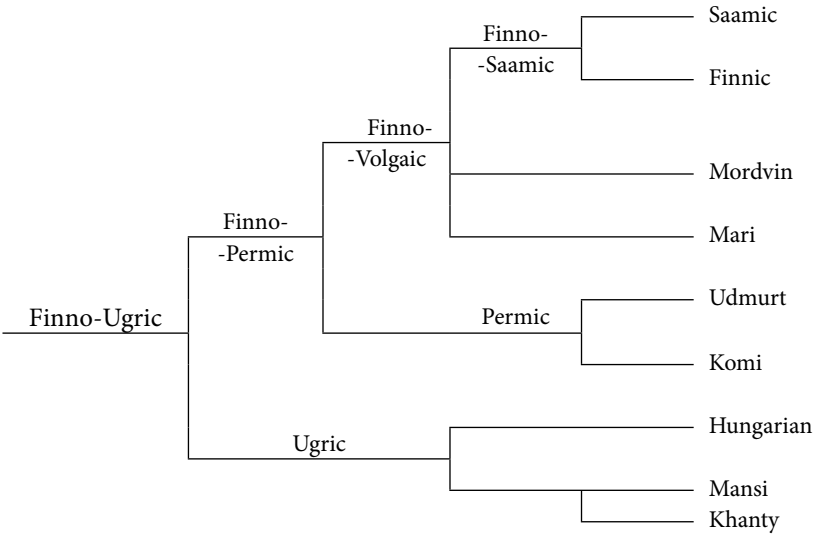
Václav Blažek

Was there a Volgaic unity within Finno-Ugric?

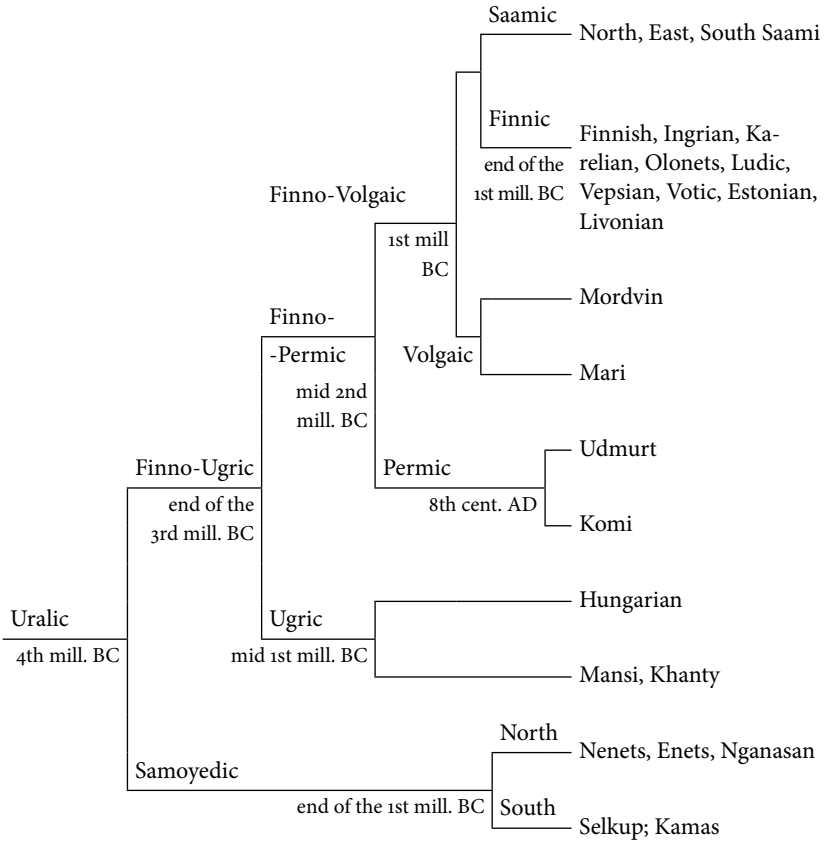
The purpose of the present study is to determine if the Volgaic branch (consisting of Mordvin and Mari) represents a real taxonomic unit in terms of the genetic classification of the Finno-Ugric/Uralic language family.

The following scenarios have been proposed for the classification of the Finno-Ugric/Uralic family. The main differences appear in the position of Mordvin and Mari.

1. Mari, Mordvin and Finno-Saamic are coordinate subbranches (see Setälä 1890, 1926, repeated in OFUJ 1974, 38; similarly Napoľskih 1997, 260, scheme 3.)



2. Traditionally Mordvin and Mari have been included in a single group, called "Volgaic" (see e.g. Collinder 1960, 11; Hajdú 1962, cited from the Russian translation Hajdu 1985, 173; see also OFUJ 1974, 39.)

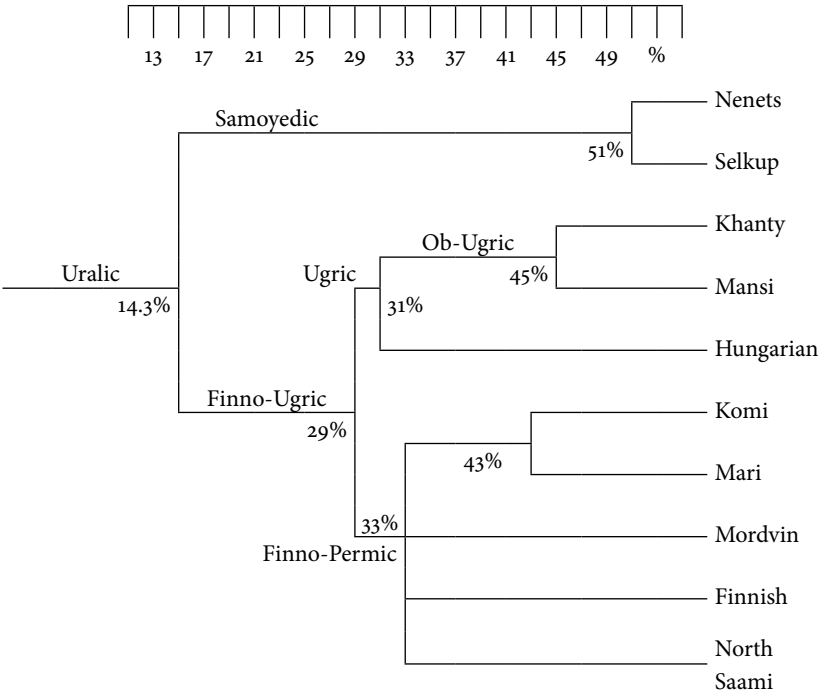


3. The first attempt to apply the lexicostatistic approach was carried out by Eeva Kangasmaa-Minn and Alo Raun (1956, 152–153). Their results were discussed in detail by Evgenij Helimskij (1982, 11–14). A new attempt was carried out by Juhani Lehtiranta (1982, 114–118). Unfortunately all of these authors published only figures, without interpretation in the form of diagrams and without lexical data.

On the basis of the standard Swadesh 100-word list, Lehtiranta (1982, 115) calculated the following percentages expressing the mutual relations between the main Uralic languages:

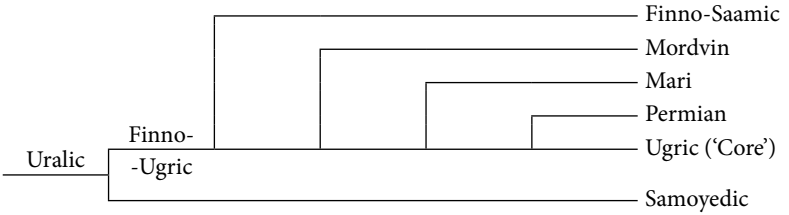
language	N.Saami	Mordvin	Mari	Komi	Hung.	Khanty	Mansi	Nenets	Selkup
Finnish	33	34	37	33	31	29	32	14	17
N.Saami		32	32	24	23	24	19	11	10
Mordvin			37	30	26	26	22	14	16
Mari				43	32	27	29	19	17
Komi					31	26	27	12	19
Hung.						28	34	10	12
Khanty							45	14	15
Mansi								13	15
Nenets									51

Using the method of balanced averages, Lehtiranta's figures can be projected into the following tree diagram 3:

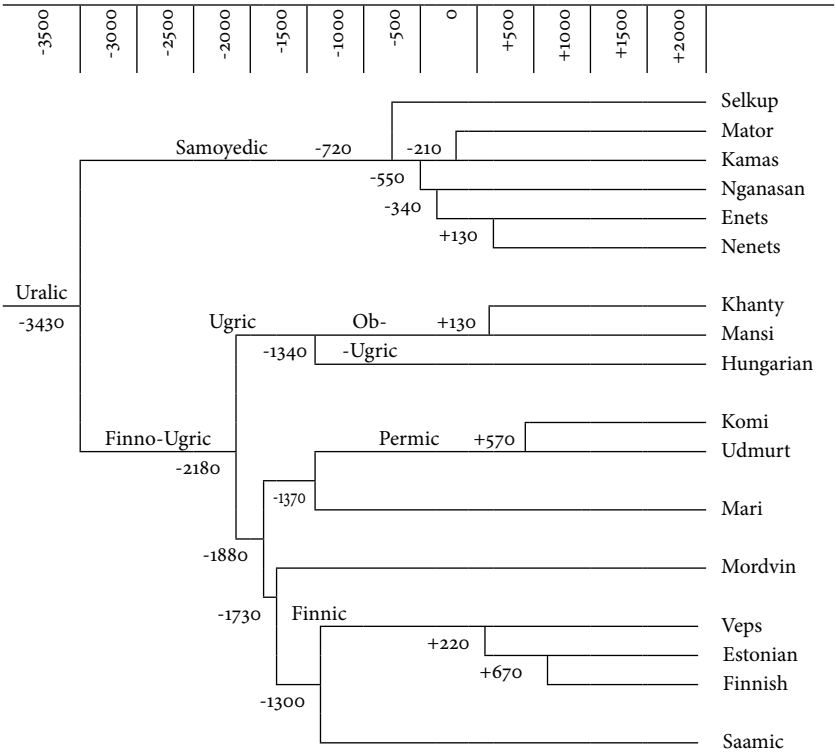


As is apparent, the closest relative of Mari is Komi, while Mordvin represents one of the coordinate subbranches of Finno-Permic. The remaining subbranches are also represented by individual languages, Saamic by North Saami, Finnic by Finnish.

4. A model of a series of sequential separations was proposed by Tiit-Rein Viitso (1996, 261–266). According to him, Mordvin and Mari represent different separations from the mainstream, formed by Ugric. Viitso accepts only a closer Finno-Saamic relationship.



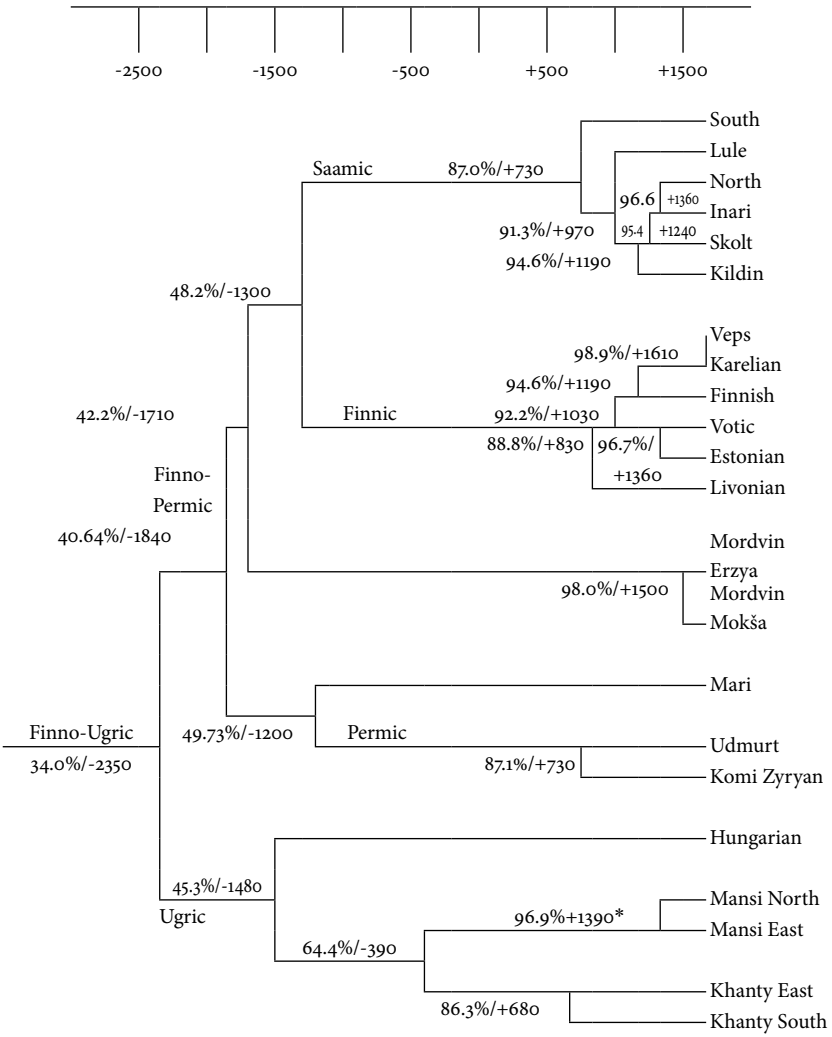
5. The first application of a so called "recalibrated" glottochronology for the Uralic languages was carried out by the team of Sergei Starostin in 2004; let us mention that the method was developed by Starostin himself at the end of the 1980s.



6. In the present study the "recalibrated" glottochronology was also used. For this reason the word-lists of 16 Fenno-Ugric languages/dialects were collected and etymologically analyzed.

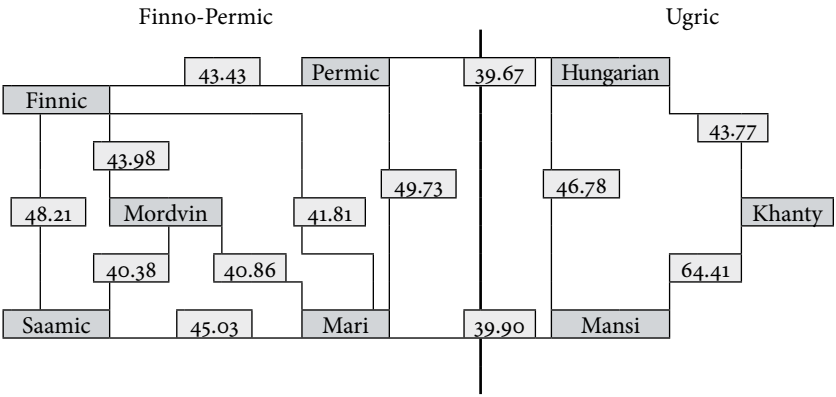
%	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. South Saami	75/85 =88.24	72/84 =86.71	44/87 =50.57	40/86 =64.51	42/86 =48.84	36/89 =40.45	36/89 =40.45	40.5/86 =47.21	32.5/89 =36.52	34.5/89 =38.76	26/86 =30.23	26.5/91 =29.12	27.5/90 =30.56	27/87 =31.03	28/89 =31.46
2. North Saami		81/85 =95.29	43/85 =50.59	39/84 =46.43	39/85 =45.88	36/89 =40.45	36/89 =40.45	37.5/87 =43.10	31.5/89 =35.39	34.5/89 =38.76	27/86 =31.40	27.5/91 =30.22	27.5/90 =30.56	28/87 =32.18	29/89 32.58
3. Skolt Saami			43/84 =51.19	39/83 =46.99	40/85 =47.06	35/87 =40.23	35/87 =40.23	38.5/86 =44.77	31.5/87 =36.21	33.5/87 =38.51	26/84 =30.95	25.5/89 =28.65	26.5/88 =30.11	27/85 =31.76	28/87 =32.18
4. Finnish				84/93 =90.32	82/92 =89.13	41/92 =44.57	42/92 =45.65	39.5/91 =43.41	41/92 =44.57	41/92 =44.57	35/89 =39.33	36.5/93 =39.25	36.5/93 =39.25	30/90 =33.33	31/91 =34.07
5. Estonian					82/92 =89.13	40/91 =43.96	41/91 =45.05	36.5/89 =41.01	41/91 =45.05	41/91 =45.05	35/89 =39.33	35.5/92 =38.59	35.5/93 =38.17	29/89 =32.58	31/90 =34.44
6. Livonian						38/91 =41.76	39/91 =42.87	36.5/89 =36.01	38/91 =41.76	36/91 =39.56	33/89 =37.08	32.5/97 =35.33	32.5/93 =34.94	27/88 =30.68	29/91 =31.87
7. Mokša Mordvin							96/98 =97.96	38/93 =40.86	36.5/97 =37.63	35.5/98 =36.22	31/92 =33.70	31.5/97 =32.47	31.5/97 =32.47	31/93 =33.33	32/95 =33.68
8. Erzya Mordvin								38/93 =40.86	37.5/97 =38.66	35.5/98 =36.22	31/92 =33.70	31.5/97 =32.47	31.5/97 =32.47	31/93 =33.33	32/95 =33.68
9. Mari									46/93 =49.46	46.5/93 =50.00	31/90 =34.44	38/94 =40.43	37/94 =39.36	28/92 =30.43	31/93 =33.33
10. Udmurt										84.5/97 =87.11	38/92 =41.30	35.5/97 =36.60	34.5/97 =35.57	32/93 =34.41	33/95 =34.74
11. Komi Zyryan											35/92 =38.04	33.5/97 =34.54	33.5/97 =34.54	33/93 =35.48	34/95 =35.79
12. Hungarian												44/94 =47.81	43/94 =45.74	39/92 =42.39	42/93 =45.14
13. North Mansi													95/98 =96.94	66/95 =69.47	58.5/96 =60.94
14. East Mansi														62/95 =65.26	59.5/96 =61.98
15. South Khanty															82/95 =86.32
16. East Khanty															–

These figures can be transformed into a tree diagram whose topology is practically identical with the model of the Starostin team, and not very far from the results of Lehtiranta (in the construction of diagram 6 Saamic and 6 Finnic languages were included (see Novotná & Blažek 2008–09[2010]), whose word-lists are given in Appendices 1 & 2:



*Note: The lexical data were collected at the end of the 19th century by Paasonen (Mordvin) and Munkácsi (Mansi); thus the calculated dating of disintegration should be shifted back into the past by about a century.

Alternatively, the mutual relationships of the Finno-Ugric languages can be depicted in the form of a net. The figures represent percentages of the common basic lexicon. The highest values identify neighbours.



Conclusion

According to our results, Mordvin stands closer to Finnic (43.98%; to Finno-Saamic 42.18%) and Mari closer to Permic (49.73%), than Mordvin to Mari (40.86%). Two other independent studies (Lehtiranta 1982; Starostin 2004), applying a quantitative approach based on a comparison of core lexicons, give analogous results. Yet more significant figures are obtained if the numbers of all exclusive lexical isoglosses are compared: Finnic-Mordvin: *c.* 110 isoglosses, Mari-Permic: *c.* 150, but Mordvin-Mari: 20 (Bereczki 1977, 57–77; 1978–79[1982], 88; 1988, 314). These lexicostatistical results may be supported by results of historical phonetics and morphology, as seriously discussed by Bereczki (1974; 1978–79[1982]; 1988). Mordvin agrees with Finno-Saamic for example in the differentiation of reflexes of long and short vowels, as opposed to Mari (cf. Itkonen 1969, 90-91; Bereczki 1974, 83). Serebrennikov (1967, 32–33) has found two exclusive morphological isoglosses between Mordvin and Mari: (i) Mordvin comitative in *-śek/-ćek* vs. Mari temporal adverbs in *-sek/-śek*; (ii) Mordvin comitative in *-ńek* vs. Mari suffix of collective numerals and essive in *-nek/-ńek*. Bereczki (1974, 82–83; 1978–79[1982], 86–87) has convincingly demonstrated the separate origins of both Mordvin and Mari suffixes. As regards other morphological parallels, cognates from other branches confirm that they represent archaisms, not common innovations indicating a closer genetic relationship.

On the other hand, there are numerous morphological correspondences between Finnic and Mordvin, including some exclusive ones (Bereczki 1978–79[1982], 88–89). All these arguments confirm that the concept of the 'Volgaic' unity as a genetic taxon is invalid.

