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Studies in Uralic vocalism I:
A more economical solution for the reconstruction
of the Proto-Permic vowel system[1]

The article discusses certain issues with the system of Proto-Permic vowels, reconstructed by V. I. Lytkin in his seminal monograph "Historical Vocalism of the Permic Languages". Several rules of complementary distribution between vocalic correspondences are established, allowing us to postulate a more compact vowel system for Proto-Permic.

Keywords: vocalic systems, linguistic reconstruction, comparative phonology, Proto-Permic vocalism, Permic languages, Komi language, Udmurt language.

In this article we intend to reconsider the data that was used by V. I. Lytkin in his classic work on the historical vocalism of the Permic languages [Lytkin 1964] as a basis for his reconstruction of the Proto-Permic vocalism. Our main point of interest are the vowels *e, *$ę$, *$ɛ$, *$ȯ$, *$ǫ$ and *$ȫ$, assumed by Lytkin for the Proto-Permic stage. The Proto-Komi and Proto-Udmurt vocalic reconstructions given below are based on the following set of correspondences between the dialects:[2]

Vocalic correspondences between Komi dialects									
Proto-Komi	*i	*u̇	*u	*ḛ	*ọ̰	*ǫ̰	*e	*ȯ	*o	*a
Literary Komi	i	i̇	u	e	ę	o	e	ę	o	a
Upper Sysola	i	i̇	u	e	ę	ǫ̰	e	ę	o	a
Old Permic	i	i̇	u	ḛ	ę	ǫ̰	e	ę	o	a
Eastern Vyčegda	i	u̇	u	e	ȯ	o	e	ȯ	o	a
Jaźva	i	ɵ	u	í	ú̇	ú	e	ȯ	o	a

Vocalic correspondences between Udmurt dialects							
Proto-Udmurt	*i	*u̇	*i̇	*u	*e	*ȯ	*o	*a
Literary Udmurt	i	u	i̇	u	e	ę	o	a
South-Western dialects	i	u̇	ɵ	u	e	ȯ	o	a
Besermyan	i	ɵ	ɵ	u	e	e	o	a

Notes:
1) Proto-Udmurt *u in South-Western dialects yields $u̇$ in roots of the CV type.
2) Proto-Udmurt *$u̇$ in Besermyan yields u before palatalised consonants.

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[2] The tables are based on [Lytkin 1964: 231–233].

Let us start with the Proto-Permic phonemes *e и *ę. According to Lytkin's reconstruction, this phonemic opposition is preserved in Proto-Komi, where *e yields *e, and Proto-Permic *ę is reflected as Proto-Komi *ę̂. In Proto-Udmurt those two vowels merged, yielding *e when adjacent to a palatalised consonant and *o when adjacent to a non-palatalised consonant.

The analysis of the Permic material shows that in the words that can be etymologised as going back to Proto-Permic (i.e. words which have Udmurt or other Finno-Ugric etymological correspondences) Proto-Komi phonemes *e и *ę̂ appear in complementary distribution: *e is the regular outcome before resonants (note three examples of *ę̂ before a lost *j or *ĺ) and voiceless obstruents. Before voiced obstruents the regular outcome is *ę̂, except the position adjacent to *b or *m, where both reflexes are possible (there are six examples with *e and two with *ę̂). Thus, the difference between the Proto-Komi vowels *e and *ę̂ cannot date back to Proto-Permic.

Before resonants (PK *e — 26 examples, PK *ę̂ (before a lost *j or *ĺ) — 3 examples):

PK *berd — PUd *bord(į) 'wall; measure of length' [KESK: 39]; PK *berg- — PUd *berg- 'to turn around' [KESK: 38–39]; PK *ćerań — PUd *ćonari 'spider' [KESK: 303]; PK *ćerig — PUd *ćorig 'fish' [KESK: 303–304]; PK *er- — PUd *or- 'to roar, curse' [KESK: 332]; PK *jen (*jenm-) — PUd *in (*inm-) 'god; sky' [KESK: 99]; PK *kel (*kelj-) 'husband's brother's wife' — PUd *kaĺi 'a form of address of a younger daughter-in-law to an older one' [KESK: 120]; PK *keĺ 'pale — PUd *keĺ- 'ginger (a horse's colour only)' [KESK: 121]; PK *ker (*kerj-) — PUd *kor 'log, beam' [KESK: 121]; PK *ker- — PUd *kor- 'to chop' [KESK: 121–122]; PK *ĺem — PUd *ĺem 'glue' [KESK: 158]; PK *ńeród — PUd *ńored 'gland' [KESK: 187]; PK *peliṡ — PUd *poliṡ 'paddle' [KESK: 218]; PK *peĺ — PUd *peĺ 'ear' [KESK: 218–219]; PK *perúd 'quick' (PFP *pir₃) [KESK: 220; UEW: 732]; PK *śer- — PUd *śer- 'to laugh' [KESK: 251]; PK *śeról — PUd *śerel 'nit' [KESK: 251]; PK *śermód — PUd *śermet 'bridle' [KESK: 251]; PK *šerd- — PUd *šordj- 'to sift' [KESK: 319]; PK *ver — PUd *vor- 'man' (in Udmurt *vorgoron* 'man') (cf. [KESK: 52]); PK *ver- — PUd *vor- 'to flicker, ripple' [KESK: 52]; PK *verd- — PUd *vord- 'to feed, rear' [KESK: 52]; PK *verm- — PUd *vorm- 'to overcome, win' [KESK: 53]; PK *verźóm — PUd *vorʒem '(to ride) on horseback' [KESK: 52–53]; PK *zel — PUd *zol 'tight, strong' [KESK: 108]; PK *zer — PUd *zor 'rain' [KESK: 108].

