungarian, and Estonian – and to read the products of journalism, e.g., newspapers and magazines, as well as books published in these languages. In other words, Mari, Komi, Udmurt, Erza-Mordvin and Moksha-Mordvin are in the process of becoming accepted as completely normal languages that can be learned and researched in the usual fashion and thus do not have to be approached through the medium of dialectal, folklore texts.

Broadly speaking, we believe there are now two major reasons for students of Finno-Ugrian linguistics to learn ‘small’ Uralic languages:

Goal 1: A student wishes to become acquainted with the basic structure of a (small) language in order to be able to work with this language as a point of reference within the field of comparative Finno-Ugrian linguistics. A serious student of Finno-Ugrian linguistics would try to deal with as many small languages as possible in this way. This goal can be reached in the case of every small Uralic language.

Goal 2: In addition to this, a student may wish to obtain a (primarily passive) command of the (written) literary language in order to be able to read literature (of both a scholarly and a belletristic/journalistic nature) and to carry out serious linguistic research on the language in

question. This does not preclude the (subsequent) usage of texts in various dialects. This goal is above all feasible in the case of Mari, Komi, Udmurt, Erza-Mordvin and Moksha-Mordvin, and Saami.

#### Teaching and Learning Small Uralic Languages Now: How?

The answer to the question of how to teach and learn small Uralic languages depends, of course, on the individual student's goal or goals.

Attaining Goal 1 – Ob-Ugric, Samoyed, Small Fennic Languages: These are the languages that either do not have a codified literary language or whose literary languages are not used extensively. Learning these languages can still best be done with traditional chrestomathies, preferably modern ones that reflect (a) the state of the language as it is now and not as it was at some point in the past, as well as (b) the society of people who speak the language as it is today. Recent years have seen the publication of newer chrestomathies for several of these small languages [5; 18; 9]. In view of the increasing internationalization of the field, it would, however, be desirable for such works to be published in an international language, thus making it possible for them to be used all over the world.

Attaining Goal 1 – Mari, Komi, Udmurt, Erza-Mordvin and Moksha-Mordvin: In the case of these languages goal 1 could also be attained with the use of a chrestomathy. The chrestomathies should, however, be written in an international language, be based on the literary language, employ solely the written norms of the literary language, i.e., Cyrillic script, and contain exclusively modern texts in the literary language that reflect modern society. Such chrestomathies still remain to be written.

Attaining Goal 2 – Mari, Komi, Udmurt, Erza-Mordvin and Moksha-Mordvin: For the attainment of goal 2, a (primarily passive) command of the literary language, even a chrestomathy of the new, yet-to-be-written type, would not be enough. What is needed here is not chrestomathies, but serious textbooks, such as those used to teach and learn Finnish, Hungarian, and Estonian. In recent years several true textbooks have been written, by either (a) representatives of these languages for their Russian-speaking compatriots or (b) 'Westerners' for use at departments of Finno-Ugrian linguistics.

(a) Textbooks for Russian Speakers: These books [25; 22; 24; 21; 23] can be of great assistance to Western students wishing to attain goal 2, but have distinct flaws in this regard: (a) They are written in Russian, i.e., not in an international language, (b) are not easily obtainable, and (c) lack depth (to varying degrees).

(b) Textbooks by Westerners for Western Students: Several attempts have been made to write modern textbooks for several of the languages mentioned above for use in a classroom context [13; 12; 11]. They share the drawback, however, of not being written in an international language and in view of goal 2, greater length and depth would make them more helpful.

#### Materials Needed for Goal 2 (Mari, Komi, Udmurt, Erza-Mordvin and Moksha-Mordvin):

1. Textbooks: These should be textbooks as described above, teaching the literary language, written in an international language, and providing more than an introduction to the grammar and vocabulary of the language in question. Theoretically, they could be a translation of a good existing textbook, a revised and lengthened version of a present textbook, or a completely new work.

2. Grammar: To complement the textbooks a proper grammar of the literary language should be available, once again in an international language, and written with the needs of learners in mind, i.e., not only including a wealth of material, but also answering questions that a native speaker would not necessarily address.