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Appendix 1: Finnic word-lists and etymologies

(see Novotná & Blažek 2010)

Gloss	Finnish	Karelian	Veps	Estonian	Livonian	Votic	Etymology / Source
1a. all	*kaikki*	*kaikki*	*kaik*	*kõik*		*ke̮ikki*	< ?B: Li *kíek* how much (S 141)
1b.	(*tykkä-nään* totally)			(E *tüküs*)	*tikkiž*		BF **tükki-* S 1447-48
1c.				(*amma* till)	*amà*		FU **čama* R 52; S 53
2a. ashes	*tuhka*	*tuhka*	*tuhk*	*tuhk*	*tū'g ∂D*	*tuhka*	BF **tuška/*tučka* S 1375
3a. bark	*kuori*	*kuori*	*koŕ*	*koor*	*kuoŕ*	*koori*	FV/FU **kõre* R 184
4a. belly	*vatsa*	*vačča*	*vac*	*vats*	*va̮ts*	*vattsa*	FU **waća* R 547
4b.			*koht*	*kõht*			FP **koktɜ* R 670; S 206
5a. big	*iso*						U **ićä* R 78
5b.		*p/buabo*					< R *baba* grand-mother S 448
5c.	*suuri*	*šuuri*	*suŕ*	*suur*	*sūr*	*sūri*	?FV **śure* R 779
6a. bird	*lintu*	*lintu*	*lĭnd*	*lind*	*lind*	*lintu*	FU **linta* R 249, FU **lunta* R 254
7a. bite	*purra*	*purra*	*purda*	*purema*		*purra*	U **pure-* R 405, S 655-56
7b.	(*jämsätä* scratch)				*jamstð*		BF **jämsä-* S 130
8a. black	*musta*	*musta*	*must*	*must*	*muštà*	*mussa*	BF **musta* S 353
9a. blood	*veri*	*veri, veŕi*	*veŕi*	*veri*	*ver*	*veri*	FU **wire* R 576
9b.		(*čakka* mos-quito)	*čak*				S 951
10a. bone	*luu*	*luu*	*лu*	*luu*	*lū*	*лū*	U **luwe* R 254
10b.	(*kontti* shin, leg)			*kont*			?FU **konte* S 216
11a. breast	*rinta*	*rinta*	*ŕind*	*rind*	*rīnda*	*rinta*	< Sc. **strinða-* S 803-04
12a. burn tr.	*polttaa*	*polttoa*	*paлa-da*	*põleta-ma*	*palattaa*	*polottaa*	FU **paľa* R 352
13a. claw	*kynsi*	*kynsi*	*küüs*	*küńź*	*kīntš*	*tšĭ̄si*	FU/U **künče* R 157
14a. cloud	*pilvi*	*pilvi*	*pilʃ*	*pilv*	*pīla*	*pilvi*	FU **pilwe* R 381

Gloss	Finnish	Karelian	Veps	Estonian	Livonian	Votic	Etymology / Source
15a. cold	*kylmä*	*kylmä*	*külm*	*külm*	*kīlma*	*tšülmä*	FP **külmä* R 663
15b.	(*vilu* arch.)	*vilu*	*viлu*				BF **vilu* S 1770-71
16a. come	*tulla*	*tulla*	*tuu̯da*	*tulema*	*tūlda*	*tulöa*	U **tule-* R 535
17a. die	*kuolla*	*kuolla*	*koлda, -uda*	*koolma*	*kūolõ*	*koollaa*	U **kola-* R 173
17b.				*surema*			FU **śure-* R 489
18a. dog	*koira*	*koira*	*koir*	*koer*		*koira*	U **koj(e)-ra* R 168
18b.					*piņ*		?FU/FP **pene* R 371
19a. drink	*juoda*	*juuva*	*ǵöda/ ďöda*	*jooma*	*jūodõ*	*joo*	FU **juye-* R 103
20a. dry	*kuiva*	*kuiva*	*kuiv*	*kuiv*	*kõuv/ kȭvaz*	*kuiva*	FU **kujwa* R 196
21a. ear	*korva*	*korva*	*korv*	*kõrv*	*kūora*	*körva*	U **kåwɨ* H 538
22a. earth	*maa*	*mua*	*ma*	*maa*	*mõ*	*maa*	U **maye* R 263
23a. eat	*syödä*	*syyvvä*	*söda*	*sööma*	*sīedõ*	*söö*	FU **sewe-/*seye-* R 440
24a. egg	*muna*	*muna*	*muna*	*muna*	*muna*	*munö*	U **muna* R 285
25a. eye	*silmä*	*šilmä*	*süum*	*silm*	*sīlma*	*silmä*	U **śilmä* R 479
26a. fat n.	*rasva*	*rasva*	*razv*	*rasv*	*razā*	*razva*	BF **rasva* S 742
27a. feather	*sulka*	*šulka*	*suu̯g*	*sulg*		*sulka*	FS **sulka* S 1102 ?U **tulka* R 535-36
27b.	*höyhen*	*heühen*	*hüuneh*	*?ehme*		*evē*	?BF **š/čewš/čem-* or **š/čewmeš/č-* S 101
27c.					*kērat∂b tūrg∂z*		
28a. fire	*tuli*	*tuli*	*tuli*	*tuli*	*tu'l'*	*tuli*	U **tule* R 535
28b.			*l'eskus*				
29a. fish	*kala*	*kala*	*kaлa*	*kala*	*kalā*	*kala*	U **kala* R 119
30a. fly v.	*lentää*	*lentyä*	*l'eta*	*lendama*	*lind∂*	*lentää*	BF **lentä-* S 287
31a. foot	*jalka*	*jalka, jalgu*	*ǵaug*	*jalg*	*jālga*	*jalka*	FU **jalka* R 88
32a. full	*täysi*	*täysi*	*t'äuź*	*täis*	*täuž*	*täüz*	FU **täwδe* R 518
33a. give	*antaa*	*antua*	*antta*	*andma*	*andõ*	*anna*	FU **amta-* R 8
34a. good	*hyvä*	*hyvä*	*hüvä*	*hea*	*jõvā*	*üvä*	FV/?FU **šewä/šeŋä* R 499
35a. green	*vihreä*	*vihrie*	*vihand*			*viher*	FP **wiša* R 823
35b.	(*haljas* light)			*haljas*	*å̮l'az*	*al'l'az*	< B **źalias* S 51
35c.				*roheline*			
36a. hair	*hapsi*						U **apte* R 14

Gloss	Finnish	Karelian	Veps	Estonian	Livonian	Votic	Etymology / Source
36b.	*hius*	*hivuš*	*hibus*	*juus*	*ibūks*	*ivuz*	BF *(š/č)iwus/ś- S 78
36c.	*tukka*	*tukka*	*tuk*	*tukk*			FS *tukka S 1386
37a. hand	*käsi*	*käsi*	*käźi*	*käsi*	*kež*	*tšäsi*	FU *käte R 140
38a. head	*pää*	*piä*	*pä*	*pea*	*pǟ*	*pǟ*	U *päŋe R 365
39a. hear	*kuulla*	*kuulla*	*kuu̯da*	*kuulma*	*kūlō*	*kūllua*	FU *kule- R 197
39b.			*heŋǵ*				
40a. heart	*sydän*	*südän*	*süda*	*süda*	*sidām*	*süä*	U *śüδäm R 477
41a. horn	*sarvi*	*šarvi*	*saŕvi*	*sarv*	*saru, sō̱ra*	*sarvi*	FU *śorwa R 486 < Iran
42a. I	*minä*	*mie*	*mina*	*mina, ma*	*minā / ma*	*miä*	U *mun J 232; R 294
43a. kill	*tappaa*	*tappua*	*tapta*	*tapma*	*tappə̑*	*tappā*	U *tappa- R 509
43b.			*ŕikta*				S 797-98
44a. knee	*polvi*	*polvi*	*poľv*	*põlv*	*pūola*	*pölvi*	U *polwe R 393
45a. know	*tietää*	*tietyä*	*ťeta*	*teadma*	*tīedə̑*	*tǟtǟ*	BF *tēttä-? S 1285
45b.	*tuntea*	*tuntie*	*tu(n)tta*	*tundma*	*tundə̑*	*tundə̑*	U *tumte- R 536
46a. leaf	*lehti*	*lehti*	*ľehtez*	*leht*	*lēḏ*	*lehto*	FV *lešte R 689
47a. lie	*maata*	*muata*	*magatta*	*magada*	*magàtə̑*	*magata*	BF *maka- S 326
47b.	(*levätä* rest)	(*lebäü-düö*)	(*ľeba̧i-tazę*)	*lebama*			BF *lewä- S 289
48a. liver	*maksa*	*makša*	*maks*	*maks*	*maḵsà*	*mahsa*	U *maksa R 264
49a. long	*pitkä*	*pitkä*	*piťk*	*pikk*	*pitkā*	*pittšä*	U *piδkä R 377
50a. louse	*täi*	*täi*	*ťäi*	*täi*	*teì*	*täi*	FU *täje R 515
51a. man	*mies*	*mieš*	*meź*	*mees*	*mìez*	*meez*	BF *mēće S 345 :: Ug *mańćɜ R 866
51b.			*mužik*				< R *mužik*
52a. many	*paljon*			*palju*	*pǟgiṇ*	*palljo*	U *paljɜ R 350-1
52b.		*äijä(n)*	*äi*				FP *äje R 609
52c.					*jennə̑*		U *enä R 74-75; S 40
53a. meat	*liha*	*liha*	*ľihä*	*liha*	*lejà*	*liha*	FS *likša S 292
53b.					*vȯzā*		?FU/FV *ońća S 333
54a. moon	*kuu*	*kuu*	*ku*	*kuu*	*kū*	*kū*	U *kuŋe R 211-12
55a. mountain	*vuori*	*vuori* < Fi					U *wōre R 571; S 1821
55b.	(*mäki* hill)	(*mägi* hill)	*mägi*	*mägi*	*mä'g*	(*mäči* hill)	FU *mäke R 266; S 358

Gloss	Finnish	Karelian	Veps	Estonian	Livonian	Votic	Etymology / Source
56a. mouth	*suu*	*suu*	*su*	*suu*	*sū*	*sū*	U **śuwe* R 492
57a. name	*nimi*	*ńimi*	*ńimi*	*nimi*	*nĭ'm*	*nimi*	U **nime* R 305
58a. neck	*kaula*	*kakla*	*kagɲ*	*kael*	*ka'ggə̑l*	*kagla*	< B: Li *kāklas*, La *kakls* S 173
59a. new	*uusi*	*uusi*	*uz*	*uus*	*ūž*	*ūsi*	FU **wuδ'e* R 587
60a. night	*yö*	*yö*	*ö*	*öö*	*īe*	*i*	FU **üje* R 72
61a. nose	*nenä*	*ńenä*	*ńenä*	*nina*	*nanā*	*nenä*	FS **ńenä* S 372-73
62a. not	*ei*	*ei*	*ii*	*ei*	*ā'B*	*ei*	FU **e/*ä* R 68; S 32
63a. one	*yksi*	*üksi*	*üks*	*üks*	*ikš*	*ühsi*	FU **ükte* R 81
64a. person	*ihminen* d. *inehmo*	*ińehmińe*	*ińehmoi*	*inimeme*	*imi* (Sal.)	*inehmīn*	FV **inše* R 627 Sm: Enets *enneťe* S 102
64b.					*rištīng*		< OR *krъstъ* S 813
64c.			*meź*				= #51
65a. rain n.	*sade*			(*sadu* arch.)	*sa'd*	*sato*	FS **śaδa-* S 979-81 < U **śådå-* H 530
65b.	(*vihma* drizzling)	*viima*	*vihm*	*vihm*			BF-L **wišma* S 1738
66a. red	*punainen*			*punane*	*pu 'nni*		FU **puna* hair R 402
66b.	(*ruskea* arch.)	*ruskie*	*rusked*				FS **ruśkeδa* < B: La arch. *rušķs* ash-colored S 880-82
66c.						*kauniz*	< G **skauniz* nice
67a. road	*tie*	*tie*	*ťe*	*tee*		*tē*	FP **teje* R 794
67b.	(*retki* arch.)				*rek̄*		BF **retkɛ* S 773 < Iran
68a. root	*juuri*	*juuŕi*	*juŕ*	*juur*	*jūŕ*	*jūri*	?FP/FV **jure* R 639
69a. round	*pyöreä*	*pyörie*	*pörüdä*				FU **peŋerä* R 372; S 678
69b.	(*ympyräinen* arch.)			*ümmar*	*immə̑r-goutlimi*	*ümmärkẹin*	BF **ümpürɜ* / **ümpärɜ* ? S 1862-63
69c.	(*kehkerä* convex)		*ǩehkar*				FV **kečkerä* U 655; S 176
70a. sand	*hiekka*, *hiukka*				*jẹugə̑*		?BF **č/šiwkkɜ* S 78

Gloss	Finnish	Karelian	Veps	Estonian	Livonian	Votic	Etymology / Source
70b.	(*liete* mud)	*lieto*	*ľete*	(*leede* sand-rock)	(*lìedə̑G* ajo-hiekka)		FS **lētɜ* S 291
70c.		*čuuru*	*čur*				FS ?**śiwrɜ* : Mansi *sir* S 1076
70d.				*liiv*		*līva*	FU **liwa* R 250; S 294
71a. say	*sanoa*	*s/šanuo*	*sanuda*				BF **sana* word S 964-65
71b.	(*jutella* talk)			*ütlema*		*juɐ̯лла*	FU/FV **jukta-* R 104; S 126
71c.	(*kiittää* praise)	(*kiittä-* id.)	(*kiťťa* id.)	(*kiita* id.)	*kītə̑*	(*tšīttǟ* id.)	BF **kīttɜ* S 192
72a. see	*nähdä*	*nähä*	*ńähta*	*nägema*	*nǟ'də̑*	*nähä*	FU **näkä* R 302
73a. seed	*siemen*	*š/siemen*	*ś/semen*	*seeme*	*sɨɛmgə̑z*	*seemee*	< B **sēmen-* S 1008
74a. sit	*istua*	*istuo*	*ištta*	*istuma*	*ištə̑*	*issua*	FV **isɜ* R 629; S 109
75a. skin	*iho*	(*iho* face)		*ihu*		*iho*	FP **(j)iša* R 636
75b.	*nahka*	*nahka*	*nahk*	*nahk*	*nə̄'gə̑*	*nahka*	?FU **ńačkɜ* R 311; S 364
75c.				*kõba*			U **kopa* R 180 = **kopå* H 537
76a. sleep	*nukkua*	(*ńukkuo* dream)	(*nukta* dream)			*nukkua*	FS **nukku-* S 397-98
76b.		*moata*	*magatta*	*magama*	*ma'ggə̑*	*magata*	= 47
77a. small	*pieni*	*pieni*	*peń, piń*	(*peen* fine)	(*pìɐ̯n* thin)	*pēni*	BF **pēnɜ* S 539
77b.	*pisku*			*pisut*, g. *pisku*	*piški*		S 578: Ud *pići*; Hu *pici* (descript.)
77c.	*pikku*	*pikkańe*				*pikka-rain*	S 557: hypocorist. *pisku*
77d.	*vähä*, *-inen*	*vähä*	*vähä*, *-ińe*	*vähene*	*və̄'ǩki* < **vähäk-käinen*	*vähä*	FV **wäšä* R 818; S 1830-31
78a. smoke n.	*savu*	*s/šavu*	*savu*		*so'u*	*savvu*	FV **sawe* R 754
78b.	(*suitsu* arch.)			*suits*			FS **śuńćɜ* S 1092-93
79a. stand	*seisoa*	*šeisuo*	*seišta*	*seisma*		*sɐ̯izoa*	FU **saŋća* R 431; S 990-91
79b.					*pīlə̑*		
80a. star	*tähti*	*t(e)ähťi*	*tähtaz*	*täht*	*tēḏ*	*tähti*	FV **täštä* R 793; S 1472-73

Gloss	Finnish	Karelian	Veps	Estonian	Livonian	Votic	Etymology / Source
81a. stone	*kivi*	*kivi*	*kivi*	*kivi*	*kiv*	*tšivi*	FU **kiwe* R 163
82a. sun	*päivä*	*päivä*	*päiväine*	*päike*	*pā̆va*	*päivikko*	FU **päjwä* R 360; S 680-81
82b.	*aurinko*						FV **aŋre/*amre* S 29
83a. swim	*uida*	*uija*	*ujuda*	*ujima*	*vȯ̀igə̂*	*ujua*	U **uje-/*oje-* R 542; S 1518-19
84a. tail	*häntä*	*händä*	*händ*	(*händ* arch.)		*äntä*	FU **čänčä* S 98
84b.	*pyrstö*	*puršto*					< G **burstō* S 657
84c.				*saba*			< B **stabas* S 969
84cd.					*tabār*		< B **stabara-* S 969
85a. that	*tuo*	*tuo*		*too*	*t(u)oi*	*tò*	U **to* R 526; S 1403-04
85b.			*nakka-лаińe*				cf. Veps *nakkaлo* there
86a. this	*tämä*	*tämä*	*t'ämä*				U **tä* R 513-14
86b.	(*se* that/ this)		*se*	*see*	*se*	*se*	U **će / *ći* R 33
87a. thou	*sinä*	*sie*	*sina*	*sina, sa*	*sinà, sa*	*siä*	U **tun* J 232; R 539
88a. tongue	*kieli*	*kieli*	*keľ, k´el*	*keel*	*kēľ*	*tšēli*	U **kēle* R 144
89a. tooth	*hammas*	*hammas*	*hambaz*	*hammas*	*āmbaz*	*ammaz*	< B **źambas* id. S 54
90a. tree	*puu*	*puu*	*pū, puu̯*	*puu*	*pū*	*pū*	U **puwe* R 410
91a. two	*kaksi*	*kakši*	*kakś*	*kaks*	*kakš*	*kahsi*	U **kakta/*käktä* R 118
92a. walk	*kulkea*	*kulge-*					U **kulke-* R 198; S 233
92b.	(*astua* marsh)	*aštuo*	*astta*	*astuda*	*aštə̂*		BF **astɜ* S 27
92c.	*mennä*	*mäne-*	*mändä*	*minna*		*mennä*	U **mene-* R 272; S 340
92d.	*käydä*	*kävvä*	*kävuda*	*käima*	*kä'uvvə̂*	*tšävvä*	FV **käwe-* R 654; S 264
93a. warm	*lämmin*	*lämmin*	*l'äm(b)*		*lem*		FV **lämpɜ* R 685; S 320
93b.	*suoja*			*soe*		*sōja*	FP **saja* shadow R 748; S 1111
94a. water	*vesi*	*vesi*	*veźi*	*vesi*	*ve'iž*	*vesi*	U **wete* R 570
95a. we	*me*	*müö*	*mö*	*me, meie*	*mēG*	*mə̄*	U **me/*mä* J 268; R 294

Gloss	Finnish	Karelian	Veps	Estonian	Livonian	Votic	Etymology / Source
96a. what	*mikä*	*mi*	*mi*	*mis*	*mis*	*mikä*	U **mi* R 296; S 343
97a. white	*valkea*	*valkie, -gie*	*vâuged*	*valge*	*vālda*	*vaŋkẹa*	FU **walkɜ* R 554; S 1621
98a. who	*kuka*	*ku*					U **ku/*ko* R 191; S 230
98ab.	*ken*		*ken*			*tšen*	U **ke/*ki* R 140; S 181
98ac.				*kes*	*kis*		U **ke/*ki* R 140; S 181
99a. woman	*nainen*	*naine*	*naine*	*naine*	*naì*	*nain*	FU **naje* R 297-98; S 364
100a. yellow	*kelta, -inen*	*keldańe*	*keлd, keud*	*koldne, kollane*		*kẹltẹn*	< B **geltas, *geltānas* S 180
100b.					*vīri*		= #35

Abbreviations of languages: B Baltic; BF (Balto-)Finnic; FP Finno-Permic; FS Finno-Saamic; FU Finno-Ugric; FV Finno-Volgaic; G Germanic; Hu Hungarian; La Latvian; Lithuanian; N North; O Old; R Russian; Sm Samoyedic; U Uralic; Ud Udmurt; Ug Ugric.