PK *jęm 'needle' (PU *äjmä) [KESK: 99; UEW: 22]; PK *pę̂múd — PUd *peĺmịt 'dark' [KESK: 219]; PK *vęm — PUd *vijịm 'brain' [KESK: 51].

Exceptions:

PK *ʒ̂ęng- 'to strike, shoot' — PUd *ʒong- 'to knock, strike' [KESK: 90]; PK *ʒ̂ę̂ńúd 'short' (PFP *čen₃) [UEW: 620][3].

Before voiceless obstruents (PK *e — 15 examples):

PK *ćećć- — PUd *tekć- 'to jump' [KESK: 304]; PK *ćepóĺ- — PUd *ćepiĺ- 'to pinch' [KESK: 303]; PK *esk- — PUd *osk- 'to believe' [KESK: 332]; PK *lećúd — PUd *lećịt 'pointed' [KESK: 165]; PK *pečór — PUd *pušńer, *pošńer 'nettle' [KESK: 220–221]; PK *pes- — PUd *pos- 'to brake, crumple' [KESK: 220]; PK *pet- — PUd *pot- 'to come out, to ascend' [KESK: 220]; PK *rekt- — PUd *ʒokt- 'to unload' [KESK: 240]; PK *setór — PUd *suter 'blackcurrant' [KESK: 272]; PK *śet- — PUd *śot- 'to give' [KESK: 251]; PK *šep — PUd *šep

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[3] According to UEW, this etymology is questionable; this makes us doubt whether the Komi word can indeed be traced back to the Proto-Permic stage.

'ear (of grain)' [KESK: 319]; PK *vek- — PUd *vek- 'narrow' [KESK: 51]; PK *veśk- — PUd *veśk- 'straight, slim' [KESK: 54]; PK *vešt- 'to buy out' — PUd *vošt- 'to cancel' [KESK: 54]; PK *ʒeskŭd — PUd *ʒoskịt 'tight' [KESK: 90].

Exceptions:

PK *pȩs — PUd *pis 'log, firewood' [KESK: 220]; PK *vȩtl- — PUd *vetl- 'to walk' [KESK: 54].

Before voiced obstruents (not adjacent to *b or *m) (PK *ȩ — 16 examples):

PK *ćeg- — PUd *ćig- 'to break (itself)' [KESK: 303]; PK *ȩʒa — PUd *ožo 'sod; grass' [KESK: 331]; PK *gez (*gȩzj-) — PUd *gozị 'rope' [KESK: 76]; PK *kȩʒ- 'to wait (for), hope' — PUd *koʒ- 'to suppose, believe' [KESK: 120]; PK *kȩʒ- postposition — PUd *koʒ- 'alone, by oneself' [KESK: 121]; PK *kȩʒ- — PUd *koʒ- 'turn away (from a road)' [KESK: 121]; PK *leʒ́- — PUd *leʒ- 'to release, let off' [KESK: 165]; PK *pȩʒ́- — PUd *peʒ́- 'to spring (with regard to a trap, snare or spring)' [KESK: 218]; PK *regŭd — PUd *ʒog 'soon' [KESK: 240]; PK *reʒ́- — PUd *ʒeʒ́- 'to rip open' [KESK: 240]; PK *šȩd- — PUd *šeḓ- 'to hit upon, chance upon' [KESK: 318]; PK *vȩʒ — PUd *vož 'green' [KESK: 49]; PK *vȩʒ — PUd *vož 'envy, hatred' [KESK: 49]; PK *vȩʒ — PUd *vož 'crossroads' [KESK: 49–50]; PK *vȩʒ- — PUd *voš-'(ex)change, replace' [KESK: 50]; PK *vȩʒa — PUd *vožo 'holy, saint' [KESK: 50].

One exception is PK *šeg 'ankle-bone, ankle' — PUd *šeg 'sprout, outgrowth (on a tree)' [KESK: 318].

Before voiced obstruents (adjacent to *b or *m) (PK *e — 6 examples, PK *ȩ — 2 examples):

PK *bed (*bedj-) — PUd *bodị 'stick, cane' [KESK: 38]; PK *leb- — PUd *lob- 'to fly' [KESK: 165]; PK *med — PUd *med 'let, may, in order to' [KESK: 171]; PK *meg 'river bend' — PUd *mog 'roundabout' [KESK: 171]; PK *mez- — PUd *moz- 'to set oneself free' [KESK: 171]; PK *šebr- — PUd *šob(ị)r- 'to cover' [KESK: 318].