Alhoniemi's grammar of Mari [1] is definitely a step in the right direction. Unfortunately, all Mari words are transliterated, an attempt is made to present two literary languages at the same time (Meadow and Hill Mari), and the grammatical survey is not thorough enough for serious students of the language.

3. Dictionary: For these languages bilingual dictionaries of a proper length using an international language as the second language and based on the literary language are an essential needed tool.

#### The Mari Web Project

To address the needs of learning one 'small' Uralic language, namely (Meadow) Mari, the Department of Finno-Ugric Studies of the University of Vienna has initiated an online project with the goal of producing various materials needed by learners, and also of providing native speakers of Mari with some much needed materials. The project's trilingual (Mari, English, Russian) website, [www.mari-language.com](http://www.mari-language.com), was launched in September 2010 and will remain a work in progress for several years. Materials will be published as they are completed.

1. Dictionary: Preparation of the world's first Mari-English dictionary, financed by the Austrian Science Fund FWF, began on January 1, 2011, and will last three years. The target of the dictionary is to cover roughly 50,000 headwords, made accessible via a web interface. The digital nature of the dictionary will offer both users and editors advantages on many fronts. In addition to basic advantages with respect to usability and availability, the dictionary's electronic nature will also allow it to be used 'in reverse', that is to say, as a makeshift English-Mari dictionary. Maintenance will be possible; the dictionary's content can be updated as the language changes. Furthermore, the dictionary can be integrated into other applications, both in-house (cf. point 5) and external (e.g., a monolingual English dictionary, which would enable Mari speakers using the dictionary to look up the pronunciation of English words, as well as other grammatical forms).

2. Textbook: The textbook Оңай мари йылме: A Comprehensive Introduction to the Mari Language [16] is based on the two-volume 1990/1991 Russian-language textbook Марийский язык для всех [25] by Emma Yakimova and Galina Krylova. The new, English edition, which is being compiled in collaboration with the original authors, gives more grammatical explanations than the original volumes since it is also intended for autodidactic learners of the language who do not have access to a native Mari teacher. The first 300 pages of the textbook, together with accompanying audio materials, have already been published. The second volume, dealing to a larger extent with syntax, is currently being prepared. When complete, this textbook will provide a comprehensive overview of productive Mari grammar and will be a suitable textbook for a year-long three-hour Mari course.

3. Chrestomathy: A collection of reading texts, aimed at reflecting the modern literary language, will be compiled from different modern sources. Texts will be categorized according to difficulty, allowing students to find suitable texts for their respective level. It will also be possible to read these texts with the assistance of the reading aid described below.

4. Keyboards and Fonts: This section, which is already available, attempts to give a comprehensive overview of the usage of Mari in computing – for users of Windows, MacOS, and soon Linux – and to provide both learners of the language and Mari native speakers with needed tools. Keyboard layouts and fonts can be downloaded; detailed instructions on their installation and usage are given.

5. Linguistic Software: This section, when complete, will provide didactic software tools for language learners as well as a Mari spelling checker suitable for all users of the language. This spelling checker already exists as an independent application, and its integration into existing applications such as Microsoft Word and OpenOffice.org (in the form of a freeware add-on), are currently at the planning stage. For learners of Mari, the most interesting application will be a reading aid, which will offer users a more efficient way of obtaining both grammatical and lexical information they lack when reading a text. When using this reading aid, users can click on a Mari word they cannot identify or interpret. The application will carry out a morphological analysis of the word in question and will output the meaning of the base lexeme and a list of suffixes connected to it (e.g. *пöртeм-влакланак* → *пöрт* 'house' + *-eм* 'possessive suffix first person singular' + *-влак* 'plural marker' + *-лан* 'dative case marker' + *-ам* 'enclitic particle', i.e., 'also to my houses'). Every entry on the list of suffixes will be a hyperlink leading to the chapter of the

textbook in which the function and usage of the suffix in question is explained. In addition to giving learners an efficient means of accessing exactly the information they need, this application will also allow them to create personalized vocabulary sheets enabling them to review only those words they themselves learned when reading a text.

### The Morphological Analyzer

The spelling checker, the reading aid, and a number of applications used by dictionary editors behind the scene in the process of analyzing our corpus (e.g., to detect gaps in the lexical base and to carry out a semi-automatic word frequency analysis) are all based on the morphological analyzer for Mari that we have developed. This application is already functional; only the incomplete state of the lexical base used by our applications prohibits its release at this point.