Appendix 2: Saamic wordlists and etymologies

(see Novotná & Blažek 2010)

Gloss	South	Lule	North	Inari	Skolt	Kildin	Etymology
1a. all	*gaajhke*	*gájkka*					< F *kaikki* (S 141)
1d.			*buot*	*puoh*	*puk*	*pugk*	**põhkẹn/-k*
2b. ashes	*govne*	*gudna*	*gutna*	*kunnâ*	*kunn*	*kunn*	**kunẹ* < FP **kunV*
3b. bark	*baarh-koe*	*bárkko*	*bárku*	*párkku*	*pärkk*	*pārrk*	**pārkkō* < Sc **barku-*
4c. belly	*tjåejjie*	*tjoajvve*	*čoavji*	*čuávji*	*čåu'jj*	*čuejjv*	**ćōwjē* < U **ćowja/*ćojwa*
5d. big	*stoere*	*stuores*	*stuoris*	*styeres*			**stōrē-* < G **stōra-*
5c.					*šurr*	*šurr*	< F *suuri*
6ab. bird	*ledtie*	*lådde*	*loddi*	*lodde*	*lå'dd*	*loannɔt*	**lonDē* < FU **lunta*
7c. bite	*gaets-kedh*	*gássket*	*gáskit*	*käskid*	*käˇck ˇ-kˇed*	*kācc'ke*	**kāckē-* < FV **kačka*
8b. black	*tjååh-pehke*	*tjáhppat*	*čáhppat*	*čappâd*	*čappâd*	*čoa'pe*	**ćāppẹ*
9a. blood	*vïrre*	*varra*	*varra*	*vorrâ*	*võrr*	*vērr*	**veri* < FU **weri*
10c. bone	*måaroe*						
10d.		*dákte*	*dákti*	*tähti*	*tä'htt*	*tāxx't*	**tāktē* < FU **täktä*
11b. breast	*njam-mah*			*njamah*			cf. Komi *ńima·v-* suck (R 83)

Gloss	South	Lule	North	Inari	Skolt	Kildin	Etymology
11c.		*njittje*					**ńińćē* < FS **ńińśä* S 386
11d.			*čiččit*				**činǯē* < U **śünśä*
11e.			*mieľgâ*	*mieľka*			**mēlkę* < FU **mälye*
11a.	*rāddie*	*raddē*	*râďde*	*radde*	*rââďdd*	*ranɔ̄t*	**rę̄ntē* < FS **rinta* < Sc **strinða-*
12a. burn tr.	*boål-ďedh*	*buollet*	*buollit*	*pyelliđ*	*pue'lled*	*pūlle*	**pōlDē-* < *FV **polta-* from U **pala-*
13a. claw	*gadtse*	*gadtsa*	*gazza*	*kozzâ*	*kōʒʒ*	*kēnnc*	**kęnʒę* < FU **künçi*
14a. cloud	*balve*	*påltēt*	*boaľdet*	*poaldiđ*	*puäˇld-ded*	*pueˇľdeð*	**pęlvę* < FU **pilwi*
15a. cold	*galmes*	*galmas*	*galm-mas*	*koolmâs*	*kōōlmâs*	*kelmas*	**kęlmē-* < FP **külmä*
16b. come	*båetedh*	*boahtet*	*boahtit*	*puáttiđ*	*pue'tted*	*puedtë*	**pōtē-*
17c. die	*jae-medh*	*jábmet*	*jápmit*	*jääm-mid*	*jää'm-med*	*jämme*	**jämē-* < FV **jama-*
18b. dog	*bïenje*	*bena*	*beana*	*peenuv*	*piânnai*	*pjēnne*	**peanē* < FP **penä*
19a. drink	*jovh-kedh*	*juhkat*	*juhkat*	*juuhâd*	*juukkâd*	*jugke*	**jukê-* < FU **juxi-*
20b. dry	*gejhkie*	*gåjkes*	*goikkis*	*koškes*	*kåå'š-kˇes*	*koašš'k*	**kośkę-* < U **kośkį-*
21b. ear	*bieljie*	*biellje*	*beallji*	*pelji*	*pe'llj*	*pēllj*	**pealē* < FU **peljä*
22b. earth	*jåarta*						< ON *jǫrð* earth
22c.		*ednam*	*eanan*	*eennâm*	*jânnam*	*jēmm'-ne*	**eanęmę* < FU **enä-* big
23b. eat	*byöp-medidh*						
23c.		*bårråt*	*borrat*	*puurrâd*	*poorrâd*	*pōrre*	**porę-* < U **porį-*
24a. egg	*munnie*	*månne*	*monni*	*mane*	*mââ'nn*	*mannъ*	**monē* < U **muna*
25a. eye	*tjelmie*	*tjalmme*	*čalbmi*	*čalme*	*čâ'lmm*	*čalľm*	**ć̆almē* < U **śilmä*
26b. fat n.	*voeje*	*vuodja*	*vuodja*	*vuojâ*	*vuōjj*	*vūjj*	**vōję* < FU **woji*
26c.	*båedvie*						**pōδvē* < FS **poδva* (Sammallahti 1998, 200)
26d.	*buöjdie*	*puoi'tēt*	*buoi'de*	*pyejdi*	*puiˇjdd*	*pūˇjd*	**pōjtē* < ON *feitr*
27d. feather	*badtse*		*boʒ'ʒâ*	*puʒʒa*	*poʒʒ*	*pōnnc*	**poncę*
27a.		*dålgge*	*dolgi*	*tolge*			**tolGē* < FU **tulka* < U **tuxlį*
28a. fire	*dålle*	*dållå*	*dolla*	*tullâ*	*toll*	*tōll*	**tolę* < U **tulį*
29a. fish	*guelie*	*guolle*	*guolli*	*kyeli*	*kue´ll*	*kūlľ*	**kōlē* < U **kala*
30b. fly v.	*haelieh-tidh*	*háledit*					**ālē-*

Gloss	South	Lule	North	Inari	Skolt	Kildin	Etymology
30c.			*girdit*	*kirdeđ*	*kˇi'rd-ded*	*kyrr'te*	**kirDē-* < FS **kīri-+-tä-*
31a. foot	*juelkie*	*juolgge*	*juolgi*	*jyelgi*	*jue´lg̊g̊*	*jūllɔk*	**jōlGē* < FU **jl̥ka*
32b. full	*dïeves*	*dievas*	*dievva*	*tievâs*			**tēvę* < FU **täwi*
32bb.					*tiiudâs*	*tīvtas*	**tēvDę-* < FS **täwti*
33a. give	*väd-ďedh*	*vaddēt*	*addit*	*adeliđ*	*â'dded*	*annɔte*	**ęntē* < F *anta-*
34b. good	*buerie*	*buorre*	*buorre*				**pōrē-* < FP **pa/ęra*
34a??				*šiev*	*šiōgg*	*šīg*	
35d. green	*kruana*	*ruonas*	*ruonas*	*ruonâs*	*ruōnâs*	*ruenn*	**(k)rōnę* < ON *grœnn*
36a. hair	*voepte*	*vuobd-da*	*vuokta*	*vuoptâ*	*vuõptt*	*vūppt*	**vōp^{h}tę* < U **ipta*
37a. hand	*gïete*	*giehta*	*giehta*	*kietâ*	*kiõtt*	*kīdt*	**kētę* < FU **käti*
38b. head	*åejjie*	*oajvve*	*oaivi*	*uáivi*	*vuei'vv*	*vuejjv*	**ōjvē* < U **ojwa*
39a. hear	*govledh*	*gullat*	*gullat*	*kuullâd*	*kuullâd*	*kulle*	**kulę-* < FU **kūli-*
40b. heart	*vaaj-moe*	*vájmmo*	*váibmu*	*váimu*			**vājmō* < FV **wajma*
40c.					*čââ'd*		**ć̊ęδēm* < U **śüδ'ä-*
40d.						*kūttɔk*	
41a. horn	*tjåervie*	*tjoarvve*	*čoarvi*	*čuárvi*	*čuă'rvv*	*čuerr'v*	**ć̊ōrvē* < FU **śorwa*
42a. I	*manne*	*mån*	*mun*	*mun*	*mon*	*munn*	**mon* < U **mun*
43c. kill	*buv-vedh*						**puvē* choke < FU **puwɜ* / **puŋɜ* R 411
43d.		*gåddet*	*goddit*	*kodded*	*kå'dded*	*koannɔte*	**konDē-* < FU **kunta*
44a. knee	*boelve*	*buolvva*			*puõlv*	*pūllv*	**pōlvę* < U **polwi*
44b.			*čibbi*				
44c.				*iidâ*			
45c. know	*daej-redh*	*tai'tēt*	*dai'det*	*täiđiđ*	*täi'dded*		**tājδē* < F *taita-*
45a.		*diehtet*	*diehtit*	*tiettid*	*tie'tted*	*tīdtë*	**tētē* < F *tietä-*
45b	*dåb-dedh*	*tåb'tåt*	*dow'dât*	*tubdađ*	*tobddâd*	*tomdeδ*	**tomDę-* < U **tumtį-*
46a. leaf	*laste*	*lassta*	*lasta*	*lostâ*	*lõstt*	*lēsst*	**lęstę* < FV **lešti*
47c. lie	*gælla-sjidh*						
47d.		*vellahit*	*veallát*	*viällåđ*			**vēllę*
47e.					*liâššâd*	*lēšše*	**lēššę* < Ru *ležáť* S 322
48b. liver	*librie*	*librre*					**liBrē* < ON *lifr*
48c.			*vuoiv-vas*	*vuoivâs*	*vuoivâs*	*vūjvas*	**vōjvę*
48a.	*muöksie*						**mōksē* < U **maksa*
49b. long	*guhkie*	*guhkke*	*guhkki*	*kukke*	*ku'kˇkˇ*	*ku'k'*	**kuhkē* < FU **kawka*

Gloss	South	Lule	North	Inari	Skolt	Kildin	Etymology
50a. louse	*dihkie*	*dihkke*	*dihkki*	*tikke*	*te'kˇkˇ*	*tyhk'*	**tikkē* < FU **täji*
51c. man	*kaarre*						
51d.		*ålmåj*	*alm-măi / olmmăi*	*almai*	*olma*	*oalma/ olma*	**ęlmāj* : **ęlmē* air, world < FU **ilma* air, wind; cf. F *ilminen* man
51e.			*dievdu*				< ON *þjóð*
52c. many	*jïjnjh*					*jēnne*	**eanē-* < FU **enä-* big
52d.		*máŋŋga*	*mánga*	*maŋgâ*	*mängg*		< Sc. **manga-*
53c. meat	*åedtjie*	*oadtje*	*oažži*	*uážži*	*vuä´šš*	*vuennč*	**ōńš̆ō/ē* < FU **onśa*
54a. moon	*aske*						cf. Farch./d. *ehtä / ehkä* new moon (S 34-35)
54b.		*mánno*	*mánnu*	*máánu*	*määnn*	*mānn*	**mānō* < Sc **mānan-*
55c. mountain	*tjahke*						**ć̆okkę* < FS **śokka* S 1062
55d.	*vaerie*	*várre*	*várri*	*vääri*	*vää'rr*		**vārē*; cf. F *vaara*
55e.						*pā'k'*	
56b. mouth	*njalmie*	*njálm-me*	*njálbmi*	*njälmi*	*njä'lmm*	*njallʼm*	**ńālmē* < FU **ńälmä*
57a. name	*nomme*	*namma*	*namma*	*nommâ*	*nõmm*	*nēmm*	**nęmę* < U **nimi*
58b. neck	*tjovrese*						
58c.		*niehkke*	*niehkki*	*niekki*			**nēkkē* < Sc
58d.					*njïšk'kˇ--madd*	*njšš'k*	**ńēškkē* < F *niska* nape of neck (S 385)
58e.	*tjeä-buoh*	*tjiepēt*	*čæbēt*	*čeve*	*čeäppat*	*čābbeð*	**ć̆eaBē/ōttē* < FU **śepä*
59a. new	*orre*	*ådås*	*ođas*	*uuđâs*	*oođâs*	*ōdt*	**oδę* < FU **wuδ'i*
60a. night	*ïjje*	*idja*	*idja*	*ijjâ*		*ijj*	**iję* < FU **üji*
60ab?					*inn*		
61a. nose	*njuenie*	*njunne*	*njunni*	*njune*	*njuu'n*	*njunnъ*	**ńōnē* < FS**ńenä*
62a. not	*ij*	*ij*	*ii*	*ij*	*ij*	*ejj*	**ij* < U **ejV*
63a. one	*akte*	*akta*	*okta*	*ohtâ*	*õhtt*	*ēxxt*	**ęktę* < FP **ükti*
64d. person	*almetje*	*ulmusj*	*olmmoš*	*olmooš*	*åålmaž*	*olma*	**ęlmeńš̆ę,-uńš̆ę* : **ęlmē* air + dimin. **-ńš̆ę*
65c. rain n.	*ebrie*		*arvi*	*arve*	*â´brr*	*abbʼr*	**ęBrē* < II **ab^{h}ra-*
65d.	*raassjoe*	*rássjo*	*ráššu*				
66c. red	*rååp-sehke*	*ruopp-sat*	*ruoksat*	*ruopsåd*	*ruõps-sâd*	*rüppse*	**rōpsę*
67c. road	*baalka*	*bálges*	*bálggis*	*päälgis*	*pää'ljes*	*poalkas*	**pālkę* > F. *palas* S 472
68b. root	*roehtse*	*ruoht-sas*	*ruohtas*	*ruotâs*			< ON *rót*

Gloss	South	Lule	North	Inari	Skolt	Kildin	Etymology
68c.	*vieddie*	*åttēs*	*væďde*	*veddi*	*vueďdes*	*vuennɔt*	**ōntē* / **veantē* < FV **ontV*
69d. round	*jor-pehke*	*jårbbåt*	*jorbbas*	*juurbâs*	*joorbâs*	*jorpas*	**jorpę* : **jorę* go round
69e.	*b'ijre*	*pirra*	*birrâ*	*pirra*	*pirr*	*pi̯r*	**pirę* < FV **pīri*
70e. sand	*saedtie*	*sáttoj*	*sáttu*				**sęntē/ō*; cf. F *santa* id. < ON *sandr*
70f.				*čunoi*			
70g.					*vuõddâs*	*vūntas*	**võntę*
71d. say	*jiehtedh*						
71e.		*javllat*					
71f.			*lohkat*				**lokē* < *FU *luke* S 307
71g.			*dadjat*				
71h.				*ettâđ*			
71i.					*ceä´lkˇ-kˇed*	*cē̯ļ'ke*	**cealhkē-*
72b. see	*vuej-nedh*	*vuojn-net*	*oaidnit*	*uáiniđ*	*vuei'n-ned*	*ujjne*	**ōjnē-* < II **vaina-*
73b. seed	*saajoe*	*sádjo*					< ON *sáð & sæði* seed
73a.			*siepman*	*siemâ*	*siõm*	*sēm*	**sēmęn* < F < B **sēmen-*
74b. sit	*tjahka-sjidh*	*tjåhk-kåhit*	*čohkkát*	*čokkáđ*			**ć́okē-*
74c.					*išttâd åårrad*	*i̯šše oerre*	< F *istu-*
75d. skin	*njaltja*						
75e.		*lijkke*	*liiki*	*liške*	*leˇškˇkˇ*	*li̯šš'k*	**liškē* < FS **likša*
76c. sleep	*åeredh*	*oadet*	*oađđit*	*uáđđiđ*	*vueď-đed*	*vuedtë*	**oaδē-* < FU **oδa-*
77e. small	*onne*	*unne*	*unni*				**uhcē*
77ee.				*ucce*	*uˇcc*	*udcˇ*	**uhcē*; cf. FU **üćä* id.?
77f.	*smaave*	*smavvē*	*smāves*	*smaa-vas*	*smaa-vâs*	*mɑɑvv*	**māvē* < Sc.: Sw *små*
78a. smoke n.	*soeve*	*suovva*	*suovva*	*suovâ*	*suõvv*	*suvv*	**sõvę* < FV **sawe*
79a. stand	*tjåad-tjodh*	*tjuod-tjot*	*čuožžut*	*čuážžuđ*	*čueǯǯad*	*čuennče*	**ć́õńǯ̌õ* < FU **śaŋśi-*
80a. star 80aa. 80aaa.	*naestie* *daastaa*	*násste*	*násti*	*täsni*	*tä'snn* *tä'stt*	*tāss't*	**nāstē* < **tāsnē* **tāsnē* **tāstē* < FV **täštä*
81b. stone	*gierkie*	*giergge*	*geađgi*	*keđgi*	*keäďđğğ*	*kēddɔk*	**keaδGē*
82a. sun	*biejjie*	*biejvve*	*beaivi*	*peivi*	*peiˇvv*	*pējjv*	**peajvē* < U **päjvä*
83a. swim	*voejedh*	*vuodjat*	*vuodjat*	*vuoijâđ*	*vuõjjâd*	*vūje*	**võję-* < U **uji-/*oji-*

Gloss	South	Lule	North	Inari	Skolt	Kildin	Etymology
84e. tail	*siejpie*	*siejbbe*	*seaibi*	*seibi*	*sei'bb*	*sējjp*	**seajpē* < U **sejpä*
85a. that	*dohte*	*duot*	*duot*	*tuot*	*tut*	*tudt*	**tuo-tę* < FU **tō-*
86a. this	*daate*	*dát*	*dát*	*táát*	*tät*	*tādt*	**tā-* < U **tä-*
87a. thou	*datne*	*dån*	*don*	*tun*	*ton*	*tōnn*	**ton* < U **tun*
88b. tongue	*njoek-tjeme*	*njuov-tjav*	*njuovč-ča*	*njuovčâ*	*njuhč-čâm*	*njuxx-čem'*	**ńuokʰć̓ęm* < FU **ńokćimi*
89b. tooth	*baenie*	*bádne*	*bátni*	*pääni*	*pää'nn*	*pānnъ*	**pānē*
90b. tree	*moere*	*muorra*	*muorra*	*muorâ*	*muõr*	*mūrr*	**mōrę* < FU *?*morV*
91a. two	*göökte*	*guokta*	*guokte*	*kyehti*	*kuõ'tt*	*kū't*	**kōkʰtē* < U **ka/ektä*
92e. walk	*vaedt-sedh*	*vádtset*	*vázzit*	*väzziđ*	*vä'ʒʒed*	*vānnъce*	**vānʒē-* < FU **wančạ-*
92c.	*m'în-nedh*	*mannat*	*mânnât*	*moon-nađ*	*mõõn-nâd*	*męęneδ*	**męnę-* < U **meni-*
93c. warm	*baahkes*	*báhkas*	*báhkas*	*paahâs*		*poakas*	**pāhkęs* < FS **pakka-*
93d.					*puõ'lli*		
93e.	*liëgges*	*liekkas*	*lieggâs*	*liegas*	*liõggâs*	*lĭŋgas*	**lēŋkę*; cf. F *lenkä* breath
94b. water	*tjaetsie*	*tjáhtje*	*čáhci*	*čääci*	*čää'cc*	*čādc'*	**ć̆ācē* < FU **śäčạä*
95a. we	*mijjeh*	*mij*	*mii*	*mij*	*mij*	*myjj*	**mij* < U **me-*+ pl. **-j*
96a. what	*mij*	*mij*	*mii*	*mii*	*mii*	*mī*	**mī/*mę* < FU **mi*
97a. white	*vyöl-kehke*	*vielggat*	*vielgat*	*vielgâd*	*viõlggâd*	*vīllke*	**vēlGęDē* < FU **wälki- / *wi̯lki-*
98abc. who	*gie*	*gij*	*gii*	*kii*	*kˇii*	*kē*	**kea-* ~ **ki-* < FU **ke-*
99b. woman	*nyjsene*		*nisu*	*nissoon*	*neezzan*	*nyzan*	**nisōn / *nisunę-* < FV **nisV* (R 708)
99c.		*gujnna*					
100c. yellow	*vys-kehke*	*visskat*	*fiskat*	*viskâd*	*viskkâd*		**viskę*
100d.						*ruččke*	**rućkē* brown & BF **ruśkeδa* id. < B.; cf. La. *rušķis*

Abbreviations: B. Baltic; BF (Balto-)Finnic; F Finnish; FP Finno-Permic; FS Finno-Saamic; FU Finno-Ugric; FV Finno-Volgaic; G. Germanic; II Indo-Iranian; La. Latvian, Li. Lithuanian, ON Old Nordic; Ru Russian; Sc Scandinavian; Sw. Swedish; U Uralic.
Note: It is not excluded that Saamic #40b **wājmō* 'heart' is a Finnic loan (Aikio, p.c., April 2008).