PK *mȩd — PUd *med 'pay, payment' [KESK: 171]; PK *ńȩbŭd — PUd *ńebịt 'soft' [KESK: 187].

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Now let us consider Udmurt correspondences to the Proto-Komi phonemes *ȩ and *e. In Udmurt three types of relevant positions are attested:

1) positions where the regular Proto-Udmurt correspondence to Proto-Komi *ȩ and *e is *e,
2) positions where the regular Proto-Udmurt correspondence to Proto-Komi *ȩ and *e is *o,
3) positions where both Proto-Udmurt *e and *o are possible in the place of Proto-Komi *ȩ and *e with no clear rule of complementary distribution.

1. Positions where the regular Proto-Udmurt correspondence to Proto-Komi *ȩ and *e is *e:

Before palatalised consonants (PUd *e — 11 examples):

PK *keĺ 'pale' — PUd *keĺ- 'ginger (colour, only of horses)' [KESK: 121]; PK *lećŭd — PUd *lećịt 'pointed' [KESK: 165]; PK *leʒ́- — PUd *leʒ- 'to let, release' [KESK: 165]; PK *peĺ — PUd *peĺ 'ear' [KESK: 218–219]; PK *pȩmŭd — PUd *peĺmịt 'dark' [KESK: 219]; PK *pȩʒ́- —

PUd *peʑ- 'to spring (a trap, snare or spring)' [KESK: 218]; PK *reʑ ~ - e̦- — PUd *ʒeʑ ~ -ʒ 'bridle-rein' [KESK: 240]; PK *reʑ- — PUd *ʒeʑ- 'to rip open' [KESK: 240]; PK *seʑ ~ -e̦- — PUd *seʒ 'clear' [KESK: 271]; PK *šed̦- — PUd *šed̦- 'to hit upon, chance upon' [KESK: 318]; PK *veśk- — PUd *veśk- 'straight, slim' [KESK: 54].

Before *m* (PUd *e — 2 examples):
PK *čem ~ -ʌ̂- — PUd *čem 'thick, close' [KESK: 290]; PK *ĺem — PUd *ĺem 'glue' [KESK: 158].

2. Positions where the regular Proto-Udmurt correspondence to Proto-Komi *e̦ and *e is *ʌ̂ and *e is *o:

Before *n* and *ŋ* (PUd *o — 5 examples):
PK *ćerań — PUd *ćonari 'spider' [KESK: 303]; PK *me (*men-) — PUd *mon 'I' [KESK: 170]; PK *šen- ~ -e̦- — PUd *šoŋ- 'to wave' [KESK: 319]; PK *te (*ten-) — PUd *ton 'you (2ⁿᵈ Sg.)' [KESK: 293–294]; PK *ʒe̦ng- 'to strike, shoot' — PUd *ʒong- 'to knock, strike' [KESK: 90].

Before *l* (PUd *o — 2 examples):
PK *pelu̇s — PUd *poli̯s 'paddle' [KESK: 218]; PK *zel — PUd *zol 'tight, strong' [KESK: 108].

Before non-palatalised sibilants and affricates (PUd *o — 21 examples):
PK *esk- — PUd *osk- 'to believe' [KESK: 332]; PK *ež- ~ *e̦- 'to attack' — PUd *ož 'war' [KESK: 331]; PK *e̦ža — PUd *ožo 'sod; grass' [KESK: 331]; PK *ge̦z (*ge̦zj-) — PUd *gozi̯ 'rope' [KESK: 76]; PK *kes- ~ -e̦- — PUd *kos- 'to order' [KESK: 122–123]; PK *ke̦ʒ- 'to wait (for), hope' — PUd *koʒ- 'to suppose, believe' [KESK: 120]; PK *ke̦ʒ- postposition — PUd *koʒ- 'alone, by oneself' [KESK: 121]; PK *ke̦ʒ- — PUd *koʒ- 'turn away (from a road)' [KESK: 121]; PK *mez- — PUd *moz- 'to set oneself free' [KESK: 171]; PK *pes- — PUd *pos- 'to break, crumple' [KESK: 220]; PK *pes- ~ -e̦- — PUd *pos- 'to wash' [KESK: 220]; PK *pež ~ -e̦- — PUd *pož 'dirty' [KESK: 218]; PK *vešt- 'to buy out' — PUd *vošt- 'to cancel' [KESK: 54]; PK *vezj ~ -e̦- — PUd *vozj- 'to stretch, to hang something' [KESK: 51]; PK *ve̦ž — PUd *vož 'green' [KESK: 49]; PK *ve̦ž — PUd *vož 'envy, hatred' [KESK: 49]; PK *ve̦ž — PUd *vož 'crossroads' [KESK: 49–50]; PK *ve̦ž- — PUd *voš- '(ex)change, replace' [KESK: 50]; PK *ve̦ža — PUd *vožo 'holy, saint' [KESK: 50]; PK *ʒesku̇d — PUd *ʒoski̯t 'tight' [KESK: 90]; PK *ʒez ~ -ʌ̂- — PUd *ʒoz(i) 'grasshopper' [KESK: 288].