Our morphological analyzer operates in a theory-neutral fashion – rather than supporting one specific theory of morphology, it was designed with the sole objective of computing productive Mari morphology in its entirety, accepting all (and only) legitimate word forms.

The development of a morphological analyzer for Mari was prompted by the relatively ‘pure agglutinative’ nature of the morphology of the Mari literary language. A large inventory of productive suffixes can be attached to stems in a quite predictable fashion. Stem changes are rare, and where they occur, predictable. These characteristics of the language facilitate the approach of this application.

The lexical base created for our dictionary is essential to the analyzer’s operation. It is necessary for word class information to be included in the lexical base, since the word class determines which suffixes can be connected to a particular stem.

Suffix order in Mari is not as rigid as it is in other Finno-Ugric languages, but it is not completely free. For example, possessive suffixes (e.g., 1Sg: *-ем*) must always precede certain case suffixes (e.g., the genitive suffix *-и*: *пöрт-ем-ын*, ‘of my house’), but always follow other case suffixes (e.g., inessive suffix *-ишт/-ишö/-ишö*: *пöрт-ишт-ем*, ‘in my house’). With some case suffixes, both arrangements are possible (e.g., dative suffix *-лан*: *пöрт-лан-ем* ~ *пöрт-ем-лан*, ‘to my house’). In order to make it possible for a computer to grasp all possible suffix arrangements, all productive suffixes found in the language were classified into a number of categories. For example, the category ‘\_case-g1’ was established, which includes all case suffixes that, like the genitive, follow the Px-Cx arrangement. ‘\_case-g2’ spans the inessive and other cases that follow the Cx-Px order, and ‘\_case-g3’ those that like the dative allow both arrangements. Other categories include comparative suffixes, enclitics, reduplication, etc.

This inventory of productive suffixes also includes data on suffixation methods, which allows the reconstruction of potential unsuffixed forms from suffixed forms. It should be noted that this is not a deterministic process – one suffixed form can stem from multiple unsuffixed forms (for example, both the words *юмо* ‘god’ and *юм* ‘horsehair worm’, when given the possessive suffix of the first person singular mentioned above, take the shape *юмем*, which thus can equally be interpreted as ‘my god’ and ‘my horsehair worm’. The analyzer yields all morphologically valid interpretations).

Furthermore, the program has a set of templates for all possible suffix arrangements (in connection with certain stem types), a complete list of which is given below. In these templates, {curly brackets} denote suffixes that must occur in an interpretation (e.g., the person/tense marker in the conjugation of finite verbs) and [square brackets] denote suffixes that may or may not occur. The suffix types represent those according to which the suffixes of the language are classified, as discussed above.

- Nominal stem + [comp][gen][poss][plur][case-g1][enc][red]
- Nominal stem + [comp][gen][poss][plur][case-g3][enc][red]
- Nominal stem + [comp][gen][plur][poss][case-g1][enc][red]
- Nominal stem + [comp][gen][plur][poss][case-g3][enc][red]

Nominal stem + [comp][gen][plur][case-g2][poss][enc][red]  
 Nominal stem + [comp][gen][plur][shILL][enc][red]  
 Nominal stem + [comp][gen][plur][case-g3][poss][enc][red]  
 Verbal stem + {tmp}[comp][enc][red]  
 Verbal stem + {infger}[comp][poss][enc][red]  
 Postposition stem + [poss][enc][red]  
 Any stem + [enc][red]

Note that productive derivational suffixes, which the analyzer is also capable of handling, have been disregarded for the sake of simplicity in this paper.

The way in which the analyzer operates can be explained using the word *нөртем-влакланак*, mentioned as an example above. At the onset of the analysis, the program has no information regarding the word class of this word. Thus none of the templates given above can be excluded from the set of valid interpretations, i.e., at the beginning of the deductive process all options are open. The analyzer first checks to see if the form as such exists in the lexical base and then works through the complete inventory of suffixes, attempting to see what suffixes could be extracted from the end of this word. Many morphologically legitimate interpretations come up (second person indicative present of a verb *нөртем-влакланаш*; second person imperative present of a verb *нөртем-влакланаташ*; possessive suffix 2Sg attached to a stem *нөртем-влаклана*; enclitic *-ат* attached to the stems *нөртем-влаклана*, *нөртем-влаклане* or *нөртем-влаклан*). All but one are nonsensical, but the program cannot know this yet.