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Appendix 3: "Volgaic" word-lists and etymologies

Gloss	Mord Moksha	Mord Erzya	Mari	Etymology
1a. all	*śem'bə̈*	*śem'bə̈*		(P IV, 2110)
1b. all		*v'eśemɛ*		U **we(ń)ćɜ* (R 568; P IV, 2627-28: E *v'eśe* ganz, all, alle)
1c. all			*čə̑la*	FP **ćilɜ* (R 613)
2a. ashes	*kulu*	*kulov,-ŋ*		FU **kuδ'mɜ* (R 194; P II, 945)
2b. ashes			*lomə̑ž*	FU **lomɜ* (R 250)
3a. bark	*kuva*	*kuvo*		U **kopa* (R 180; P II, 989)
	sud	*sud*		FP **soδɜ* (R 763)
		(*kɛ́ŕ* ~ *kə̈ŕ* Linden-rinde)		FU **kere* (R 148; LG 133) = *keri/ä* (S 543)
3b. bark			*šüm*	FU/U **śōme* (R 476)
4a. belly	*pɛ́kə̈*	*pɛ́kɛ*		FU **pikkä/*päkkä* (R 379; P III, 1592)
4b. belly			*müškə̑r*	FP **müškɜ* (R 703)
5a. big	*oťšu*	*oćuv*		cf. U **ićä* father (R 78; P III, 1416)
5b. big			*kuyu*	FV **kokɜ* (R 670)
6a. bird	*narmoń*	*narma, -uń*		(P III, 1327; RMS 477); cf. E *narvams* hatch (chicken) (ERS 145)
6b. bird			*kajə̑k*	< Chuv *kajə̑k* wildes Tier, wilder Vogel (Räs 139-40); perhaps better than Komi Zyryan *kaj* id.; cf. U **kaja(-ka)* Larus (R 117) or FU/U **käjɜ* young bird (R 133)?
7a. bite	*suskəms*	*suskoms*		U **soske-* (R 448-49; P IV, 2066)
7b. bite			*puraš*	U **pure-* (R 405) = FU **puri-* || Sm **por-* < U **porɨ-* (S 539)
8a. black	*ravža, ravᵈžə̈*	*ra(v)užo*		(P III, 1887)
8b. black			*šem*	FP **simɜ* (R 758)
9. blood	*v'eŕ* ~ *v'ɛr*	*v'eŕ* ~ *v'ə̈ŕ*	*wür*	FU **wire* (R 576) = **weri* (S 551; P IV, 2622)
10a. bone	*lovaža*	*lovaža*	*lu*	U **luwe* (R 254; P II, 1066); FU **luxi* || Sm **lé´* < U **lɨxi-* (S 538)
10b. bone	*pakaŕ*	*pakaŕ*		(P III, 1504)
11a. breast	*mäl'kə̈*	*mɛ́l'kɛ*		FU **mälye* (R 267; P II, 1235) = **mälki* (S 546)
11b. breast			*oŋ*	< Chuv *om, um* Brust; vorn (Räs 166; OT 83)
12a. burn	*pə̑lta·ms*	*pultams*		FU **paľa* (R 352; P III, 1840)
12b. burn			*jülem*	(OT 30: < Chuv *śůlə̑m*)
			koyartem	(OT 42)
13. claw	*kɛńžə̈*	*kɛnže*	*küč*	FU **künče* (R 157; LG 84; P II, 700;) = **künci* (S 544)
14a. cloud			*pə̑l*	FU **pilwe* (R 381)

Gloss	Mord Moksha	Mord Erzya	Mari	Etymology
14b. cloud	*kovə̑l*	*kovol*		FU **kumɜ* (R 204; LG 151; P II, 885) = **kumå-(lå)* cloudy (S 544)
15a. cold	*kʲeľmä*	*kʲeľme*		FP **külmä* (R 663; P II, 693)
15b. cold	*jakšamă*	*jakšamo*	*jüšta*	FU **jäkšɜ* (R 90-91; P I, 488); cf. FV **jakša* (R 631)
16a. come	*sajəms*	*sams*		U **saye-* (R 429; P IV, 1944-45)
16b. come			*tolaš*	U **tule-* (R 535)
17. die	*kulə̑ms*	*kuloms*	*kolem*	U **kola-* (R 173; P II, 942) = U **kōle-* (LG 143) = FU **kooli-* || Sm **kåə̑* < U **kåxlɨ-* (S 538)
18. dog	*pʲińä*	*pʲińe*	*pij*	FU **pene* (R 371; LG 224-25; P III, 1671) = FP **penä* (S 553)
19a. drink			*jüaš*	FU **juye-* (R 103) = **jūye-* (LG 335) = **juxi-* (S 543)
19b. drink	*śimməms*	*śimʲems*		FV **śēme* (R 773; P IV, 2154)
20. dry	*kośkʲä*	*kośkʲe*	*kukšə̑*	U **kuśka/*kośka* (R 223) FP **koksɜ* (R 670; P II, 872) = **koksɜ* (LG 134) = **koksɜ* (S 552)
21. ear	*pʲilɛ̈*	*pʲilʲe*	*pə̑lə̑š*	FU **peljä* (R 370; LG 218; P III, 1660) = **peljä* (S 547)
22a. earth	*mastə̑r*	*mastor,-ur*		(P II, 1186)
			müländə	U **maye* (LG 177) = **mɨxi* (S 546) + U **lamte* (R 235-36)
22b. earth	*moda*	*moda*		FV **muδa* (R 705; P II, 1270)
23a. eat	*jarcams*	*jartsams*		cf. Fi *järsiä*; Udm *jirjɨnį*, Komi *jirnį* nagen (Ker 44; P I, 497; R 635 connects Fi *jyrsi-* + Perm < FP **jüre-* nagen)
23b. eat			*kočkaš*	FP **kačka-* (R 641)
24a. egg	*al*	*al*		(P I, 20); cf. Md E & M *al* das untere (R 6)
24b. egg			*munə̑*	U **muna* (R 285)
25. eye	*śeľmʲe*	*śeľmʲä*	*šinča*	U **śilmä* (R 479; LG 256; P IV, 2128) = FU **śilmä* || Sm **sə̑jmä* < U **śilmä* (S 540)
26a. fat n.			*šel*	FP **silɜ* (R 758); cf. Perm **sùl*; Mari *šel* id. (LG 267)
26b. fat n.	*kujä*	*kuja*	*koja*	FU **kuje* (R 195; P II, 933)
26c. fat n.	*vaj*	*oj*	*üj*	FU **woje* (R 578; P III, 1430)
27a. feather	*tolga*	*tolga*		U **tulka* (R 535; LG 292; P IV, 2309) = FU **tulka* || Sm **tuə̑j* < U **tuxlɨ-*(S 540)
27b. feather			*pun*	FU **puna* (R 402)
27c. feather			*pə̑stə̑l*	(cf. R 536)
28. fire	*tol*	*tol*	*tul*	U **tule* (R 535; LG 292; P IV, 2306) = FU **tuli* || Sm **tuj* < U **tulɨ* (S 540)

Gloss	Mord Moksha	Mord Erzya	Mari	Etymology
29. fish	*kal*	*kal*	*kol*	U **kala* (R 119; P II, 574)
30a. fly v.	*lĭjəms*	*lĭjems*		FU **loŋe-* (R 251; P III, 1133) ≠ Hu. *lebegni* (LG 165) < FU **lempɜ-* (R 245)
30b. fly v.			*čoŋeštem*	(OT 154)
31a. foot	*piľg'ä*	*piľg'e*		FU **piľkɜ* (R 364; P III, 1664)
31b. foot			*jol*	FU **jalka* (R 88)
32a. full	*p'äškśä*	*p'eškśe*	*(peškəδə hart, geizig)*	Md-Mari **päškɜ* (Ker 111; Ber 48; P III, 1625)
32b. full			*tič*	FU **täwδe* (R 518)
33a. give	*maksə̂ms*	*maksoms*		FV **maksa-* (R 698; P II, 1162)
33b. give			*puem*	(OT 97)
34a. good	*parä*	*paro*	*puro*	FP **para* (R 724; P III, 1545); cf. Udm *bur* right (LG 42) < FP **pé´ra* good (S 553)
34b. good			*saj*	< Chuv *sajə* id. (OT 107)
35a. green	*pižä*	*piže*		U **piša* (R 384-85; P III, 1697)
35b. green			*užar*	FP **wiša* (R 823; LG 49; S 554)
36a. hair	*šäjäŕ/r, šäŕ*	*tšeń, čeŕ*		**č-/*š-* (P I, 240; cf. R 886: not with Ug **säyɜrɜ* < **ś-*)
	pona	*pona*	*pun*	FU **puna* (R 402)
36b. hair			*üp*	U **apte* (R 14)
37a. hand	*k'äď*	*k'eď*	*kiδ*	FU **käte* (R 140; LG 123; P II, 672) = **käti* (S 545)
38a. head	*p'ŕä*	*p'ŕa ~ piŕa'*		FU **perä* (R 373; P III, 1796)
38b. head			*wuj*	U **ojwa* (R 336)
39. hear	*kuľəms*	*kuľems*	*kolaš*	FU/U **kule-* (R 197) = FU **küle-* (LG 149) = **kuuli-* (S 544)
40. heart	*śeďi*	*śeďej,-eŋ*	*šüm*	U **śüδämɜ* (R 477; LG 270; P IV, 2118) = FU **śüdämi / *śedmi* (S 549)
41a. horn	*śurä*	*śuro*	*šur*	FU **śorwa* (R 486; P III, 2201) = **śorwå* (S 549) < II **śŕwā*
41b. horn			*tükə̂*	< Chuv *təgə* (OT 149)
42. I	*mon*	*mon*	*mə̂j*	U **mə̆* (R 294; P II, 1279; cf. LG 170)
43a. kill	*šavə̂ms*	*čavoms*		FU **čaŋɜ* (R 53; P I, 225-26)
43b. kill			*puštam*	(OT 100)
44. knee	*pə̂lma·ńžä*	*pulmanžа*	*pulwuj*	U **polwe* (R 393; P III, 1833)
45a. know	*sodams*	*sodams*		(P IV, 1999)
45b. know			*palem*	< Chuv *palla* (Räs 174; OT 89)
45c. know			*šinčem*	: *šinča* eye (#25; OT 121-22)
46a. leaf	*lopa*	*lopa*		FU **lepɜ* (R 259; P II, 1055)
46b. leaf			*lə̂staš*	FV **lešte* (R 689)
47b. lie	*maďems*	*madə̂ms*		FV **maδa-* (Ker 85; P II, 1156)

Gloss	Mord Moksha	Mord Erzya	Mari	Etymology
47a. lie			*kijaš*	FU **kujɜ* (R 197) = **kəjlV* (LG 144)
48. liver	*maksă*	*makso*	*mokš*	U **maksa* (R 264; LG 179; P II, 1162) = FU **mɨkså* || Sm **mɨtə̑* < U **mɨkså* (S 538)
49a. long	*kə̑va·ka*	*kuvaka*		FU **kawka* (R 132; P II, 983)
49b. long			*kužu*	U **ko(ń)ćɜ* (R 180); cf. Perm. **kuź*; Hu. *hosszú* (LG 144) = FU **kåśi(w)* long (S 545)
50a. louse	*śi*	*śi*		(P IV, 2147)
50b. louse			*tij*	FU **täje* (R 515; LG 280) = **täji* (S 550)
51a. man	*lomań*	*lomań*		(P II, 1051, also "anderer, fremd, Fremder") < Indo-Iranian **aryaman-*)
51b. man	*alʹä*	*alʹa*		(P I, 35: primarily elder brother; husband etc., also "fremd") < Indo-Iranian **arya-*)
		ćora		< Chuv *čoro, čuru* Knecht, Diener (Räs 233; ERS 240)
51c. man			*pörjeŋ*	(OT 96: *pört* Zimmer < Chuv < Russ); cf. #64 *jeŋ* person, human being
52a. many	*lamă*	*lamo*		FV **lama* (R 684; P II, 1007)
52b. many			*jana* adj.	U **enä* (R 74-75) = FU **enä / *inä* (S 541)
52c. many			*šukə̑* adv.	FP **sakka* (R 750)
53a. meat	*śivəlʹ*	*sivʾelʹ*	*šə̑l*	VP **siwɜlʹɜ* (R 763; P IV, 1989; cf. Perm. **silʹ-* < **siwɜlʹɜ* (LG 258) = FP **silɜ* meat (S 553)
53b. meat	*pal*	*pal*		U **pala* (R 350; P III, 1510)
54a. moon	*kov*	*kov ~ koŋ*		U **kuŋe* (R 211-12)
54b. moon			*tə̑lzə̑*	< Perm **tòlšcə̈*, pres. participle from the verb in Udm *dolal-* glänzen, Komi *dẹlal-* id., leuchten (Ber 111)
55a. mountain	*pandă*	*pando*		(P III, 1522: Berg, Anhöhe, Hügel)
55.b mountain			*kurə̑k*	FP **kurɜ(-ka)* Hügel, Landrücken or FP **korkɜ* hoch (R 677, 672)
56a. mouth	*kurgă*	*kurgo*		VP **kürkɜ* (Ker 72; P II, 965)
56b. mouth			*umša/ ušma /upša/ ašma*	(OT 164)
57. name	*läm*	*ľem*	*lüm*	U **nime* (R 305; LG 191; P II, 1104) = FU **nimi* || Sm. **nim* < U **nimi* (S 538)
58a. neck	*kʾə̑rga*	*kʾirga*		FV **kurk(k)ɜ* (R 676; P II, 764)
58b. neck			*šüj*	FU **śepä* (R 473-74) = **śepä(lV)* (LG 271) = **śepä* (S 548)
59. new	*od*	*od*	*u*	FU **wuδ´e* (R 587; P III, 1420) = **(w)uδ´e* (LG 72) = **wudï* (S 551)

Gloss	Mord Moksha	Mord Erzya	Mari	Etymology
60a. night	*v'e(j)*	*v'e* ~ *v'ä*		FU **üje* (R 72; LG 60; P IV, 2580) = **üji* (S 542)
60b. night			*jüδ*	U **jütɜ* (R 99)
61a. nose	*šalᶜka*			(P IV, 2213)
61b. nose		*sudo*		(P IV, 2045)
61b. nose			*ńer*	U **nēre* (R 303; LG 197)
62. not	*af*	*a*	*ok*	U**e/*ä* (R 68-70; P I, 1); cf. Perm **ob-* + **vẹl* nicht sein (W 54-55) < **epä-(v)ole* (LG 29)
63. one	*fkä*	*v'ejk'e*	*ik*	FU **ükte* (R 81; P IV, 2594); cf. FP **ükti* (S 552)
64a. person	*lomań*	*lomań*		P II, 1051; cf. #51; < Indo-Iranian **aryaman-*
64b. person			*jeŋ*	(OT 25)
			aδeme	< Chuv ɛ*Dem* < Tat *ädäm* < Arab (Räs 111; OT 1)
65a. rain n.	*p'iźem*	*p'iźem'e*		FV **pisa-/*piśa-* (R 732; P III, 1694: cf. E *p'iźi* regnend)
65b. rain n.			*jür*	(OT 30: Md *ir*?); cf. OUg **jīrt* rain n.
66a. red	*jaksťəŕ*	*jaksťeŕe*	*jöškaryə̑* / *jokšarye*	pMd **jakćarə* + pMari **jokšaryə̑* (Ker 42-43; Ber 12; P I, 486)
67a. road	*k'i*	*k'i*		P II, 745
67b. road			*kornə̑*	FU **kurńa* (R 216)
68a. root	*jur*	*jur*		FP **jure* (R 639; P I, 543)
68b. root			*vož*	U **wa(n)čɜ* (R 548) = **wančɜ* (LG 69-70) = FU **wåncå* || Sm. **wåncå* < U **wåncå* (S 541)
69a. round	*k'evəŕ*	*k'ev'iŕ*		(P II, 734; in RMS 232 the Moksha equivalent is missing)
69b. round	*šari*	(*čari* kreisend)		P I, 213-14: from M *šarə̑ms*, E *čarams* schwanken, wanken < pMd **čara-/*šara-*; cf. Komi *šurgan* Wirbel, Strudel (Ker 154)
69c. round		*k'iŕeń końďamo*		FU **kerä* (R 147; P II, 779: cf. E *k'iŕe*, M *kəŕä·* Bündel, Rolle)
69d. round	*kruglaj*	*krugloj*		(P II, 896: < Russ.)
69e. round			*jə̑ryeške*	(OT 31: *jə̑r* um)
70a. sand	*šovar*	*tšovar*		(P I, 288)
70b. sand			*ošma*	(OT 86)
71a. say	*azə̑ms*	*azoms*		(P I, 98: also opfern, versprechen, widmen, weihen, fluchen, erklären, schelten etc.)
71b. say	*joftams*	*jovtams*		FU **jukta-* (R 104; P I, 533)
71c. say			*manaš*	U **monɜ* (R 290)

Gloss	Mord Moksha	Mord Erzya	Mari	Etymology
71d. say			kalasem	(Räs 140; OT 34: < Chuv *kala* to say, speak; but cf. Komi *kʲil-vor* Aussprache - W 313)
72a. see	*ńäjəms*	*ńejems*		FU **näke-* (R 302; P III, 1385)
72b. see			*užam*	FV **wača-* (R 809)
			onče	FP **ańćɜ* (R 607; LG 30)
73a. seed	*vʼiďmʹä*	*vʼiďmʹe*		(P IV, 2646: E *vʼiďems*, M *vʼiďəms* säen < FU **wettä-* werfen - R 570)
73b. seed			*nöšmö*	(OT 78)
73c. seed			*pə̑rčə̑*	< Chuv *pə̑rӡə̑* (Räs 177; OT 103)
73d. seed			*urluk*	(OT 164: < Tat *örlök*)
74a. sit	*ozams*	*ozams*		FV **isɜ* (R 629; P III, 1480)
74b. sit			*šinčaš*	FU **saŋća-* stehen (R 431); cf. #79
75a. skin			*kowašte*	(OT 42: < Chuv?; R 180 excludes it from U **kopa* bark, skin)
75b. skin	*keď*	*keď ~ käď*		FU **keδʼe* (R 142; P II, 678)
76a. sleep	*udə̑ms*	*udoms*		FU **oδa-* (R 334; P IV, 2432)
76b. sleep			*malem*	(OT 69)
77a. small	*jolma ~ °mla*			(P I, 518)
77b. small	*ańćej*			(P I, 47: from Tk?)
77c. small		*vʼiška*		FV **wäšä* (R 818; ERS 54)
77d. small		*maľeŋkoj*		(P II, 1169 < Russ)
77e. small			*izi*	FU **üćä* (R 78)
78a. smoke n.	*kačam*	*katšamo*		FP **kačkɜ* (R 641; P II, 560)
78b. smoke n.			*šikš*	(OT 121)
79a. stand	*sťado ašťems*	*sťada aš̌čəms*		FU **saŋća-* stehen (R 431; P IV, 2180: E *śťado*, M *śťada* stehend, in stehende stellung + P I, 81: E *ašťems*, M *aštšəms* sich befinden
79b. stand			*šoyem / šolgem*	FU **salkɜ* (R 431; OT 122)
80a. star	*ťäštä*	*ťešťe*		FV **täštä* (R 793; P IV, 2393)
80b. star			*šüδə̑r*	(OT 131: < Chuv *śăltăr* - see Egorov 1964, 206)
81b. stone	*kʲev'*	*kʲev ~ kʲäv*	*kü*	FU **kiwi* (R 163; P II, 730; cf. Komi *iz-ki* millstone, Udm. *kö* id. - LG 123) = **kiwi* (S 543)
82a. sun	*ši*	*tši, če, čä*	*kečə̑*	FU **kečä* Kreis, Ring (R 141; P I, 249); cf. Komi Zyry *kʲič* Ohrring; Mondhof, Sonnenring
83. swim	*ujəms*	*ujems*	*ijaš*	FU **uje-/*oje-* (R 542; LG 296; P IV, 2440) = FU **uji-*|| Sm **u-* < U **uxi-* (S 536)
84a. tail	*pulă*	*pulo*		FU **poľa* (R 393-94; P III, 1833)
84b. tail			*poč*	FU **ponča* / **panča* (R 353; LG 40) = FU **ponci* (S 547)

Gloss	Mord Moksha	Mord Erzya	Mari	Etymology
85a. that	*śä*	*śe*	*seδe*	U **će/*ći* (R 33-34; P IV, 2102)
85b. that	*tona*	*tona*	*tuδə̑*	U **to* (R 526-28; P IV, 2297)
86. this	*ťä*	*ťe*	*tiδə̑*	U **tä/*te/*ti* (R 513-14; P IV, 2367)
87. thou	*ton*	*ton*	*tə̑j*	U **tə̆* (R 539; P IV, 2314); Perm **tẹn* < U **tinä/*tunä* (LG 293-94)
88a. tongue	*kɛ̀ľ*	*kə̀ľ*		U **kēle-* (R 144-45; LG 149; P II, 683) = FU **keeli* || Sm. **keə̑j* < U **käxli* (S 538)
88b. tongue			*jə̑lmə̑*	FU **ńälmä* (R 313-14)
89. tooth	*pə̀ej*	*pə̀ej ~ pə̀ev ~ pə̀eŋ*	*püj*	FU **piŋe* (R 382; LG 222; P III, 1586) = **piŋi* (S 547)
90a. tree	*šuftă*	*tšufto, čuvto*		FV **šukta* (R 788; P I, 308)
90b. tree			*pu*	U **puwe* (R 410; LG 230) = FU **puxi* || Sm. **pä* < U **pu/o/äxɨ/i* (S 539)
91. two	*kaftă*	*kavto, kafto*	*kok*	U **kakta/*käktä* (R 118-19; P II, 656; FU **kektä* || Sm. **kitä* < U **kektä* (S 537)
92a. walk	*jakams*	*jakams*		FU **jakka-* (R 88; P I, 480)
92b. walk			*koštam*	(OT 47); cf. Udm *koškiŋi* id.?
93a. warm	*lämbä*	*ľem'bə̀*		FV **lämpɜ* (R 685; P II, 1108)
93b. warm			*šokšo*	(OT 123)
94. water	*və̀ď ~ və̆ď*	*və̀ď*	*wüδ*	U **wete* (R 570; P IV, 2585) = FU **weti* || Sm **wit* < U **weti* (S 541)
95. we	*m'iń*	*m'iń*	*me*	U **mə̆* (R 294-95; P II, 1263)
96. what	*mə̀ećä*	*mə̀će*	*mo*	U **mɜ* (R 296; P II, 1209-10)
97a. white	*akšă*	*ašo*	*oš*	FU **ačka* (R 3; P I, 76)
98. who	*k'i ~ k'ijä kona*	*k'i ~ k'ije kona*	*kö kuδo*	U **ke/*ki* (R 140; P II, 750) U **ku-/*ko-* (R 191; P II, 805)
99a. woman	*ava*	*ava*		(P I, 89)
99b. woman			*kuwa*	(OT 49)
100a. yellow	*ťužä*	*ťuže*		MdPerm **čoša* (R 621; P IV, 2422); cf. Perm **čúž* (LG 305)
100b. yellow	*ožə̑*	*ožo*		FP **wiša* (R 823; P III, 1492); cf. #35 green
100c. yellow			*narə̑nče*	< Chuv *nar* (OT 76)

Abbreviations of languages: Arab Arabic, Chuv Chuvash, E Erzya, FP Finno-Permic, FU Finno-Ugric, FV Finno-Volgaic, M Moksha, M(or)d Mordvin, Perm Permic, Sm Samoyedic, Tat Tatar, U Uralic, VP Volga-Permic.