3. Positions where both Proto-Udmurt *e and *o are possible in the place of Proto-Komi *e̦ and *e:

Before non-palatalised stops (PUd *o — 12 examples, PUd *e — 12 examples):
PK *bed (*bedj-) — PUd *bodi̯ 'stick, cane' [KESK: 38]; PK *čeg- ~ -e̦- 'a plank on the edge of a bench in a house' — PUd *čog 'stake, peg, nail, rack' [KESK: 289–290]; PK *leb- — PUd *lob- 'to fly' [KESK: 165]; PK *meg 'river bend' — PUd *mog 'roundabout' [KESK: 171]; PK *pet- — PUd *pot- 'to come out, to ascend' [KESK: 220]; PK *re̦gu̇d — PUd *ʒog 'soon' [KESK: 240]; PK *rekt- — PUd *ʒokt- 'to unload' [KESK: 240]; PK *rektan ~ -e̦- — PUd *ʒokton 'reel' [KESK: 240]; PK *śet- — PUd *śot- 'to give' [KESK: 251]; PK *šebr- — PUd *šob(i)r- 'to cover' [KESK: 318]; PK *vetȯs ~ -e̦- — PUd *votes 'spider web, snare' [KESK: 54]; PK *žeb ~ -e̦- 'weak, puny' — PUd *žob 'dirty, muddy, evil' [KESK: 102].

PK *ćećć- — PUd *tekć 'to jump' [KESK: 304]; PK *ćepól- — PUd *ćepil̦- 'to pinch' [KESK: 303]; PK *geg- ~ -ę̂- — PUd *keg- 'to freeze, feel chilly' [KESK: 75]; PK *l̦ek (*l̦ekj-) ~ -ę̂- — PUd *l̦eki̦ 'ankle-bone, knucklebone' [KESK: 158]; PK *med — PUd *med 'let, may, in order to' [KESK: 171]; PK *mẹd — PUd *med 'pay, payment' [KESK: 171]; PK *ńẹbi̦d — PUd *ńebi̦t 'soft' [KESK: 187]; PK *śepu̇s ~ -ę̂- — PUd *śepi̦s 'sack' [KESK: 250]; PK *šeg 'ankle-bone, ankle' — PUd *šeg 'sprout, outgrowth (on a tree)' [KESK: 318]; PK *šep — PUd *šep 'ear (of grain)' [KESK: 319]; PK *vek- — PUd *vek- 'narrow' [KESK: 51]; PK *vẹtl- — PUd *vetl- 'to walk' [KESK: 54].

Before r (PUd *o — 15 examples, PUd *e — 10 examples):

PK *berd — PUd *bord(i̦) 'wall; measure of length' [KESK: 39]; PK *ćerig — PUd *ćorig 'fish' [KESK: 303–304]; PK *er- — PUd *or- 'to roar, curse' [KESK: 332]; PK *ker (*kerj-) — PUd *kor 'log, beam' [KESK: 121]; PK *ker- — PUd *kor- 'to chop' [KESK: 121–122]; PK *ńeród — PUd *ńored 'gland' [KESK: 187]; PK *śer ~ -ę̂- — PUd *śor 'marten' [KESK: 250]; PK *šerd- — PUd *šordj- 'to sift' [KESK: 319]; PK *ver — PUd *vor- 'man' (in Udmurt vorgoron 'man') (cf. [KESK: 52]); PK *ver- — PUd *vor- 'to flicker, ripple' [KESK: 52]; PK *verd- — PUd *vord- 'to feed, rear' [KESK: 52]; PK *verd- ~ -ę̂- — PUd *vord- 'to give birth to' [KESK: 52]; PK *verm- — PUd *vorm- 'to overcome, win' [KESK: 53]; PK *verźóm — PUd *vorʒem '(to ride) on horseback' [KESK: 52–53]; PK *zer — PUd *zor 'rain' [KESK: 108].

PK *berg- — PUd *berg- 'to revolve' [KESK: 38–39]; PK *beriś ~ -ę̂- — PUd *beriź ~ -ʒ́ 'lime-tree' [KESK: 39]; PK *perób ~ -ę̂- 'a moss-covered riverbank in a wood' — PUd *pera 'a damp black earth' [KESK: 220]; PK *ser- ~ -ę̂- 'to hoe' — PUd *ser- 'to untangle' [KESK: 272]; PK *sera ~ -ę̂- — PUd *sereg 'firebrand' [KESK: 272]; PK *seróg ~ -ę̂- — PUd *sereg 'corner' [KESK: 272]; PK *śer- — PUd *śer- 'to laugh' [KESK: 251]; PK *śeról — PUd *śerel 'nit' [KESK: 251]; PK *śermód — PUd *śermet 'bridle-rein' [KESK: 251]; PK *šerg- ~ -ę̂- — PUd *šer- 'to move apart' [KESK: 319].