The analyzer employs a so-called queue. As they are found, new interpretations are placed at the end of this queue. Every interpretation is stored along with (a) information on possible word classes, and (b) suffixes that have already been extracted in the given interpretation. For example, the interpretation *нөртем-влаклан* + enclitic suffix ' would look like this in the queue:

*нөртем-влаклан* ? [enc]

The question mark indicates that no word class information exists yet – since enclitic particles can be attached to all stems, having extracted one does not narrow down the options.

As the program works through the queue, it checks to see if the given form can be found in the lexical base and attempts to further analyze this form. All interpretations listed above lead to dead ends, in that (a) they do not exist in the lexical base and (b) no further suffixes can be extracted from them – except for *нөртем-влаклан*, from which the suffix *-лан* (dative marker) can be extracted, leading to the following new entry in the queue:

*нөртем-влак* n [case-g3][enc]

At this point, the analyzer can deduce that we are looking for a nominal (noun, adjective, proper name, place name, numeral, pronoun) stem, since the suffix type *\_case-g3'* only appears in three templates, all of which require nominal stems. Interpretations are valid if and only if they can be matched with at least one template – that is to say, if the suffix types appear in said template in the order in which they appear in the interpretation:

Nominal stem + [comp][gen][poss][plur]{**case-g3**}{**ene**}[red]

Nominal stem + [comp][gen][plur][poss]{**case-g3**}{**ene**}[red]

Nominal stem + [comp][gen][plur]{**case-g3**}{**poss**}{**ene**}[red]

When attempting to further analyze an interpretation, only suffix classes that appear to the left of the categories that have already been found need be taken into consideration. The category *\_enc'*, for example, can be ignored henceforth, since no template would allow an enclitic suffix to precede a case suffix or allow more than one enclitic suffix.

After extracting the plural marker *-лак*, the following entry is made in the queue, which continues to be valid under three of our templates:

*нөртем* n [plur][case-g3][enc]

The three templates given above remain valid:

Nominal stem + [comp][gen][poss]{**plur**}{**case-g3**}{**ene**}[red]

Nominal stem + [comp][gen]{**plur**}[poss]{**case-g3**}[**enc**]{red}

Nominal stem + [comp][gen]{**plur**}[**case-g3**][poss]{**enc**}{red}

After extracting the possessive suffix *-em*, the following interpretation is placed in the queue:

*nöpm* n [poss][plur][case-g3][enc]

It still matches one of the templates, and is thus considered valid by the program:

Nominal stem + [comp][gen]{**poss**}[**plur**][**case-g3**][**enc**]{red}

When a matching entry is now found in the lexical base – *nöpm* 'house' – which belongs to a fitting word class, this interpretation can be classified not only as legitimate, but also as valid, and is returned.

Whereas only one valid interpretation was found in this example, this does not always have to be the case. The word *ypem*, for example, can be determined to be the following: (1) *ypem* 'street', no suffixes, (2) *yp* 'squirrel' + possessive suffix first person singular *-em* ('my squirrel'), and (3) *ypau* 'to dig', first person singular indicative ('I dig'). The analyzer returns all valid forms in such cases; users themselves must then decide which of the morphologically valid interpretations makes sense in a given context.

While it would be theoretically possible to allow the computer to make semi-deterministic choices in some cases by using probabilistic measures or collocation, or by parsing the syntax of sentences, this is not needed for the applications at hand and is not currently planned.

**Applications:** The morphological analyzer was developed for the reading aid discussed above, but is quite useful in other contexts as well. Its ability to identify only morphologically valid forms derived from a given lexical base enables this application to serve as a spelling checker for a highly agglutinative language like Mari. The analyzer has also been used in a semi-automated frequency analysis by the BEDLAN project, a Finnish research initiative involving scholars from the Universities of Turku, Helsinki, and Tampere studying the emergence of the Uralic language family (T. Honkola, unpublished data).

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