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Appendix 4: Permic word-lists and etymologies

Gloss	Udmurt	Komi Zyr.	Komi Per.	Etymology
1a. all	*voťś*			U **we(ń)ćə*; cf. Komi *vaťś* ganz und gar (W 324; LG 48; R 568)
	dolak		*dȯl*	FU **täwδe* full (R 518)
1b. all	*ńar*			
1c. all	*i̯śśo*			< Russ *vsë* ? (W 67)
1d. all	*vań, vańm-*			Perm **olə* < U **elə* leben (R 73, 580)
1e. all		*bi̯dẹn*	*bi̯den*	Cf. Udm. *bi̯d/bi̯d* ganz vollständig (W 22-23) - #5
1f. all	(*koťkin* every)	*koď*		Cf. Komi *kod* who, which & Udm. *koť-kin* every (LG 127) < U **ku-/*ko-* (R 191)
2. ashes	*peń*	*pẹi̯im*	*pẹi̯im*	FP **peľme* (LG 228; R 728)
3ae. bark	*kur/kî̯r*	*kor*		FU **kere* (LG 133; R 148-49) = *keri/ä* (S 543)

Gloss	Udmurt	Komi Zyr.	Komi Per.	Etymology
3a. bark		*kị̈rś*		Hu *hárs* Linde; Fi *kuori* < FU **kōre* (LG 154; R 184)
3g. bark	*kẹ̈m/köm*			U **kama* (R 121-22)
3d. bark	*sul/suľ*	*sọ̈l-kọ̈r*		Perm **sọ̈l*; Md. *sud* < FP **suδ₃* (LG 260; R 763)
4a. belly	*kẹ̈t/köt*			FP **kokt₃* (R 670); cf. Komi *köta* trächtig (W 104)
4b. belly	*puṭš/puš*	*pi̮ṭš*		Perm **pǔčk-/*pučk-* < U **pučk₃* (LG 237; R 398)
4c. belly		*kị̈nöm*	*kị̈nöm*	FU **kun₃* (R 208); cf. Kh *kŏñ*, Hu *jonh-* < **johon* (LG 152)
5a. big	*bi̮dzi̮m/ bud´źi̮n*			Cf. Udm *bi̮d/bi̮d* ganz vollständig (W 22-23)
5b. big	*i̮li̮s*			Cf. Komi *uli̮s* wet, full, raw; Fi *ylys* adj. fat < **el₃* (LG 296; R 73-74)
5c. big	*zẹ̈k/zök*			
5d. big		*i̮šši̮d*	*i̮šši̮d*	Perm **ǔš-* < Md-Perm **ǔč₃* (R 627); cf. Md E *ečke*, M *ečkä* dick (LG 328: Fi. *isa* big); Fi *isa* + Md M *ocü* < U **ićä* father (R 78)
6a. bird	*papa*			onom.
6b. bird		*lebač*		(L 397); cf. FU **lemp₃/*lämp₃* to fly (LG 165; R 245); see #30 fly
		kai	*kai*	U **käj₃* (R 133)
7a. bite	*kurťťśi̮nị̂*	*kurččavnị̮*	*kurččavnị̮*	FU **kar₃/*kor₃* (R 129)
7b. bite	*puri̮nị̮*	*purnị̮*		FU **pure-* (LG 233; R 405-06) = FU **puri-* || Sm. **por-* < U **porɨ-* (S 539)
8a. black	*kị̈rś/kî̮rś*			cf. Udm *kị̈r* Schwarzspecht? (R 230: **kŏr₃* eine Art Specht)
8b. black	*śẹd/śẹ̈d*	*śẹ̈d*	*śẹ̈d*	Perm **śọ̈d* (LG 269; not with FP **sonta* Kot, Mist - see R 265)
9. blood	*vir*	*vir*	*vir*	FU **wire* (R 576; LG 57) = FU **weri* (S 551)
10a. bone	*lî̮/li̮*	*li̮*	*li̮*	U **luwe* (R 254) = FU **luxi* || Sm. **lé´* < U **lɨxɨ-* (S 538)
10b. bone			*koska*	cf. Md-Perm **kask₃* Kreuz (R 648)
11a. breast	*gaď*	*gaď*		(LG 74; R 178)
11b. breast	*mî̮l/mi̮l*			FU **mälye* (R 267) = **mälki* (S 546)
11c. breast		*moreṣ*	*moros*	U **mɤr₃* (R 293) or VP **mer₃* (R 703; LG 174)
12a. burn	*ḏžuànị̮*			cf. Udm *ǯu, žu* glühende Kohle (R 420)
12b. burn	*sut(i̮)nị̮*	*sotnị̮*	*sotnị̮*	FP **sŏttŏ* (LG 262); cf. Fi *syttyä*
12c. burn	*ṭ̮šuškànị̮*			

Gloss	Udmurt	Komi Zyr.	Komi Per.	Etymology
13. claw	*gižį*	*gįž*	*gįž*	FU/U *künče* (R 157-58; LG 84) = *künci* (S 544)
14a. cloud	*piľem*	*piv/pī*		FU *pilwe* (R 381)
14b. cloud		*kįmör*	*kįmör*	FU *kumɜ* (R 204; LG 151) = *kumå-(lå)* cloudy (S 544)
15a. cold	*keźįt*	*kędźįd*		FP *käćɜ* (R 648) = *kščɜ* (LG 139) = *käśV* (S 552)
15b. cold	*kedî*			cf. Hung *hideg* cold?
15c. cold	*kįn/kĵm*	*kįn*		Perm *kùn(m-)* < FP *külmä* (LG 152; R 663; S 552)
16a. come	*lįktįnį*	*loknį*	*loknį*	FU *läkte* (R 239-40; LG 160) = FP *läkti-* to depart (S 552)
16b. come		*vonį*	*vonį*	Perm *vo-* (LG 63) < FP *wäke* (R 817)
17. die	*kul(i)nį*	*kulnį*	*kulnį*	U *kola-* (R 173) = *kōle-* (LG 143) = FU *kooli-* || Sm *kåə̑* < U *kåxlɨ-* (S 538)
18a. dog	*kuťśa*	*kįťšan*		Perm *kučɜ* / *kùčɜ* (LG 155) < Iran *kuti-* > Sogd *'kwty*, Yaghn *kud, kut*, Ossetic pl. *kwitae* (Sasse 1993, 351-52; Abaev I, 605)
18b. dog	*punį*	*pon*	*pon*	FU *pene* (R 371; LG 224-25) = FP *penä* (S 553)
19. drink	*juįnį*	*junį*	*junį*	FU *juye-* (R 103) = *jūye-* (LG 335) = *juxi-* (S 543)
20. dry	*kęs/kös*	*kos*	*kęs*	FP *koksɜ* (R 670; LG 134) = *koksV* (S 552)
21. ear	*peľ*	*peľ*	*peľ*	FU *peljä* (R 370; LG 218) = *peljä* (S 547)
22. earth	*mu*	*mu*	*mu*	U *maye* (R 263; LG 177) = *mɨxi* (S 546)
23. eat	*śiįni*	*śoįnį*	*śoįnį*	FU *seye-* (R 440; LG 252) = *sewi-* (S 548)
24a. egg	*koko*			onom.?
24b. egg	*puz/pįz*	(*poz* nest)		U *pesä* (R 375) = FU *pesä* || Sm. *pitä* < U *pesä* nest (S 539)
24c. egg		*koľk*	*koľť*	FP *kaľkɜ* (R 644)
25. eye	*śin/śim*	*śin*	*śin*	U *śilmä* (R 479; LG 256) = FU *śilmä* || Sm. *sə̑jmä* < U *śilmä* (S 540)
26a. fat n.		*sįv*		FP *silɜ* (R 758; LG 267)
26b. fat n.	*kęį/köį*			FU *kuje* (R 195)
26c. fat n.		*gos*	*gos*	FU *kaswa-* wachsen (R 129-30: without Komi); cf. Fi *kasvaa* to grow; Md *kasoms* id.; Hu *haszon* profit (LG 79)
26d. fat n.		*tšęg*		Cf. Mari *čoga* muscles (LG 290)
27a. feather	*tįĺĵ/tįlį*	*tįl*		U *tulka* (R 535; LG 292) = FU *tulka* || Sm *tuə̑j* < U *tuxlɨ-*(S 540)

Gloss	Udmurt	Komi Zyr.	Komi Per.	Etymology
27b. feather		*gẹn*	*gẹn*	Cf. Udm *gon* hair of body < Iran **gauna-* (Joki 1973, 262; LG 80: Perm + Fi *kynä* feather)
28a. fire	*tî̮l/tị̮l*	*tị̮v*		U **tule* (R 535; LG 292) = FU **tuli* || Sm **tuj* < U **tulɨ* (S 540)
28b. fire		*bi*	*bi*	FU **päjwä* (R 360; LG 40) = FP **päjwä* || Sm **pejwä* < U **päjwä* sun, warmth (S 540) or FU **päjä* (R 359)
29. fish	*ťšorị̮g*	*ťšeri*	*ťšeri*	Perm **ćẹ̈rig* < FU **ćšrə̈* (LG 303-04)
30a. fly v.	*ďurga-*			
30b. fly v.	*lob(i)nị̮*	*lèbnị̮*	*lèbnị̮*	FU **lempɜ/*lämpɜ* (LG 165; R 245); cf. Hu *lebegni*
31a. foot	*pị̮d*	*pod*		< Indo-Iranian (LG 223; Joki 1973, 303)
31b. foot	(*kuk* paw)	*kok*	*kok*	Perm **kọ̈k* (LG 129)
32a. full	*tî̮r/tị̮r*	*tị̮r*	*tị̮r*	FU **türe* (R 524; LG 293)
32b. full	*bị̮des*			Udm *bị̮d* ganz vollständlich = Komi *bị̮d* (W 22), cf.##1, 5
33. give	*śot(i)nị̮*	*śetnị̮*	*śetnị̮*	Perm **śẹ̈t-* (LG 251; Paas., *s*-Laute 101: Kh N *soɣoptałem* to pay)
34a. good	(*bur* right)	*bur*	*bur*	FP **para* (R 724; LG 42) = FP **pé´ra* good (S 553)
34b. good	*ďes/džeťś*			Mari-Perm **reć(k)ɜ* (R 744)
34c. good	*umoị̮*			FP **oma* eigen (R 717)
35a. green	*vož*	*vež*		FP **wiša* (R 823; LG 49) = **viša* (S 554)
35b. green			*zelënöi*	< Rus
36. hair	*śi*	*śi*	*śi*	Perm **śi* < FU **säŋe* (R 471) = **säje* (LG 254)
37a. hand	*ki*	*ki*	*ki*	FU **käte* (R 140; LG 123) = **käti* (S 545)
37b. hand	*suj*	*soj*	*soj*	Perm **sọ̈j* < U **soja* (R 445; LG 260)
37c. hand		*kị̮rịm*		Perm **kùrim* < FP **kurmɜ* (R 677), cf. Hu. *köröm* fingernail (LG 154)
38. head	*jị̮r/ďị̮r*	*jur*	*jur*	FP **jure* (R 639) = **jüre-* (LG 335)
39. hear	*kị̮l(i)nị̮*	*kị̮lnị̮*	*kị̮lnị̮*	FU **kule-* (R 197) = **kūle-* (LG 149) = **kuuli-* (S 544)
40. heart	*śulem*	*śẹlẹm*	*śẹlẹm*	U **śüδämɨ̈* (R 477; LG 270) = FU **śüdämi / *śedmi* (S 549)
41. horn	*śur*	*śur*	*śur*	Perm **śur* < FU **śorwa* (R 486) = **śorwå* (S 549) < II **śrvā*
42. I	*mon*	*me*	*me*	U **mɨ̈* (R 294; LG 170)
43. kill	*viị̮nị̮*	*vinị̮*	*vijnị̮*	FU **weδɜ* (R 566-67; LG 59) = **wilä-* (S 551)
44. knee	*pị̮ďžes*	*piďžes*	*piďžes*	FU **püćɜ* (R 376); Cf. Mansi *pisi, päs* elbow (LG 221)
45. know	*tod(i)nị̮*	*tẹdnị̮*	*tẹdnị̮*	U **tumte-* (R 536) = FU **tumti-* || Sm. **tumtə̂-* < **tumtɨ-* (S 541)

Gloss	Udmurt	Komi Zyr.	Komi Per.	Etymology
46. leaf	*kuar*	*kor*	*kor*	Perm **kwǫr*; Fi. *korva* ear (LG 133; R 187) < FP **kovra* || Sm **kåw* < U **kåwɨ* ear (S 538)
47. lie	*kiľľi̯ni̯*	*kuiľi̯ni̯*	*kuiľi̯ni̯*	FU **kujɜ-* (R 197) = **kəjlV* (LG 144)
48. liver	*mus*	*mus*	*mus*	FU **maksa* (R 264; LG 179) = FU **mɨkså* || Sm. **mɨtə̑* < U **mɨkså* (S 538)
49. long	*kuź/kuďž*	*kuź*	*kuź*	U **ko(ń)ćɜ* (R 380; LG 144) = FU **kåśi(w)* long (S 545)
50. louse	*teį*	*toį*	*toį*	FU **täje-* (R 515; LG 280) = **täji* (S 550)
51a. man	*murt*			Md-Perm **mertä* (R 702)
51b. man	*vorgo-ron/m*			
51c. man	*kart*			< Tat (W 94)
		mužik	*mužik*	< Rus
52a. many	*uno/i̯no*	*una*	*una*	U **enä* (R 74-75) = **enä / *inä* (S 541)
52b. many	*ti̯ros*			Cf. *ti̯r* full (W 262-63)
52c. many	*ešto/ešk̆o*			
52d. many	*dan*			< Tat? (W 30)
53a. meat	*siľ*			Perm **siľ-* < FP **siwɜľɜ* (R 763; LG 258) = FP **silɜ* meat (S 553)
53b. meat		*jaj*	*jaj*	Cf. Udm *jajtem* weak; Sm: Nenets *ŋaaja* body, muscles, etc. (LG 337)
54. moon	*tolî́ź*	*tę̇liś*	*tę̇liś*	Perm **tòlšcə̆*, pres. participle from the verb in Udm *dolal-* glänzen, Komi *dę̇lal-* id., leuchten (Ber 111)
55a. mountain	*gureź*	*gor*		Perm **gǫr* mountain, hill (LG 79: Komi *goruv* foot of mountain : *uv* down)
55b. mountain		*kerę̇s*	*kerę̇s*	(LG 122; R 647: not from FP **karke* gross, grob); cf. Komi *kį̇r* shore, slope, mountain < **kur-* (LG 153)
55.c mountain		*čoj*	*čoj*	Cf. Kh *č´i̯w* (slope of a) hill (LG 309)
56. mouth	*i̯m*	*vom*	*ę̇m*	U **aŋe* (R 11; LG 62) = FU **åŋi* (S 542)
57. name	*ńim/ńi̯m*	*ńim*	*ńim*	U **nime* (R 305; LG 191) = FU **nimi* || Sm **nim* < U **nimi* (S 538)
58a. neck	*tśi̯rti̯*			
58b. neck	(*śiľšör* nape of neck)	*śi̯lï*		Perm **śu-l* < FU **śepä(lɜ)* (LG 271; R 473-74) = **śepä* (S 548)
58c. neck	*guľo*	*goľa*	*goľa*	Perm **goľs* (LG 78) < ?Iran: Middle Persian /*galōg*/, Persian *gulō* throat, Old Indic *gala* id. (EWAI I, 476)
59. new	*viľ/vi̯ľ*	*vi̯ľ*	*vi̯ľ*	FU **wuðˊe* (R 587; LG 72) = **wuďi* (S 551)
60. night	*ui̯*	*voi̯*	*oi̯*	FU **üje* (R 72; LG 60) = **üji* (S 542)

Gloss	Udmurt	Komi Zyr.	Komi Per.	Etymology
61. nose	*niṛ/nî̮r*	*niṛ*	*niṛ*	FV **nēre* (R 303-04; LG 197)
62. not	*e̮vel/övöl*	*abu*	*abu*	**ob-* + **vẹl* nicht sein (W 54-55) < **epä-(v)ole* (LG 29) < U **e/*ä/*a* (R 68-70)
63. one	*og*	*e̮t/e̮k*	*e̮t/e̮k*	FU **ükte* (R 81) = FP **ükti* (S 552)
64. person	*murt*	*mort*	*mort*	FP **mertä* (R 702; S 552) < Iran (LG 174-75; Joki 1973, 281-82)
65. rain n.	*zor*	*zer*	*zer*	Perm **zẹr*; cf. Nenets *sarë* id. (LG 108)
66a. red	*gord*	*ge̮rd*	*ge̮rd*	Perm **gȯrd* < **gȕrd*; cf. Komi *gi̮rd* blood (LG 80)
66b. red	*ṭšiži̮t*			
67a. road	*śures/śî̮res*			Cf. Komi *mu-śur* lange Strecke Weges (W 240) < FU **śor₃* (R 487)
67b. road		*tuj*	*tuj*	FP **teje* (R 794; LG 285)
68. root	*vižį*	*vuž*	*vuž*	U **wa(n)č₃* (R 548; LG 69-70) = FU **wåncå* || Sm **wåncå* < U **wåncå* (S 541)
69a. round	*bigi̮lî*			Cf. Komi *bigi̮ltnį* wälzen (W 23)
69b. round	*koti̮res*			Cf. Udm *koti̮r* ringsherum, Komi *koti̮r* Haufe, Schar, Familie (W 123-24)
69c. round		*gegre̮s*	*gegre̮s*	cf. Komi *gege̮r* around < Perm **gȯg-* : **gȯg₃* navel (LG 79)
70. sand	*luo*	*li̮(v)a*	*li̮(v)a*	FU **liwa* (R 250; LG 163)
71a. say	*šuį̮nį*	*šunį*	*šunį*	Perm **šu-* < FP **šoke-* (R 786; LG 324)
71b. say	*vaźi̮nį*			
71c. say	*veràni̮*			Cf. Komi *ki̮l-vor* Aussprache (W 313), Komi *ki̮v-vor* speech < Perm **vọr* speech (LG 63)
72a. see	*adďźi̮nį*	*adďźi̮nį*	*adďźi̮nį*	FP **ańć₃-* (R 607; LG 30)
72b. see	*nalʹlànî*			FU **näke-* (R 302)
73a. seed	*ti̮ś*	*tuś*	*tuś*	Perm **tuś*; Mari *tuš* < Chuv *tüš* (LG 288)
73b. seed	*ju*			FP **jewä* (R 633-34); cf. Komi *ji*, *ji̮* in *ji-ki*, *ji̮-ki̮* Spreu, Kleie, Spelze, Granne (W 81) < Indo-Iranian **yawa-*
73c. seed	*kidi̮s*	*ke̮idi̮s*	*ke̮dzi̮s*	Cf. Udm *kiźnį* säen, Komi *ke̮ďźnį* < Perm **kȯ̑ʒ̑-* (LG 138-39; R 664: not to FP **kə̈ntɜ* (R 681) nor **künčä-* (R 663-64)
73d. seed	*kiźon*			Cf. Udm *kiźnį* säen, Komi *ke̮ďźnį* < Perm **kȯ̑ʒ̑-* (LG 138-39)
74. sit	*puk(i)nį*	*puknį*	*puknį*	Perm **puk-*; Hu. *fekszik* lie < FU **päkk₃* (R 361; LG 232)
75a. skin	*ku*	*ku*		**kopa* (R 180; LG 143)
75b. skin	*kudsi*	*kutš*	*kučik*	Perm **kuč´-*; Saami *gačče* ~ *gače* < **kšč´₃-* (LG 148)
76. sleep	*i̮ź(i)nį*	*uźnį*	*uźnį*	Perm **uź-* (LG 296)
77a. small	*pitši/pe̮ťši*			cf. Fi *pisku* id.