This "partial complementary distribution" can be explained in two ways: 1) PUd *e and *o, corresponding to Proto-Komi *e и *ę̂, go back to a single Proto-Permic phoneme, and the double reflex of this phoneme before non-palatalised stops and r is conditioned by some unknown factor; 2) PUd *e и *o in the words analyzed above reflect two different Proto-Permic vowels: this opposition is preserved only in Udmurt and only before non-palatalised stops and r. The first explanation seems more plausible, because we have no external data which could corroborate the antiquity of the Proto-Udmurt opposition *e vs. *o.

Now we may turn to the Proto-Permic vowels *ɛ и *ȯ. According to Lytkin's reconstruction, those Proto-Permic phonemes merged in Komi, yielding Proto-Komi *ȯ. In Udmurt their reflexes are, however, different: Proto-Permic *ɛ yields PUd *e, and Proto-Permic *ȯ yields PUd *o (but *a before *l not after a dental) (see [Lytkin 1964: 128–129]).

An examination of correspondences to Proto-Komi *ȯ in Udmurt reveals that here as well the Proto-Udmurt *e and *o are in a "partial complementary distribution" like the one shown above (but not identical). In this case we can also distinguish between three types of positions:

1) positions in which the regular Proto-Udmurt correspondence to Proto-Komi *ȯ is *e,

2) positions in which the regular Proto-Udmurt correspondence to Proto-Komi *ȯ is *o,

3) positions in which both Proto-Udmurt *e and *o are possible in the place of Proto-Komi *ȯ with no clear rule of complementary distribution.

1. Positions in which the regular Proto-Udmurt correspondence to Proto-Komi *ȯ is *e:

Before palatalised consonants (PUd *e — 11 examples):

PK *ćȯj ~ -ọ̈- — PUd *ćej 'bark beetle' [KESK: 234]; PK *kȯć ~ -ọ̈- — PUd *keć 'hare' [KESK: 143]; PK *kȯć- ~ -ọ̈- 'rinse out' — PUd *keć- 'to tilt to one side, overturn; to pour out' [KESK: 143]; PK *kȯj ~ -ọ̈- 'a worm (in meat)' — PUd *kej 'moth' [KESK: 139]; PK *kȯȝ̌- ~ -ọ̈- — PUd *keȝ̌- 'cold' [KESK: 139]; PK *lȯś — PUd *leś 'to approach' [KESK: 163]; PK *pȯć ~ -ọ̈- 'grandmother' — PUd *peć 'old' [KESK: 230]; PK *pȯim — PUd *peń (*peńm-) 'ashes' [KESK: 228]; PK *pȯĺ- — PUd *peĺ- 'to blow' [KESK: 228]; PK *rȯć ~ -ọ̈- 'lump, knob' — PUd *ȝ̌eć 'humerus' [KESK: 244]; PK *vȯĺ- ~ -ọ̈- — PUd *veĺ- 'just now' [KESK: 66–67].

One exception is PK *ĺȯĺ ~ -ọ̈- — PUd *ĺoĺo 'milk' (a nursery word) [KESK: 164].

Before s (PUd *e — 5 examples):

PK *ćȯskьd — PUd *ćeskьt 'tasty' [KESK: 312]; PK *mȯs (*mȯsk-) — PUd *mes 'cow; female' [KESK: 176]; PK *ȯz- — PUd *est- 'to burn' [KESK: 210]; PK *sȯs — PUd *ses 'unclean' [KESK: 264]; PK *vȯs- — PUd *ves- 'thin' [KESK: 68].

2. Positions in which the regular Proto-Udmurt correspondence to Proto-Komi *ȯ is *o:

Before non-palatalised sibilants and affricates, except *s* (PUd *o — 12 examples):

PK *čȯč — PUd *čoš 'together' [KESK: 290]; PK *čȯž ~ -ọ̈- — PUd *čož postposition 'during, throughout' [KESK: 310]; PK *jȯz ~ -ọ̈- — PUd *joz 'joint, articulation' [KESK: 112]; PK *jȯž ~ -ọ̈- — PUd *jočko 'raw, uncooked' [KESK: 112]; PK *nȯšta ~ -ọ̈- — PUd *noš 'again' [KESK: 195]; PK *ńȯž ~ -ọ̈- 'slowly' — PUd *ńožj- 'to drawl' [KESK: 198]; PK *ȯš (*ȯšk-) — PUd *oš 'bull' [KESK: 213]; PK *ȯš- — PUd *oš- 'to hang' [KESK: 213]; PK *ȯšmȯs — PUd *ošmes 'well, spring' [KESK: 213]; PK *ȯzьn ~ *ọ̈- — PUd *ozon 'berth' [KESK: 210]; PK *ȯžьn ~ *ọ̈- — PUd *ožon 'chisel' [KESK: 210]; PK *rȯz ~ -ọ̈- — PUd *ȝ̌oz 'madder' [KESK: 243].

Before l (PUd *a — 10 examples, PUd *o (after a dental) — 5 examples):

PK *ćȯl — PUd *ćal 'quiet' [KESK: 310]; PK *ćȯl- ~ -ọ̈- 'to cut a slice' — PUd *ćal- 'to hew a stake' [KESK: 311]; PK *kȯl (*kȯlj-) — PUd *kal 'cord' [KESK: 137]; PK *kȯlt- ~ -ọ̈- — PUd *kalt- 'to catch, to fish out (using a net), to take out with a ladle (e.g. meat from a kettle)' [KESK: 138]; PK *mȯlp- ~ -ọ̈- — PUd *malp- 'to think' [KESK: 175]; PK *ȯl- — PUd *al- 'to prohibit, repress, soothe' [KESK: 211]; PK *pȯl — PUd *pal 'half' [KESK: 227]; PK *śȯl- — PUd *śal- 'to spit' [KESK: 270]; PK *śȯla ~ -ọ̈- — PUd *śala 'hazel-grouse' [KESK: 270]; PK *vȯl — PUd *val 'horse' [KESK: 65].

PK *dȯl — PUd *dol 'all, everything' [UEW: 518]; PK *dȯlal- ~ -ọ̈- — PUd *dolal- 'to flutter' [KESK: 96]; PK *tȯl — PUd *tol 'winter' [KESK: 283]; PK *tȯlȯs ~ -ọ̈- — PUd *toles 'a two-year old ram' [KESK: 283]; PK *tȯlьś — PUd *toleȝ̌ 'moon' [KESK: 283].

One exception is PK *kȯld- 'kolobok (a kind of pasty or pie)' — PUd *kold-, *kȯld- 'spring wheat' [KESK: 137–138].

3. Positions in which both Proto-Udmurt **e* and **o* are possible in the place of Proto-Komi **ȯ* with no clear rule of complementary distribution:

Before non-palatalised nasals (PUd **o* — 6 examples, PUd **e* — 5 examples):
PK **gȯn* — PUd **gon* 'feather, wool' [KESK: 80]; PK **lȯm ~ -ộ-* — PUd **lom* 'scab, mange, tetter' [KESK: 162]; PK **pȯn- ~ -ộ-* 'to copulate' — PUd **pon-, *pȯn-* 'to put' [KESK: 228]; PK **rȯm* — PUd **ʒom-* 'colour' [KESK: 243–244]; PK **rȯmiʒ ~ -ộ-* — PUd **ʒomes-* 'cud' [KESK: 244]; PK **rȯmu̇d ~ -ộ-* — PUd **ʒomi̜t* 'twilight' [KESK: 244].

PK **dȯnʒ́- ~ -ộ-* 'constitute one's share' — PUd **demʒ́-* 'to hit against, to catch on, to get stuck' [KESK: 96]; PK **kȯn* — PUd **kenem* 'hemp' [KESK: 141]; PK **kȯn ~ -ộ-* — PUd **ken* 'female (of a wood- or black grouse)' [KESK: 141]; PK **ȯmiʒ* — PUd **emeʒ* 'raspberry' [KESK: 211]; PK **zȯm* 'steep; straight' — PUd **zem* 'truth, rightly; truthful' [KESK: 106].

Before non-palatalised stops (PUd **o* — 13 examples, PUd **e* — 11 examples):
PK **čȯk- ~ -ộ-* — PUd **čok-* 'to close' [KESK: 290]; PK **gȯg (*gȯgj-)* — PUd **gogi̜* 'navel' [KESK: 79]; PK **gȯp (*gȯpt-)* — PUd **gop* 'pit, hole' [KESK: 80]; PK **jȯg ~ -ộ-* — PUd **l̷og* 'outgrowth (on a tree)' [KESK: 112]; PK **kȯt-* — PUd **kot* 'wet' [KESK: 143]; PK **nȯd ~ -ộ-* 'riddle' — PUd **nod* 'sharpness, quick wit' [KESK: 194]; PK **ȯk-* — PUd **ok-* 'to gather' [KESK: 211]; PK **ȯtik* — PUd **odig* 'one' [KESK: 212]; PK **pȯd-* — PUd **pod-* 'to close' [KESK: 227]; PK **pȯt ~ -ộ-* 'winterweed (plant)' — PUd **pot* 'goose-foot (plant)' [KESK: 230]; PK **rȯp- ~ -ộ-* — PUd **ʒopi̜* 'smoke-hole in a bathhouse' [KESK: 244]; PK **sȯp- ~ -ộ-* 'to eat, gorge oneself' — PUd **sop-* 'to champ' [KESK: 264]; PK **tȯd-* — PUd **tod-* 'to know' [KESK: 283].