Gloss	Udmurt	Komi Zyr.	Komi Per.	Etymology
77b. small	*pokťši/ pękťši*			
		pońi		< BF: Fi *pieni*, Est *peen* (LG 225)
77c. small	*tśi̮rį*			FP **ćïrɜ* (R 615; LG 306-07; W 286)
77d. small		*ićętik*	*ućętik*	FU **üćä* (R 78)
77e. small		*dzoľa*		< **č´ol'-*, Est *till* id. (LG 92)
78. smoke n.	*ťšį̮ŋ*	*ťšį̮n*		Perm **čüŋ* < FU **čüŋɜ* (R 59; LG 292)
79. stand	*si̮l(i)nį*	*sulalnį*		Perm **sul-* < FU **salkɜ-* (R 431; LG 265) = FP **sé´lkV-* (S 553)
80. star	*kiźili*	*koďžul*		FU **ku(ń)ćɜ* (R 210-11; LG 126) = FU **kunśå* || Sm **kɨnsV* < U **kunśå* (S 537)
81a. stone	*iz*	*iz*	*iz*	Perm **iz-* (LG 109)
81b. stone		*-ki* in *iz-ki*		Komi *iz-ki* millstone, Udm *kö* id. (LG 123) < FU **kiwe* (R 163-64) = **kiwi* (S 543)
82. sun	*šundį*	*šondi*	*šondi*	Perm **šǫndi*; Cf. Udm *šuni̮t*, Komi *šoni̮d* warm (W 253) < FP **šonɜ* (R 787) or **šŋ̈ŋe-* (LG 322)
83. swim	*ujàni̮*	*ui̮ni̮*	*ui̮ni̮*	FU **uje-/*oje-* (R 542; LG 296) = FU **uji-* || Sm **u-* < U **uxɨ-* (S 536)
84. tail	*bi̮ž/bi̮ž*	*bęž*	*bęž*	FU **pončɜ / *pančɜ* (R 353; LG 40) = FU **ponci* (S 547)
85a. that	*so*	*si̮*	*sija*	Perm **sù* < FU **šš /*sš* (R 453; LG 258)
85b. that	*tu*	*ti̮*		U **to* (R 526-27; LG 292)
86. this	*ta*	*ta, taję*	*etija*	Perm **ta* < U **tä* (R 513-14; LG 277)
87. thou	*ton*	*te*	*te*	Perm **tęn* < U **tinä/*tunä* (LG 293-94)
88. tongue	*ki̮l*	*ki̮l*	*ki̮v*	U **kēle* (R 144; LG 149) = FU **keeli* || Sm. **keə̑j* < U **käxli* (S 538)
89. tooth	*piń*	*piń*	*piń*	FU **piŋe* (R 382; LG 222) = **piŋi* (S 547)
90. tree	*pu*	*pu*	*pu*	U **puwe* (R 410; LG 230) = FU **puxi* || Sm. **pä* < U **pu/o/äxɨ/i* (S 539)
91. two	*ki̮k*, *ki̮kt-*	*ki̮k*	*ki̮k*	U **kakta / *käktä* (R 118) = FU **kektä* || Sm **kitä* < U **kektä* (S 537)
92a. walk	*koškį̮nį*			
92b. walk	*mi̮n(i)nį*	*munnį*	*munnį*	U **mene-* (R 272; LG 178) = FU **meni-* || Sm **min-* < **meni-*
92c. walk	*vetli̮nį*	*vetli̮nį*		(LG 54)
93a. warm	*pęś/pös*	*pęś*		FP **pośɜ* (R 738; LG 230)
93b. warm	*šuni̮t*	*šoni̮d*	*šoni̮t*	Perm **šoni̮t* < FP **šonɜ* (R 787) or **šŋ̈ŋe-* (LG 322); cf. #80: sun
93c. warm		*pi̮m*		U **päwe* (R 366); cf. Kh *päm* id. (Hu *fény* light, lightning quoted in LG 236 does not belong here, see R 367)
94. water	*vu*	*va*	*va*	U **wete* (R 570) = FU **weti* || Sm **wit* < U **weti* (S 541)

Gloss	Udmurt	Komi Zyr.	Komi Per.	Etymology
95. we	*mi*	*mi*	*mi*	U **mï* (R 294-95; LG 171)
96. what	*ma*	*mi̮j*	*mi̮j*	U **mз* (R 296; LG 181)
97a. white	*tẹďi̮/töďi̮*			
97b. white		*je̮ž̮id*		(L 219)
97c. white			*čočkom*	cf. Saami N *čæskis* niveus, *čæskat* albescere (LG 310; Affr 132)
98. who	*kin/kiń*	*kin, kod(i)*	*kin*	U **ke/*ki* (R 140-41)
99. woman	*ni̮lki̮šno*	*ni̮vbaba*		U **nejδe* (R 302; LG 196)
			jińka	cf. *jiń-* female (LG 109)
100a. yellow	*ṭšuž*	*čiž*		Perm **čüž* (LG 305) < Md-Perm **čoša* (R 621-22)
100b. yellow		*vež, viž*	*vež*	FP **wiša* (R 823-24; LG 49); cf. #35 green
100c. yellow		*čal*		Cf. Mari *čal* grey < Chuv *čal* желтизна, седина (LG 200)

Abbreviations: BF (Balto-)Finnic, Chuv Chuvash, E Erzya, Est Estonian, Fi Finnish, FP Finno-Permic, FV Finno-Volgaic, Hu Hungarian, Iran Iranian, Kh Khanty, M Moksha, Md Mordvinian, N North, OI Old Indic, Perm Permic, Rus Russian, Sm Samoyedic, Sogd Sogdian, Tat Tatar, U Uralic, Udm Udmurt, VP Volga-Permic, Yaghn Yaghnobi.

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Appendix 5: Ugric word-lists and etymologies

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
1a. all	*mind(en)*					H *mi* what < U **mз* (R 296)
1g.		*sōχ*	*soχ, sokh*			(Mu 553)
1h.		*pusėn*	*pǫsėn*			M N *pus*, K *pǫs* gesund, heil, ganz (Mu 484)
1i.		*jēmt-ke*				(Mu 153)
1l.		*akwäi̯ʸ*				*akw* one (Mu 30)
1m.					Y *ə̀i̯nàm*	*ə̀i̯* one (P 21)
1n.				*pərtā, patlā*		< Tat. *bərdä* (P 179)
2a. ashes	*hamu*	*χuľėm*	*khuľėm*	*χōi̯əm*		FU **kuδ'mз* (R 194)
2b.					*pär*, Y *(nài̯-)pàr*	: *nài̯* fire (P 171)
2c.					Y *(nài̯-)rew*	*rew* zerstückeln (P 201)
2d.				*tüm*		cf. Boľčarovo *lüm* (P 267)
3ae. bark	*kéreg*	*χar*; *kēr*		*kàr*	*kär*	FU **kere* (R 148-49); Mu 210
3b.	*héj*					FU **koja* bark/skin (R 166)
3c.		*såw*	*sâu*	*soχ* (+ Fell)	(*sŏγ* Fell)	FU **śuka* (R 488; P 220)
3a.		*χurp*	*khurėp*			FU **kōre* (R 184; Mu 129)
3f.		*sām*	*sə̄̆m*		(*sam* Schuppe)	FU/U **śōme* (R 476; Mu 523)
4a. belly	*has*					FU **kačз* (R 114)
4b.				*χon*	*kŏn̯*	FU **kunз* (R 208; P 56)
4c.		*kaχėr*	*kaχr*			(Mu 187)
4d.			*mokh*			N *mok* Kind (Mu 410)
4e.		*puki*			(*pə̑ki* Kropf)	FU **pikkä/*päkkä* (R 379; Mu 472)
4f.		*sōriy*				(Mu 562)
5a. big	*nagy*					FU **nзńćз* strong (R 310)
5b.		*jäniy*	*jäni*	*ē·nз*	(*eṇə* dick)	U **enä* (R 74-75; P 17; Mu 146)
5c.		*kapaj*	*käpi*			(Mu 192)
5d.			*śåpėr*			(Mu 600)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
5e.				*t/Lô-wȧ·ttɜ*		(P 263)
5f.					*əḽḽə*	
6a. bird	*madár*					B 919: unbek. Urspr.
6b.		*tåuliŋ-uj*	*tåulėŋ-vuj*			geflügelt Tier (Mu 668, 689)
7a. bite	*harap*					FU **karɜ* / **korɜ* (R 129)
7b.	*mar*					U **mura* Stück; zerbrechen (R 288)
7c.	*csíp*					FU **ćəppɜ* (R 49)
7d.		*χåmėspi*				(Mu 102)
7e.		*puri*	*pǫri*	*porə̑m*	Y *porrəm*	U **pure-* (R 405; P 189; Mu 483)
7f.		(*towt-* chew)		DN *toχət-* + chew	*joγə̑lta*	U **soske-* (R 448-49)
7g.		*sasɣi*	*säsɣi*			(Mu 533) < Komi *sǫskį-* chew
7h.				*ńoŋχrəm*	Y *ɻuŋkrə̑m*	cf. Fi *nakerta-* (P 153, 48)
7i.		*tåumi*		*toχməm*	Y *tawməm*	OUg **tōγəm-* (LH #625; P 257; Mu 669)
8a. black	*fekete*	*piti* < Kh		*pəγtɜ*	*pəγtə*, Y *°ə*	Ug **pə̈kkɜ-ttɜ* (R 882; Mu 444)
8b.		*ēl̈äŋ*				(Mu 65)
8c.		*sēmėl*	*sēmėl*			FU **simɜ* (R 758; Mu 541)
8d.		*śoräs*				(Mu 601)
9a. blood	*vér*	*wį̄r*	*wįr*	*wər*	*wər*	FU **wire* (R 576)
9b.		*kēlp*	*kēlp*			U **kälɜ* (R 134; Mu 204: + rot)
9c.		*nērp*				(Mu 338: also „color")
9d.				*tåį*		U **säje* Eiter (R 434; P 236)
10a. bone	*csont*					FU **ćutte* Knöchelbein (R 45)
10b.		*lu(w)*	*lǫ*	*tȯw*	*lŏy*, Y *Low‘*	U **luwe* (R 254-55; P 263)
11a. breast	*mell*	*māyl*	*måul*	*mēyət*	*möyəl* Y *mȧwwəL*	FU **mälye* (R 267)
11b.	*kebel*					B 716: unbek. Urspr (AD1186: .PN *Keleb*?; 1230 *kebeil*)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
11c.		*śakw ~ śäkw*	*śäkw*			(Mu 585)
12a. burn	*ég, éget*					FU **äŋɜ-* (R 26)
12b.		*isti*				FU **ščɜ-* (R 592; Mu 137)
12c.		*jåswė*	*jäsau*			(Mu 179: intr. : N *jåsi* intr.)
12c.		*kwotėrti kwośėr-tawė*		*kȯtər-tə·m*		(P 92; Mu 242, 740)
12d.		*śäriti*	*säriti*			FU **ćärke-* (R 32-33; Mu 589)
12e.		*vort(t)i*				(Mu 737)
12f.				*saťəm*		(P 207)
12g.				*tåptəm*	Y *Liptəm*	(P 239)
13a. claw	*karom*					?cf. *köröm* nail (R 175: U **komVrV* hohle Hand; R 677: FP *kurmV* Handvoll)
13b.		*kwons*	*kwäns*	*kȯntš*	*kŏn̯č*	U **künče* (R 157; P 89; Mu 239)
13c.				*pȧŋktɜ*		Huf, Klaue (P 171)
14a. cloud	*felhő*			pl. *pətyət*	*pələŋ* Y *pəllə̄ŋ*	FU **pilwe* (R 381)
14b.		*tul*	*tǫl*			(Mu 675); cf. FP **tule* wind (R 800)
15a. cold	*hideg*					B 557: ? (AD1138 ON *Hede*gcut)
15b.		*aśerėm*	*aśėrėm*			(Mu 53)
15c.		*pōľëm*	*pōľëm*			FU **paľa* (R 352; Mu 451)
15d.					Y *jȧγli*	FU **jäkšɜ* (R 90; P 31)
15e.				*əťək*	*əťəγ*	(P 22)
16a. come	*jön*	*jiw*	*jiw*, imp. *jiχw*	*i̯ᵊᵒwə·m*		FU **jəŋV/*jəγV* (R 109)
16b.		*joχtėli*		*i̯oχtəm*		Ug **juktɜ-* (R 851; P 41; Mu 164)
16c.		*jēmti*	*jėmti*		*jŏntä*	(Mu 154)
16d.		*kwāli*	*kwali*			(Mu 228: + „gehen"); cf. #92

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
17a. die	*hal*	*χōli*	*khōli*		*kôlata*	U **kola* (R 173)
17b.				*pəsəm*		cf. M *(is-)pīsuls* (P 179)
17c.		*sori-māli*, cf. *sorėm* death		*sarə̂m*		(P 209), FU **śurema* death : **śure-* to die (R 489-90)
17d.					*tewərsäy jəntä*	*tewər* Splitter
18a. dog	*kutya*					B 855: MansiN *kūťuw*, Komi *ķi̯ćan*, Est *kutsikas* (onom.?); Sasse 1993, 351-52; Abaev I, 605: all from Iran **kuti-* > Sogd *'kwty*, Yaghn *kud, kut*, Ossetic pl. *kwitae*
18b.		*āmp*	*oåmp*	*åmp*	*ämp*	Ug **ämpɜ* (R 836; P 11; Mu 38)
19a. drink	*i-szik*	*aji*	*äji*	*i̯àńťə·m*	S *jînďem*	FU **juye-/*juke-* (R 103)
20. dry	*száraz*	*sūr*	*šur*			FU **śarɜ* (R 466)
20b.		*tōsam*	*tōsėm*	*sasə̂m*	V *sos-*	(P 210) Ug **θasɜ-* (R 844)
21. ear	*fül*	*paľ*	*päľ*	*pət*	*pəl*, Y *pəL*	FU **peljä* (R 371)
22a. earth	*föld*					< Gothic?/Gepidic? (G 451)
22b. earth	*talaj*					B 1472: *talp* Fusssohle
22c.		*mā*	*mō̄*	*məy*	*məy*	U **maye* (R 263)
23. eat	*ëv-, ë-(sz-ik)*	*tēy*	*tėi̯y*	*tēwəm*	*i-ntä*, V *li-*	FU **sewe-/*seye-* (R 440)
24a. egg	*tojás*					*toj-* Eier legen < ?U **toye-* geben (R 529)
24b.		*muŋi*	*moŋ*			U **muna* (R 285; Mu 320; 312: N *mōn*, K *mån* Hode)
24c.				*kårə-mo·χ*		(P 73), cf. *moχ*, Y *mok* child,
24d.					Y *Lokkŋ-mok*	(P 113, 127), M *moχi* Sprössling
25. eye	*szëm*	*sam*	*säm*	*sem*	*sem*, Y *sàm*	U **śilmä* (R 479)
26a. fat n.	*háj*					U **kuje* (R 195)
26b.	*faggyú* Talg			*puť*	*poľť*, Y *poLť*	Ug **pəľćɜ* (R 881)
26c.	*zsír*					< Slk. *žír* Fett, Schmer
26d.		*vōj*	*vuoj*		*woj*	FU **woje* (R 578)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
27a. feather	*toll*	*tåul*	*tåul*	*toχ̂t*	*tŏγə̂l* Y *towwə̂L*	U **tulka* (R 535)
27b. feather				*ńōrɜ*		(P 154)
27c. feather		*pun*	*pǫn* ~ *pun*		*pun*	cf. #36
28a. fire	*tűz*		*tåut*	*tüt*	*tŏ̝γət* Y *tə̯wwət*	Ug **tüγɜ-tɜ/*tüwɜ-tɜ* (R 895)
28b.		*nāj*		*nåi̯*		OUg **nā̆j* (LH #423; P 134; Mu 326; cf. R 297)
28c.		*uľä*				(Mu 694)
29. fish	*hal*	*khul*	*khul*	*χuť*	*kul* , Y *kuL*	U **kala* (R 119)
30a. fly v.	*repül*	*roplaχti*				FU **rə̆ppɜ-* (R 428; MU 503)
30b.	*száll*					B 1387: oldest „sich setzen“
30c.		*jäli*	*jäli*			Ug **jälɜ-* (R 850; Mu 143); #92
30d.		*tī̯lėli* *täulä·l*	*tėi̯leli* *täulä·l*	*təytəm*	Y *Ləyləm* V *lĕγəl-*	FU **šülkɜ* (R 500; P 249; Mu 645)
30e.					*jayi̯sə̂lta*	
31a. foot	*láb*					U **luwe* Knochen (R 254) or U **lɤmpɜ* Fläche (der Hand, des Fusses) (R 255)
31b.		*laʸi̯l*	*ɲøl, låjl-*			Ug **lɤlkɜ* (R 865; Mu 245)
31c.				*kȯr*	*kŏ̆r*	(P 90)
32a. full	*teli*	*taʸi̯l* *tēli* vb.	*taʸi̯l* / *tayėl* *tēli* vb.	*tet*	*tel* Y *tə̂llə̆L*	FU **täwδe/*tälkɜ* (R 518)
32b.		*mańtiŋ*	*måńtiŋ*			(Mu 300: + ganz, bis)
33a. give	*ad*					FU **amta* (R 8)
33b.		*miγ*	*mėi̯(ʸ)*	*məi̯əm*	V *mĕ-*	U **miγe-* (P 124; R 275)
34a. good	*jó*	*jåmės*	*jåmės*	*i̯əm*	*jəm*	Ug **jomɜ/*jamɜ* (R 850) P 36: Mari *jem* vergnügen
34b.			*löń*			(Mu 265: < Komi)
35a. green	*zöld*					B 1666: Alanic, cf. Ossetic *zældæ* grass
35b.		*ńār*	*ńoår*			(Mu 356: + fresh, raw, wet)
35c.				*wastɜ*		(P 287)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
36a. hair	*szőr*					Ug **säγɜ-rɜ/*säkrɜ* (R 886)
36b.	*haj*	*χå̈j*	*khōj*			Ug **kajɜ* (R 854)
36c.		*āt*	*ø:t*	DN *upət*	*awə̑t*	U **apte* (R 14; Mu 56)
36d.		*pun*	*pǫn*	*pün*	*pun*	FU **puna* (R 402)
37a. hand	*kéz*	*kāt*	*kǫät*	*ket*	*köt*, Y *kȯt*	FU **käte* (R 140)
37b.		*jå̈s*				(Mu 178: < Khanty)
38a. head	*fej, fő*	*puŋk*	*päŋk*			U **päŋe* (R 365)
38b.				*uχ*	*ɔy*, Y *ow‘*	U **ukɜ* (R 542) (P 276: M *äχ* mountain)
38c.				*təi̯*	Y *toi̯‘*	FU **tuδ’ka* (R 533; P 250)
39a. hear	*hall*	*χå̈li ~ χōli*	*khōli*	*χütə̑m*	Y *kulləm* V *kɔl-*	FU **kule-* (R 197)
39b.				*χunttə·m*		FU **kuntalɜ* (R 207)
40. heart	*szív*	*sim*	*sėm*	*səm*	*səm*	U **šüδä(-mV)* (R 477)
41a. horn	*szarv*					FU **śorwa* (R 486)
41b.	*kürt*					?
41c.		*āńt*	*ø:ńť*	*ōŋət*	*ə̑ŋə̑t*	U **aŋtɜ/*oŋtɜ* (R 12)
42. I	*én*	*am*	*åm ~ om*	*màn*	*mä*, Y *mȧ*	U **mš̆* (R 294)
43a. kill	*öl-*	*ali*	*äli*	*wētəm*	Y *wȧllə̑m*	FU **weδɜ-* (R 566-67; Mu 33)
43b.		*vayi̯lti ~ vālti*				(Mu 713)
44a. knee	*térd*					B 1506: OBulg., cf. Chuv *čər*
44b.		*sāns*	*sånės ~ sans*	*tšàntš*	*čäŋč*	U **šänčɜ* (R 471)
45a. know	*tud*					**tumte-* fühlen (R 536)
45b. know	*ismer*					B 626: unbekannte Ursp.; *-r* iterat.
45c.		*χāsi*	*khø:si*			FU **kačɜ-/*kočɜ-* (R 114; Mu 88)
45d.		*vāʸi̯*	*vǫj*	*ūi̯əm*	(V *wu-* see)	U **wsjɜ* to see (R 588)
45e.					*onə̑lttə̑*	
46. leaf	*levél*	*låpės lūptā*	*løptė ~ låptę*	*lïpət*	*ļ̇iwə̑t* Y *løpət*	FU **lepɜ* (R 259)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
47a. lie	*fek-*					FU (Perm-Ug) **päkkɜ-* sitzen (R 361)
47b. lie	*hever*					B 555: unbek. Urspr.; *-r* iterat.
47c.		*χuji*	*khǫji*	(Ob-dorsk: *χoj-*)		FU **kujɜ-* (R 197; Mu 116: liegen, schlafen)
48d.				*paneǫm* legen	*pə̑nta*	U **pane-* legen (R 353)
48. liver	*máj*	*majt* ~ *mājt*	*mø:t*	*mūχə̑t*	*muγə̑l* Y *muwL*	U **maksa* (R 264)
49a. long	*hosszú*	*χåsä*	*khwåiśė*			U **ko(ń)ćɜ* (R 180)
49b.		*palit*	*pā̈lt*			U **piδe* (R 377; Mu 408)
49c.				*χow*	*koγ*, Y *kow‘*	FU **kawka* (R 132)
50a. louse	*tetű*	*tākėm*	*tå̄χėm*	*tewtəm*	*töγtəm*	FU **täje* (R 515)
51a. man	*férfi, férj*					*-érj* < FU **ürkä* (R 84)
51b.				*χuį*	*ku(j)*, Y *ko*	U **koje* (R 166)
51c.		*χum*	*khǫm*			U **koj(e)-mɜ* (R 168; Mu 122: + Mensch)
52a. many	*sok*	*saw* ~ *sau*	*såu*			FU **čukkɜ/*čokkɜ* thick (R 62)
52b.		(TJ *är*)		*ȧr*	*är*	U **erä* (R 75; P 13)
53a. meat	*<u>hús</u>*					B 590: ?Iran.: Yidgha *γuš*, *γūš*, Parachi *γūš*, Pashto *gwaša*, Khot *ggūštā-*, MPers *gōšt* (J 263-64)
53b.		*ńåwėl’*	*ńoul* ~ *ńouľ*	*ńoχə̑*	*ńoγį*	(P 152; Mu 371)
53c.		*<u>ńoχi</u>* < Kh				(Mu 364)
54a. moon	*hold*			(*χaw* month)		cf. *hó* month < U **kuŋe* (R 211)
54b.				*<u>tīľəš</u>*		< Komi Zyry *tęliś*, Udm *tolež* (P 253)
54c.		*jå̄ŋχēp*	*jōŋkhėp*			Mu 173; 172: N *jå̄ŋχi*, K *jōŋkhi* umgehen, sich umwandeln, 174: N *jå̄ŋχėpi* sich herumdrehen
54d.					*iki*	