PK **čȯkt-* — PUd **čekt-* 'to order, command' [KESK: 290]; PK **jȯkt-* — PUd **ekt-* 'to dance' [KESK: 113]; PK **kȯkan ~ -ộ-* — PUd **kekon* 'hellebore' [KESK: 140]; PK **mȯd-* — PUd **med-* 'to gather' [KESK: 176]; PK **ȯgu̇r* — PUd **egi̜r* 'coal' [KESK: 209]; PK **ȯksu̇* — PUd **eksej* 'prince, tsar' [KESK: 211]; PK **pȯk (*pȯkj-)* 'caviar; calves (of the leg)' — PUd **pek(i̜)l̷a* 'kidneys; testicles' [KESK: 228]; PK **sȯp (*sȯpt-)* — PUd **sep* 'bile' [KESK: 263]; PK **śȯku̇d ~ -ộ-* — PUd **śeki̜t* 'hard, difficult' [KESK: 270]; PK **śȯp ~ -ộ-* — PUd **śep* 'widow(er)' [KESK: 270]; PK **tȯb-* — PUd **teb-* 'to wrap' [KESK: 283].

Before *r* (PUd **o* — 8 examples, PUd **e* — 11 examples):
PK **gȯrd* — PUd **gord* 'red' [KESK: 80]; PK **jȯr* 'pen, enclosure' — PUd **joros* 'place, surroundings' [KESK: 113]; PK **kȯr* — PUd **kor-* 'taste' [KESK: 141]; PK **kȯrt* — PUd **kort* 'iron' [KESK: 142]; PK **śȯr- ~ -ộ-* 'ease oneself, go to the john' — PUd **śor-* 'loo' [KESK: 271]; PK **šȯr* — PUd **šor* 'middle' [KESK: 322]; PK **šȯr-* — PUd **šor-* 'to cut (a piece, a slice of bread)' [KESK: 322–323]; PK **šȯrt* — PUd **šort* 'yarn' [KESK: 323].

PK **bȯr* — PUd **ber* 'rear part, back' [KESK: 41]; PK **dȯra* — PUd **dera* 'canvas' [KESK: 96]; PK **gȯr (*gȯrj-)* — PUd **geri̜* 'wooden plow' [KESK: 80]; PK **gȯrȯd* — PUd **gerd* 'knot' [KESK: 81]; PK **kȯrt- ~ -ộ-* — PUd **kert-* 'to tie, bind' [KESK: 142]; PK **kȯrtu̇m ~ -ộ-* 'rent' — PUd **kerti̜m* 'tribute' [KESK: 142]; PK **pȯru̇ś* — PUd **pereś* 'old' [KESK: 229]; PK **pȯrtć-* — PUd **pertć-* 'to untie' [KESK: 229]; PK **sȯr ~ -ộ-* — PUd **ser* 'vein, blood-vessel' [KESK: 264]; PK **sȯr- ~ -ộ-* 'to be delirious (in one's sleep); to chatter, babble, talk nonsense' — PUd **serek* 'hot, hot-tempered, anxious' [KESK: 264]; PK **tȯr-* — PUd **ter-* 'to fit, to fit into' [KESK: 284].

It is evident that, despite some particularities, the status of the Udmurt correspondences to the Proto-Komi vowel *ȯ is similar to that of Udmurt correspondences to Proto-Komi *e and *ẹ. This means that it is not possible to accept V.I. Lytkin's reconstruction, where in one case the difference between Udmurt vowels *o and *e is regarded as secondary, and in the other case it is traced back to the Proto-Permic period. It is necessary either to consider this difference as Proto-Permic in both cases or to regard it as always secondary, arising under the influence of the following consonants and some other yet unknown factors. We believe that the second solution is more appropriate, because, as well as in the previous case, we do not have at our disposal any external data that could confirm the antiquity of the Proto-Udmurt contrast between *e and *o. It must be noted that, although P. Sammallahti, following V. I. Lytkin, preferred to reconstruct here two different Proto-Permic phonemes, at the same time he pointed out that they resulted from a "non-conditional" split of a single Pre-Permic phoneme *ȯ [Sammallahti 1988: 527]. As we have shown above, this split was at least partially conditioned by the phonetic environment.

Let us turn to the Proto-Permic phonemes *ǫ̣ and *ọ̈. According to Lytkin, they fell together in Komi as Proto-Komi *ǫ̣. The difference between the two phonemes remained in Proto-Udmurt, where Proto-Permic *ǫ̣ > *u, and Proto-Permic *ọ̈ > *ů. Lytkin also takes into consideration the secondary shift *u > *ů before palatalised consonants in Proto-Udmurt. Thus, the assumed opposition between Proto-Permic *ǫ̣ and *ọ̈ remained intact only before non-palatalised consonants. However, examination of the relevant evidence[4] allows to conclude that in this position a complementary distribution between *ǫ̣ and *ọ̈ can be shown as well. The CVC-type stems regularly contain *ů, while CVCVC-type stems always show *u. Only a handful of examples of other stem types (CV, CVCj̣/i, CVCo) is available; they do not warrant the reconstruction of an opposition between *ǫ̣ and *ọ̈ in Proto-Permic.