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
55a. mountain	*hëgy*					FU **kaća* end, tip (R 110)
55b.		*äχ*	*øχ*			U **ukɜ* head (R 542; Mu 24); cf. #38
55c.		*ńå̊r*	*ńor*			(Mu 368: + Ural; Stein)
55d.		*ur*	*vǫr*			Ug **arɜ/*urɜ* (R 833; Mu 701: + Gipfel, Wald)
55e.				*rep*	Y *rȧp*	(P 201) < Indo-Iranian?
56a. mouth	*száj*	*sūp*				U **śuwe* (R 492-93; Mu 578)
56b.				*tut*	*jul*, Y *LuL*	FU **šule* (R 903)
56c.		*tūs*	*tus*			(Mu 685)
57. name	*név*	*nam*	*năm*	*nem*	*nem*, Y *nȧm*	U **nime* (R 305)
58a. neck	*nyak*					?U **ńskkV* (R 328-29)
58b.	*torok* n., throat				(*tur* Kehle)	Ug **turɜ* (R 895)
58c.		*sip, sip-lu*	*sop-lø*	*sāpət*	*säwəl* Y *sȧpəL*	FU **śepä* (R 473)
59a. new	*új*					FU **wuδ'e* (R 587)
59b.		*iľp ~ (j) ilpi ľiľpėl*	*jelpėl ~ jä°*	*i̯ətəp*	*jələw* Y *i̯əlləp*	U *elä-* (R 73; P 38; Mu 135, 283; LH #190: OUg **jïləp*)
60a. night	*éj(szaka), éjjel*		*jė ~ ji*		*əj*	FU **üje* (R 72; Mu 156)
60b.		*ēt*	*jėt*	*ȧt*	(*ät* evening)	U **jütɜ* (R 99)
61a. nose	*orr*					FU/?U **wōre* Berg (R 571)
61b.		*ńol ~ ńål*	*ńål*	*ńat*	*ńŏl*, Y *ńoL*	OUg **ńăl/*ńŏl* (LH #451; P 146; cf. R 875)
62a. not	*nëm*					FU (Perm-Ug) **nä* (R 301: from U **nä* this)
62b.		*ul*	*vėl*			(Mu 692)
62c.		*at, ātï*	*oåt, oåtï*	*əntă*	*əntə*, Y *əntə*	U **e ~ *ä* (R 68-69; P 22; Mu 55, 58)
63a. one	*ëgy*			*ei̯*	*əj*	U **e* this (R 67)
63b.		*akwa*	*äkwäi̯ʸ*			FU **ükte* (Mu 29)
64a. person	*embër*					< U **eme* Mutter, Weib + *-ër* - - see #51a: FU **ürkä*
64b.		*χum*	*khǫm*			U **koj(e)-mɜ* (R 168; Mu 122: + Mensch)

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		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
64c.		*χar*	*khår*			(Mu 80: + etwas; Wesen)
64d.		*χå̈lės*	*khol(ė)s*			(Mu 98: + jemand)
64e.				*χaį̈à·t*		(P 44: Kh + M *khol(ė)s*); but cf. EKh *χoį̈ɜ* & *χoį̈te·n* wer
65f.				*ȧtā·mɜ*		< Tk *adam* < Arab (P 15: FUF II, 1902, 114)
65g.					*kə̂sį̈*	
64h.				*į̈aχ*	pl. *jaγ*, Y *į̈aγ*	cf. Mari *jeŋ*
64i. person	*fő* p. = head					B 367
64j. person	*személy*					B 1412: also "face", from *szëm* eye
65a. rain n.	*eső*					U **ećV-* fallen (R 71)
65b.		*rakw*	*räχw*			(Mu 491)
65c.				*į̈om*		(P 41)
65d.				*į̈ert*		(LH #208: OUg **jïrt*; P 34: Mari *jür*)
65e.					*ļ̂wə̂ť*	
66a. red	*vörös, vërës*	*viγį̈r* ~ *vį̈r*	*vį̈r*	*wərtɜ*	*wərtə* Y *wərtə*	from FU **wire* blood (R 576) (P 296; Mu 726: + Blut)
66b.	*piros*					B 1164-65: cf. *pirít* beschämen, rösten, rot färben, (onom. or from Slavic *pyriti* to blush)
66c.		*kēlp*	*kēlp*			(Mu 204: + Blut)
66d.		*nērp*				(Mu 338: Farbe; Blut)
67a. road	*út*					U **utka* (R 546)
67b.		*lå̊ŋχ*	*ľöŋkh*	DN *lok*	*ļ̈ɔ̈k*	(LH #773; Mu 284)
67c.				*pənt*		(P 177-78: M *patį̈m*) < II
68a. root	*gyökér*					Ug **jə̈kkɜ-rɜ* (R 852; not related with FP **jure* (R 852)
68b.		(*porėχ* Rumpf)	*på̊rėkh*			(Mu 457)
68c.		*tār*	*toå̊r*	*ter*		FU **särɜ* (R 437; LH #155: **θēr*; P 242)
68d.				*turt*	*jor*, Y *Lort*	(LH #157: **θōr*; P 266; *s*-Laute 87; R 785)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
69a. round	*kerek*					FU **kerä* (R 147)
69b.	*gömbölyű*					back formation from *gombolyag* Kugel; (kugel) rund; cf. *gomb* Knopf, Kugel (B 466-67)
69c.		*jēŋta* < Kh		*ja̯ŋtā·*		(P 31)
69d.		*lākwėŋ*				(Mu 247; 246: N *lākw*, K *låχw* Kreis, Rundheit)
69e.		*pūyėr* ~ *po°*	*päwėr*			FU **peŋerä* (R 372; Mu 469)
69f.					Y *kəmrək*	(P 89)
69g.		*marawi*	*märwė*			(Mu 301)
70a. sand	*homok*					< Tk., cf. Chagat *qumaq* (B 572)
70b.	*föveny*					B 420: unbek. Urspr.
70c.		*jēm*	*jėm*			(Mu 153)
70d.		*χis* < Kh				(Mu 90)
70e.				*pån*		(P 170)
70f.		*sėi* ~ *sei*			Y *sə̯ɨ̯ʻ*	(P 170; Mu 539: + Schlamm)
70g.			*sėr*			(Mu 550)
70h.				*saŋχɜ*	Y *saŋχi*	(P 208)
71a. say	*mond*					U **monV* (R 290-91)
71b.		*lātti*	*loåtti*			(Mu 253: N *lātiŋ* Wort, Rede)
71c.		*lāwi*	*låwi*, inf. *låuχ*			(LH #770; Mu 254)
71d.		*lāyi*				(LH #771; Mu 279: N *ľā(ŋ)χ*, K *ľäχ* Wort)
71e.				*ja̯stə(·)m*	*jäsŋəltä*	(P 32: *ja̯səŋ* Rede)
71f.		(*miryi* brüllen)	(*märyi* id.)	*neryəm*		(P 138: M *ńäŕgə-*)
71g.				*ńoχməm*	Y *ńawməm*	(P 153)
71h.					*tŏl̮ə̂yta*	
72a. see	*lát*					U (Hu+Sm) **lɜttV-* (R 257)
72b.	*néz*					FU **näke-* (R 302)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
72c.		*χå̈nti*	*khōnti*			U **kunta* (R 207; Mu 104)
72d.				*ettī·təm*		FU **itä* (R 85; P 20)
72e.					Y *Leələm*	(P 113: Hu *les* to lurk for?)
72f.		*vāʸi̯*	*vǫj*	*ūi̯əm*	Y *ui̯əm* (+ wissen)	U **wɜjə* to see (R 588) (P 276; Mu 711); cf. #45
73a. seed	*mag*					FU **muŋkV* Körper (R 286) but cf. Ossetic!
73b.			*toåjėm*			(Mu 617)
73c.			*khǫmėr*			(Mu 102)
73d.		*ūrlaχ*	*vǫrlėχ*			(Mu 704: < Tat)
73e. seed				*i̯em*		(P 33; JSFOu 34.3, 5; cf. R 634)
73f.					Y *panpət*	(P 165)
74a. sit	*ül*					R 434-5 rejects the relation to U **säle-* sich setzen
74b.				*panęm* (= 47)		U **pane-* legen (R 353; P 165)
74c.		*ūnli*	*vǫnli*	*omtəm* Y *ømləm*	*amə̂tta*	(P 158; Mu 695: sitzen; LH #729)
75a. skin	*bőr*					U **perV* Haut, Rinde (R 374)
75b.				*kȧr*		U **kere* (R 148-49; P 73: M *kerep* Schale); cf. #3
75c.		*såw*	*såu ~ søu*	*soχ*	*sŏγ* Y *sowʿ*	FU **śuka* (R 488; P 220; Mu 568: + fell) = #3
76a. sleep	*al-*			*atə̂m*	Y *olləm*, V *ăla-*	FU **oδa-* (R 334; P 5)
76b.	*hál*					FU **kalV-* übernachten (R 120-21)
76c.		*χuji*	*kh(w)ǫji*	(Ob-dorsk: *χoj-*)		FU **kujɜ-* (R 197; Mu 116: + liegen; cf. #47)
77a. small	*kicsi(ny)*					< OBulg, cf. Chuv *kəśən* klein, jung, Kirgiz *kičigine* id. < **kičig-kine* (B 749)
77b.	*apró*					< Tk.: Kašγ *oprak* allmählich < **oprā-* zerstückeln (B 43)
		lai ~ laj	*läi*			Ug **lɤjə* (R 864; Mu 246)
		māń				(Mu 299)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
77c.		*aj* < Kh		*ȧi*	*äj*	Ug **äjɜ* (R 835)
77d.				*ńāχ̂t*		(P 143: + low, short)
77e.			*viś*	*wȧť*		Ug **wä(ń)ćɜ* (R 899; P 289; Mu 745; cf. Fi *vähä-* < FV **wäšä-* R 818)
77f.					*ŏkəm*	
77g.					*werəŋ*	
78a. smoke n.	*füst*	*posim*	*påsėm*			Ug **pičɜ/*pićɜ* (R 879; Mu 465)
78b.					Y *Løpət*	(P 113)
78c.				*tšaχi·m*		(P 269: Komi *tśyn*, Udm *śyn* < FU **čüŋɜ* - R 59 with other OUg cognates)
79a. stand	*áll*					FU **salkɜ-* (R 431)
79b.		*lŭlĭ*		*tŏťəm*	Y *Lulləm*	(P 102; FUF 8, 71; Beitr. 46)
79c.			*tuńśi*			FU **saŋća-* (R 431; Mu 680)
80a. star	*csillag*					*csillog* glanzen < FU **ćślkV-* / **ćšlkV-* (R 46)
80b.		*såw*	*såu*			(Mu 567)
80c.		(TJ *kōńś*)		*χus*	*kɔs*, Y *kos*	U **kuńćɜ* (R 210-11; P 67)
81b. stone	*kő*	*kaw*	*käu* ~ *käw*	*kew*	*köy*, Y *kȧw‘*	**kiwe* (R 163)
82a. sun	*nap* s., day					B 1015: unbek. Urspr.
82b.		*χå̈täl*	*khotėl*	*χat*	*kotə̑l*, Y *katL*	U **koje* (R 167; P 49)
82c.		*nāj*				(Mu 324: + Feuer)
82d.					*süŋk*	
83a. swim	*úsz-ik*	*uji*	*vuji*	*ūťəm*		U **uje-/*oje-* (R 543)
83b.		*nāti*	*nø:ti*	*nopət-*		OUg **nīpət-* (LH #434; Mu 332)
83c.		*χi̯uli* ~ *χi̯wli*				FU **kupla* (R 212-13; Mu 91)
83d.					*ńorə̑yta* Y *ńaryə̑m*	(P 145)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
84a. tail	*far(o)k*					*far* Hintertail < U **purV* (R 407)
84b.		*kōk*				(Mu 218: + Vögelein; cf. R 172)
84c.		*lēʸi*		*təɣ*	*ləɣ*, Y *Ləɣ‘*	(P 249; Mu 256)
84d.					*mäsəɣ* Y *messəɣ*	U **mäńćɜ* (R 268; P 123)
85a. that	*az(on)*; *amaz*					U **o/*u* (R 332)
85b. that	*ő*					FU **sə̈* (R 453)
85c.		*ta* *ton*	*tǫ* *ton, tåt*	*tåm*	V *tim*, Vy *temi*	U **tä/*te/*ti* (R 513-14; Mu 608, 649; 654, 664; P 237)
85d.		*ań-ta*				(Mu 40)
85e.				*ťə̯w*	Y *ťu*	U **će / ći* (R 33-34; P 100-01)
86a. this	*ez*; *az*; *emez*					U **e* (R 67)
86b.		*ań-ti*	*äń-tė*			(Mu 40)
86c.		*aj-tė*	*äj-tė*			(Mu 25)
86d.					V *ťit*, Y *ťi*	U **će / *ći* (R 33-34; P 101)
87a. thou	*të*					U **tə̈* (R 539)
87b.		*naŋ*	*näǯ̆ʸ⁾*	*nòŋ*	*nə̋ŋ*	OUg **näɣ/*něɣ* (LH #423; P 141; Mu 328)
88a. tongue	*nyelv*	*ńelm*	*ńilėm*		*ńäləm*	FU **ńälmä* (R 313; Mu 360)
88b.				*ket*	Y *kòL* (*köl* speech, language)	U **kēle* (R 144; P 78)
89. tooth	*fog*	*puŋk*	*päŋk*	*peŋk*	*pöŋk* Y *paŋ̯ko*	FU **piŋe* (R 382)
90a. tree	*fa*	(*-pä* in comp.)				U **puwe* (R 410)
90b.		*jiw*	*jiw*	*i̯uχ*	*juɣ*, Y *i̯uw‘*	U **juwɜ* (R 107; P 42)
91. two	*kettő*, *két*	*kit*	*kit*	*kătən*	*kät*, Y *kȧtɣən*	U **kakta / *käktä* (R 118)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
92a. walk	*jár*					FU **jorɜ-* rollen / **jorkɜ* drehen (R 102)
92b.		*jäli*	*jäli*		V, Vy *jĕl-*	Ug **jälɜ-* (R 850; Mu 143)
92c.		*jåmi*	*jōmi*			U **jomɜ-* (R 100; Mu 171)
92d.		*kwāli*	*kwåli/ kwali*			FU **kälä-* (R 133; Mu 228)
92e.	*mën-*	*mini*	*mėni*	*mənəm*	Y *mənnəm*	U **mene-* (R 272)
92f.				*i̯aŋχə̑m*	Y *i̯aŋ k̮ə̑m*	(P 28; Beitr. 292)
92g.				*tšūtšə̑m*	Y *suttšəm*	U **ča(n)čɜ* (R 53; P 276; Beitr. 123, 130)
92h.	*gyalogol*					*gyalog* zu Fuss gehend < FU **jalka* „Fuss, Bein" (R 88-89)
93a. warm	*forró*					*forr-* sieden, kochen < U **pɜrk/yɜ-* drehen (R 414; G 410; B 412)
93b.	*meleg*	*māltip ~ maltip*	*moåltėp ~ maltėp*	*mēľək*	Y *màlləŋk*	Ug **mälɜ* (R 868) (P 120; Mu 295)
93c.		*isėm*	*ėsėm*			FU **ščɜ-* (R 592; Mu 137), cf. #12
93d.		*rēʸi̯*	*rėi̯ʸ*			U **reŋ/kɜ* (R 423; Mu 497)
93e.				*χōtšəm*	Y *kåttšəm* v. *kačča*	FU **kačɜ* (R 114; P 63)
93f.				*ńāməkˑ*	Y *ńåməkˑ*	FU **ńämɜ* weak (R 314; P 147)
93g.					*koŋə̑k*, Y *kani*	(P 71)
93h.					*pəməŋ*	< Komi *pi̯m* (R 366)
94a. water	*víz*	*vit*	*viť*	*wot*		U **wete* (R 570; P 300)
94b.				*i̯əŋk*	*jəŋk*, Y *i̯əŋk*	FU **jäŋe* ice (R 92; P 36)
95. we	*mi*	*man ~ mān*	*mån*	DN *mŏŋ*	*məŋ*, V *mĕŋ*	U **mš* (R 294; LH #399)
96a. what	*mi*	*man*		*mətā*	*mŏ̄yi*	U **mɜ* (R 296)
96b.			*när*			(Mu 330)
96c.				*χotɜ*		U **ku-/*ko-* (R 191)

Gloss	Hungarian	Mansi		Khanty		Etymological remarks
		North	East: Konda	South: K (+ DN)	East: Vy (+ S, V, Y)	
97a. white	*fehér*, d. *fejér*					FU **päjɜ* weiss; glänzem (R 360)
97b.				*nawwə̑*	*näγi*, Y *newi*	(P 134)
97c.		*jāŋk*	*j(o)åŋk*			(Mu 148: + Eis)
97d.		*vojkėn*				(Mu 731)
97e.			*såjrėŋ*			(Mu 515)
98a. who	*ki(k)*	*χå̄*		*χoi̯ɜ*	Y *koi̯a(γ)ɜ*	U **ke/*ki* (R 140)
98b.			*khwån-nė̄*			(Mu 334: Kh *nė, ni* was < Tat)
99a. woman	*nő*	*nē*	*nē*	*neŋ*	*niŋ* : *ni* Weib Y *ne*	U **niŋä* (R 305; P 137)
99b.	*asszony*	(*śāń* Mutter Mu 855)				< Ossetic *æχsīn* Herrin, Fürstin < Alanic **χšaiθnī* (B 55; J 253)
99c.		*ēkwä*	*jēkw(ė)*			FU **ewkkɜ* (R 76; Mu 61)
100a. yellow	*sárga*					< OBulg **šarïγ* gelb (B 1306)
100b.		*kasm*	*käsėm*			(Mu 198; LH #222; cf. R 861)
100c. yellow					Y *wastə*	(P 287) yellow, green – cf. #35
100d. yellow				*wərki·m oχte·p*		cf. #66 (P 296)

Abbreviations of languages: Bulg Bulgarian, Chagat Chagatai, Chuv Chuvash, DN Upper Demyanka (Narygin), FU Finno-Ugric, Gmc Germanic, H Hungarian, II Indo-Iranian, Iran Iranian, Kašγ Kašγarī, Kh Khanty, Khot Khotanese, M Mansi, MPers Middle Persian, O Old, OUg Ob-Ugric, Sogd Sogdian, Tat Tatar, Tk Turkic, U Uralic, Ug Ugric, v. verb, V Vakh, Vy Vasyugan, Y Yugan, Yaghn. Yaghnobi.