CVC-type stems (PUd *ů — 14 examples):
PK *dǫn — PUd *důn 'clean' [KESK: 95]; PK *dǫz 'crockery' — PUd *důz 'vat' [KESK: 94]; PK *gǫrz- 'to cry' — PUd *gůr bȯrd- 'to sob' [KESK: 78]; PK *gǫrźod- — PUd *gůrʒ- 'to belch' [KESK: 78]; PK *gǫz — PUd *kůz 'couple' [KESK: 77]; PK *kǫr 'husk' — PUd *kůr 'lime-bast' [KESK: 133]; PK *kǫs — PUd *kůs 'waist' [KESK: 134]; PK *lǫl — PUd *lůl 'spirit' [KESK: 160]; PK * ǫr — PUd *ůr 'pus' [KESK: 206]; PK * ǫr- 'tear' — PUd *ůr- 'tear apart' [KESK: 207]; PK * ǫraś- — PUd *ůr- 'to weed' [KESK: 206]; PK *pǫž — PUd *půž 'sieve' [KESK: 223]; PK *šǫm 'coal'– PUd *šům 'soot' [KESK: 321]; PK *tǫš — PUd *tůš 'beard' [KESK: 282].

One exception is PK *ǫ̂rt 'ghost' — PUd *urt 'spirit' [KESK: 208].

CVCVC-type stems (PUd *u — 6 examples):
PK *ćǫrůd — PUd * ćuri̯t 'hard' [KESK: 310]; PK *kǫmi̮ʒ 'spring onion' — PUd *kumi̮ʒ 'wild garlic' [Lytkin 1964: 47]; PK *kǫmúĺ 'rind' — PUd *kumeĺ 'the bark on a piece of bast' [KESK: 132]; PK *kǫpůrt- — PUd *kupi̯rt- 'bend' [KESK: 133]; PK *ńǫžtǫm 'ugly' — PUd *ńužtem 'naughty' [KESK: 188; Lytkin 1964: 55]; PK * ǫzůr — PUd *uzi̯r 'rich' [KESK: 203].

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[4] We do not adduce here those words in which Komi data show fluctuation between reflexes of Proto-Komi *ǫ̣ and *u, since we cannot exclude that such words contained Proto-Permic *u or *ü rather than *ǫ̣ or *ọ̈.

CV-type stems (PUd *u* — 2 examples):

PK *śǫ̈* — PUd *śu* 'hundred' [KESK: 252]; PK *vǫ̈-* — PUd *vu-* 'arrive' [KESK: 63].

CVC*i̯*/*i*-type stems (PUd *u̇* — 3 examples, PUd *u* — 1 example):

PK *ɡǫ̈b* — PUd *ɡu̇bi* 'mushroom' [KESK: 76]; PK *pǫ̈n* — PUd *pu̇ni̯* 'dog' [KESK: 224]; PK *śǫ̈r* 'pole' — PUd *śu̇ri̯* 'perch, beam' [KESK: 253].

PK *ǫ̈z* — PUd *uzi̯* 'wild strawberry' [KESK: 203].

CVCo-type stems (PUd *u* — 2 examples, PUd *u̇* — 1 example):

PK *kǫ̈k-* 'to hoe' — PUd *kukćo* 'hoe' [KESK: 129]; PK *pǫ̈da* — PUd *pudo* 'cattle' [KESK: 223].

PK *kǫ̈ča* — PUd *ku̇čo* 'many-coloured' [Lytkin 1964: 53].

The revised set of correspondences between Komi and Udmurt can be interpreted in the following way:

Proto-Permic	*i	*u̇	*i̯	*u	*e	*ȯ	*ẹ	*o	*ä	*ɔ̇	*a	*ɔ
Proto-Komi	*i	*u	*u̇	*u	*ẹ̈, *e	*ǫ̈	*ǫ̇̈	*o	*ȯ	*ǫ̇̈	*a	*a
Proto-Udmurt	*i	*u̇	*i̯	*u	*e, *o	*u̇, *u	*i̯	*u	*e, *o, *a	*ȯ	*a	*u

Notes:

1) Udmurt *u* of any origin changes to *u̇* before palatalised consonants.

2) Udmurt *u* and *u̇* from Proto-Permic *u̇, *u, *ȯ и *o may yield *i̯ under uncertain conditions. Following V. I. Lytkin and P. Sammallahti, we do not think that in those cases it is necessary to reconstruct separate Proto-Permic phonemes, first of all, because of the great number of parallel forms with *u* and *i̯* in Udmurt (see [Lytkin 1964: 21]).

The system of the Proto-Permic vocalism in our reconstruction proves to be less complicated than the ones assumed by Lytkin and Sammallahti, since there are only three vowel heights and no reduced vowels:

	front	central	back	
	non-labialised	labialised	non-labialised	labialised
high	i	u̇	i̯	u
mid	e	ȯ	ẹ	o
low	ä	ɔ̇	a	ɔ

Abbreviations

PFP — Proto-Finno-Permic; PK — Proto-Komi; PU — Proto-Uralic; PUd — Proto-Udmurt

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