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Appendix 6: "Classical" and "recalibrated" glottochronology

0. The method called *glottochronology* represents an attempt to date the divergence of related languages in absolute chronology. Its author, Morris Swadesh, was inspired by the so-called radiocarbon method, used for dating organic remnants. Here we can reiterate the main steps in the deduction of the method. In the first place there was the discovery of the radiocarbon isotope C^{14}, existing in the atmosphere in the proportion $1 : 10^{12}$ with the usual isotope C^{12}. Due to the food-chain this radioactive isotope occurs first in green plants and subsequently in the biological tissues of animals. After the death of any living organism the disintegration of the radioactive isotope takes place according to an exponential function. This exponential disintegration means that after a constant time period T (= half-time of disintegration) the concentration of the radioactive isotope is reduced by half, after 2T by a quarter, etc. On the basis of this phenomenon, W.F. Libby developed the radiocarbon method (1947), serving to determine the age of organic remnants younger than 50 millennia. The method was recently defined with more precision (e.g. the change of the half-time from 5568 to 5730 years; correlation with dendrochronology, etc.), but its basic idea remains. Since M. Swadesh borrowed the mathematical apparatus from Libby, it is useful to repeat it here.

(1) $\Delta N(t) = -\lambda \cdot N(t) \cdot \Delta t$ ... decrease ΔN from N radioactive nuclei in the time interval Δt, where $\lambda\lambda$ is a constant of proportion

(2) $dN(t) = -\lambda \cdot N(t) \cdot dt$ ... approximation of discrete quantities by connected ones, allowing the integration

$$\int \frac{dN(t)}{N(t)} = \int -\lambda \cdot dt$$ .... leading to the solution

$\ln N(t) = -\lambda \cdot t + C$. After delogarithmization we reach
$N(t) = e^{-\lambda t + C} = e^{-\lambda t} \cdot e^{C}$, where $e^{C} = K$. So we can write
$N(t) = K \cdot e^{-\lambda t}$.

It remains to determine the function of the constant K. It is possible thanks to the initial conditions, i.e. in the time t = 0, when $N(t) = N_o$:

(3) $N(t) = N_o \cdot e^{-\lambda t}$, where N_o represents the number of undisintegrated nuclei at the beginning of the process.

From the equation (3), which is a standard solution of the differential equation (2), we deduce the significance of the *half-time of disintegration* T, defined as the time interval, in which the number of the undisintegrated nuclei decrease in $^1/_2$:

(4) $N(T) = {}^1/_2 N_o$
$^1/_2 N_o = N_o \cdot e^{-\lambda T}$, after a reduction
$^1/_2 = e^{-\lambda T}$, after logarithmization
$\ln {}^1/_2 = -\lambda T$, i.e. $\ln 2 = \lambda T$, or

(5) $$T = \frac{\ln 2}{\lambda}$$

The half-time of disintegration of the radioactive isotope C^{14} was empirically established as 5730 years. This allows one to determine the value of the constant of disintegration λ.

For the purpose of practical calculations it is helpful to use the formula derived from the definition of the half-time of disintegration. If the number of the undisintegrated nuclei decreases by $^1/_2$ after every time period T, we get:

(6) $N(t) = N_o \cdot (\frac{1}{2})^n$,

where n means, how many periods T correspond with the age of the specimen. Hence

$\frac{N(t)}{N_0} = (\frac{1}{2})^n$, i.e. $\frac{N_0}{N(t)} = 2^n$. Let us logarithmize it:

$$\ln \frac{N_0}{N(t)} = \ln 2^n = n \cdot \ln 2$$ and we reach

$$(7)\ n = \frac{\ln \frac{N_0}{N(t)}}{\ln 2}$$

From here we get the age of the specimen

$$(8)\ t = n \cdot T .$$

1. Around 1950 Libby's radiocarbon method inspired Morris Swadesh, an American anthropologist and specialist in Native American languages, to extend its application to the development of languages. His goal was the absolute dating of the time of divergence of related languages. Swadesh thought that the replacement of words in languages was determined by an exponential rule similar to the rate of disintegration of radioactive nuclei of isotope C^{14}. To calculate the rate of this change he established a testing word-list, consisting first of 215, later of 200 semantic units, which had to be universal and immune from borrowing. Thanks to the cooperation of specialists in Sinology, Egyptology, Classical Philology and Romance and Germanic linguistics, he was able to determine the average constant of disintegration applied to one millennium, in 19.5% changes in the testing word-list; in other words, in the development of any given language an average of 80.5% of the units of the basic lexicon should be preserved during this period (see Swadesh 1952). Naturally, this is only true if the constant actually is universal. In 1955 Swadesh published a new study, reflecting the first critical reactions. He radically reduced and changed the testing word-list, now consisting of 100 semantic units. On the basis of the reduced "basic lexicon", the constant of disintegration was changed to 14% per millennium, i.e. 86% of the lexical units should be preserved in the development of one language after one millennium. The elementary postulates may be formulated as follows:

[1] In the lexicon of every natural language it is possible to identify a part which is more stable than others. This is commonly called the *basic lexicon*.
[2] It is possible to define a set of meanings expressed in every language by words from the *basic lexicon*. This can be designated the *basic testing list* (BTL). The symbol N_o will signify the number of distinct meanings included in the list.
[3] The share r of words from the basic testing list preserved after a constant period Δt is constant; in other words, it depends only on the length of the time interval, not on the specific language or choice of words.
[4] All words representing the basic testing list have an equal chance of being preserved during the same time interval.
[5] The probability of any unit from the basic testing list being preserved does not depend on the probability of the corresponding unit being preserved in the basic testing list of any other language.

To calculate the time elapsed between the existence of two languages A and B, where B is a descendant of A, Swadesh used the mathematical apparatus from the radiocarbon method. He began with equation (3):

(9) $N(t) = N_o \cdot e^{-\lambda t}$, where λ represents the analogy to the constant of disintegration in equation (3). This is defined exactly as the share of the words in the basic testing list which are replaced during one millennium. Hence:

(10) $\frac{N(t)}{N_0} = e^{-\lambda t}$, or $\ln \frac{N(t)}{N_0} = -\lambda t$. From here

(11) $t = \frac{\ln \frac{N(t)}{N_0}}{-\lambda}$ or $\ln \frac{\ln c}{-\lambda}$, where $c = \frac{N(t)}{N_0}$.

If the share r from postulate (3) is also related to the period of one millennium, it will represent the constant which is complementary to λ, i.e.

(12) $r = 1 - \lambda$.

For the decrease of the words from BTS per millennium the equation $\Delta N = N_o - N(t_1) = N_o - N_o \cdot e^{-\lambda \cdot 1} = N_o (1 - e^{-\lambda})$ is valid. The same value must be reflected in the product $N_o \cdot \lambda$. From the comparison $1 - e^{-\lambda} = \lambda = 1 - r$ (see 11) we reach

(13) $r = e^{-\lambda}$.

The same result is accessible from a comparison of the right sides of the equations expressing the shares of the preserved words in the BTL per millennium: $N = N_o \cdot e^{-\lambda \cdot 1}$ & $N = N_o \cdot r$.

Consequently it is possible to rewrite the equation (10) by means of (13) in the form

(14) $c = r^t$, where t indicates the time in millennia.

Regarding postulate (5), the share c_2 of the preserved lexicon from the BTL in two related languages, i.e. languages that developed from a common protolanguage, is equal to the square of the share of the words preserved in the individual development:

(15) $c_2 = (r^t)^2 = r^{2t}$. Logarithmizing it, we express t:
$\ln c_2 = \ln r^{2t} = 2t \ln r$. From this we get

$$(16)\ t = \frac{\ln c_2}{2 \ln r}$$

or with respect to equation (13)

$$(17)\ t = \frac{\ln c_2}{-2\lambda},$$

where c_2 means the share of commonly inherited pairs of words in BTL in both of the languages analyzed.

In the application of glottochronology the formulae (16) or (17) are used most frequently. To illustrate the practical procedure, let us estimate the time of divergence of German and French. In the BTL of both languages there are 33 pairs of commonly inherited words. Both lists are complete, which means that $c_2 = 0.33$. Applying this to equations (16) or (17), we reach the time of divergence in millennia:

$$(16)\ t = \frac{\ln 0{,}33}{2 \ln 0{,}86} = \frac{-1{,}10866}{-0{,}30164} = 3.675$$

It is more advantageous to calculate a rich set of data with a corresponding share of preservation of BTL for one language (c_1) or for two related languages (c_2) – see Table 1:

c_1	0.99	0.97	0.95	0.90	0.85	0.80	0.75	0.70	0.65	0.60	0.55	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
c_2	0.97	0.94	0.90	0.81	0.72	0.64	0.56	0.49	0.42	0.36	0.30	0.25	0.20	0.16	0.12	0.09	0.06	0.04	0.02	0.01
t	0.03	0.20	0.35	0.70	1.10	1.50	1.90	2.40	2.90	3.40	4.00	4.60	5.30	6.10	7.00	8.00	9.30	10.7	13.0	15.3

The time of divergence for German and French is shown in line t, corresponding with $c_2 = 0.33$. This value may be located approximately between 3.40 and 4.00 millennia in Table 1. Thus it is concretely possible to estimate the age of the common ancestor of German and French as 3700 BP or 1700 BC according to the methodology developed by Swadesh.

The preceding steps are operative only with a pair of synchronous (contemporaneous) languages. It may also be necessary to estimate the divergence of nonsynchronous languages (i.e. if each of the compared languages was recorded at a different time). Let us designate the respective time spans from the disintegration of the common ancestor of the compared languages to the written records of each language as t_1 and t_2. In this case equation (16) can be modified as

$$2t = \frac{\ln c_2}{\ln r},$$

and further

$$(18)\ t_1 + t_2 = \frac{\ln c}{\ln r}.$$

Since t_1 and t_2 are usually unknown, and only their subtraction Δt_{12} is at our disposal, it is possible to substitute the sum $t_1 + t_2$ with $t_1 + t_1 + \Delta t_{12} = 2t_1 + \Delta t_{12}$, where t_1 is shorter from both intervals t_1, t_2. Hence for two nonsynchronically attested languages the final formula appears as follows:

$$(19)\ t_1 = \frac{\ln c}{2 \ln r} - \frac{\Delta t_{12}}{2}, \text{ where } t_1 = \min (t_1, t_2).$$

2. Swadesh's glottochronology was welcomed by specialists studying languages without a lengthy written history. On the other hand, the sharpest negative reaction was from specialists in the Indo-European languages. This was understandable, since some glottochronological estimates of the time-depth of Indo-European languages strongly disagreed with well-known historical facts. More interesting than aprioristic rejection was criticism of the specific premises, postulates, and conclusions, especially if the critics offered alternative solutions. The most significant modifications, eliminating some of the weak points of the method, were formulated by the Canadian Sheila Embleton (1986) and the Russian Sergei Starostin (1989; English traslation 1999). Both scholars agreed that the "classical glottochronology" of Swadesh was mistaken in that the replacement of words was not distinguished from borrowing. For example, one such innovation was Russian *glaz* 'eye', which replaced common Slavic **oko*. On the other hand, it is possible to identify a borrowing, probably of Iranian origin, in Russian *sobaka* 'dog', besides the less frequent *pës*, which reflects common Slavic **pьsъ* 'dog'. Starostin offered a simple solution: eliminate all borrowings before any calculation. Applying this procedure to the testing languages used for the estimation of the constant of disintegration λ, we reach a lower value of the constant and its significantly smaller dispersion (table 3).

Starostin compared the proportions of inherited lexicon in histories of the same languages during various times of divergence, as related to millennial time spans, specifically in some Romance languages versus Vulgar Latin from the middle of the first mill. AD and versus early classical Latin from the time of Plautus, c. 200 BC. The values of c in table 2 are now calculated without loans; time is expressed in millennia:

Table 2 **Language**	$c = \frac{N(t)}{No}$, t = 1.5	$\lambda = \frac{\ln c}{-t}$, t = 1.5	$c = \frac{N(t)}{-t}$, t = 2.2	$\lambda = \frac{\ln c}{-t}$, t = 2.2
French	88/99 = 0.89	0.07	75/97 = 0.77	0.12
Spanish	90/98 = 0.92	0.06	79/97 = 0.80	0.10
Rumanian	87/96 = 0.91	0.06	76/95 = 0.80	0.10

For the differences between the results in the third and fifth columns Starostin finds the only explanation: formula (11), implying

$\lambda = \frac{\ln c}{-t}$, is not valid.

The empirical figures from Table 2 confirm that the optimal approximation is the function

(20) $\lambda^* = \frac{\lambda}{t} = \frac{\ln c}{-t^2}$

The preceding ideas are based on the data in Table 3:

Language	age t [millennia]	λ after Swadesh	λ without loans	λ* = λ / t
English	1.3	0.14	0.10	0.08
German	1.2	0.08	0.05	0.04
Norwegian (Riksmål)	1.0	0.20	0.05	0.05
Icelandic	1.0	0.06	0.06	0.06
French	1.5	0.09	0.07	0.05
Spanish	1.5	0.07	0.06	0.04
Rumanian	1.5	0.09	0.06	0.04
Japanese	1.2	0.11	0.06	0.05
Chinese	2.6	0.10	0.10	0.04

It is apparent that the dispersion of the "constant of disintegration" λ according to Swadesh is very high, from 6 to 20%. After the elimination of borrowings, the dispersion of this value for the nine languages analyzed tapers off to 5–10%. The interval will be narrower still in the case where λ is a function of time. Abstracting specifically from the data on English, this value oscillates from 4 to 6%. These results led Starostin to a new value for the "constant of decrease": λ = 0.05 per millennium. The situation of English is more complex, since its development is apparently faster than is usual in other languages. This phenomenon is undoubtedly connected with the massive influence of Old Norse in the period 800-1100 and that of

Old French in the following five centuries, causing, according to Starostin, certain pidgin-like features in English. But even the new value of $\lambda = 5\%$ does not prevent the tendency to reach a more recent date of divergence, especially in the case of longer time periods. Starostin seeks a solution in the following idea. It is empirically proven that individual words in the lexicon of every language, including BTL, are replaced unevenly. If the words in any language were to be ordered from least stable to most stable, the words with the lowest stability would be replaced most quickly, while more stable words would have a longer life. This means that the speed of lexical change decreases over time. Summing up, "c" is not a constant but a function of time, $c = c(t)$, and formula (9) should be modified as follows:

(21) $N(t) = No \cdot e^{-\lambda \cdot c(t) \cdot t^2}$ for the development of one language, where

$$c(t) = \frac{N(t)}{N_0}, \text{ and}$$

(22) $N(t) = No \cdot e^{-2\lambda \cdot \sqrt{c(t)} \cdot t^2}$

for the divergence of two languages, developed from a common protolanguage.

From this it is possible to deduce for the time of development of one language (23), or for the time of divergence of two languages (24):

$$(23)\ t = \frac{\sqrt{\ln c}}{\sqrt{-\lambda c}}$$

$$(24)\ t = \frac{\sqrt{\ln c}}{\sqrt{-2\lambda\sqrt{c}}}$$

The result is a transcendental function, since $c = c(t)$. The easiest way of determining of the time of divergence for the empirically investigated values is offered in Table 4, calculated by Sergei Starostin:

c_1	0.99	0.97	0.95	0.90	0.85	0.80	0.75	0.70	0.65	0.60	0.55	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
c_2	0.97	0.94	0.90	0.81	0.72	0.64	0.56	0.49	0.42	0.36	0.30	0.25	0.20	0.16	0.12	0.09	0.06	0.04	0.02	0.01
t	0.3	0.8	1.0	1.5	2.0	2.4	2.8	3.2	3.7	4.1	4.7	5.3	6.0	6.8	7.8	9.0	10.7	12.7	16.6	21.5

Now we can return to the question of the time of divergence between German and French. In both languages there are three loans in the BTL and 33 common cognates.

Hence

$$c_2 = \frac{3}{100\text{-}3\text{-}3} = \frac{33}{94} = 0.351 = 35.1\%.$$

The corresponding time of divergence is *c.* 4220 years. Naturally, it is an exaggeration to conclude that two languages were separated within a single specified decade. It is better to use the formulation that their common protolanguage disintegrated in the 23rd century BC.

2.1. The situation of two asynchronically attested languages is solved by Starostin differently from Swadesh. Starostin's strategy consists of projecting the historical data to the present level; only after this synchronization is the same approach applied to them as for living languages. It is useful to demonstrate this procedure on specific idioms, for example Classical Latin (e.g. that of Caesar: 1st cent. BC) and the Gothic of Wulfila's translation of the New Testament (4th century AD). The Latin corpus (i.e. the 100-word-list) is complete, while in the Gothic list 18 units are missing (if Crimean Gothic *ada* 'egg' is included). This means that there are 82 common semantic pairs from the BTL, and of these 39 cognates (i.e. etymologically related forms) inherited from a common protolanguage. The proportion 39/82 = 47,6%. A language recorded at a time interval Δt ago would preserve till the present c-times fewer words from BTL. For Latin recorded 20.5 centuries ago it is *c.* 0.845. If Gothic had existed down to the present, in its hypothetical descendant the share of the preserved BTL would be 0.892 (see Table 4). The common protolanguage of Latin and Gothic projected into the present would preserve $c_{LG} \cdot c_L \cdot c_G = 0.476 \cdot 0.842 \cdot 0.892 = 0.357$, i.e. 35.7% common words. We may recall that the comparison of German and French gave the

a share of 0.351. This means that the dating of the divergence of the representatives of modern Germanic and Romance languages is practically the same as the dating of the divergence of Latin and Gothic, the 23rd century BC. This seems quite natural, but for "classical glottochronology" it was an unattainable goal.

References to Appendix 6

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