

TIIT-REIN VIITSO (Tallinn)

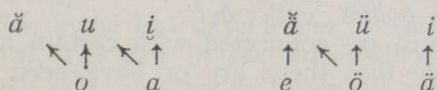
VACH HANTI VOWEL ALTERNATION

The phenomenon of Ob Ugric vowel alternation was established long ago (cf. Castrén 1858 : 8—10; Karjalainen 1905 : 231—267; Kannisto 1919 : 130—196; Steinitz 1944 : 17—19, 84—86; 1950 : 33—47; 98—110; 1955 : 100—151, 305—336). More exactly, what has been established is which vowels alternate with each other. It means that only the output of a set of historical rules is known whereas the rules remain entirely unknown. Below an attempt will be made to establish the rules that have caused the vowel alternations. The attempt is limited to Vach (in Hanti : *Way*) Hanti. Among the variety of Hanti dialects (which can be grouped into 5—9 languages) Vach Hanti exhibits the largest scale of alternations and is relatively well investigated.

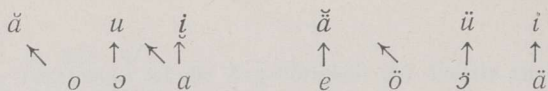
The transcription is phonemic. It is in essence identical with that of Schiefer (1975), except that \check{a} and $\check{ä}$ are used instead of Schiefer's ə and ä . Note that both the transcriptions can be viewed as transliterations of Tereškin's Cyrillic transcription (Терешкин 1961) with Tereškin's non-phonemic κ (before front vowels) and κ_a (before back vowels) being collapsed. The phonemes of Vach Hanti are as follows: (a) vowels: $i, e, \check{a}, \check{o}, \check{u}, \check{i}, a, o, u, \check{ä}, \check{ö}, \check{ä}, \check{ö}$; (b) consonants: $p, m, w, t, n, l, s, \check{t}, \check{n}, \check{l}, \check{j}, \check{č}, \check{n}, \check{l}, r, k, \eta, \gamma$. Additionally, the following symbols are used: O — any vowel, э — a «full» vowel, э — a high vowel, э — a low vowel, $\check{\text{э}}$ — a reduced vowel; C — any consonant; R — any sonorant consonant in the set $\{m, n, \check{n}, \check{n}, \eta, l, \check{l}, r\}$, P — any stop in the set $\{p, t, \check{t}, \check{č}, k\}$, B — any obstruent from the set $\{t, \check{č}, k, s\}$. For any given symbol S , S_m^n means that in a certain environment a sequence of at least m and at most n phonemes of the set S occurs. The notation S^n indicates that a sequence of exactly n phonemes of the set S occurs in a given environment.

1. Vowel alternation: facts.

1.1. Surface vowel alternation. In Vach Hanti vowels alternate unidirectionally according to the following scheme (cf. Steinitz 1950 : 33—34; Терешкин 1961 : 20—23; Gulya 1966 : 41):



According to Steinitz (1944 : 17; 1950 : 34), Karjalainen's data suggest that in the early 1900's the earlier ɔ merged into o and $\check{\text{ɔ}}$ into \check{o} , the result being the present twofold alternation of o and \check{o} . The earlier scheme was as follows:



Vowel alternations are present both in a number of inflectional paradigms (paradigmatic alternation) and in stem derivation. Here only paradigmatic alternation is dealt with.

1.2. Surface conditions. Depending on their scope, vowel alternations can be divided into three groups.

A. *a*, *o*, \check{a} , \ddot{o} change into the high «full» vowels i , *u*, *i*, \ddot{u} (a) in singular nouns having possessive suffixes, and (b) in the imperative and the definite (morphologically unmarked) perfect forms of verbs.

Alternations of *a* are the most complicated ones, as in most nouns having possessive suffixes *a* changes into *u* and in one noun into i , in the imperative *a* becomes i , whereas in the definite perfect one group of verbs has i and another has *u*. Cf. (a) nouns in nsg without the 1sg possessive suffix and with it: (1) *awät* 'hair': *uwätäm*, (2) *kaläp* 'son's son; son-in-law': *kilpäm*; (b) intransitive verbs in the infinitive, the definite perfect 1sg and the imperative 2sg: (3) *amästa* 'sit, be seated': *umsäm* : *imsa*, (4) *kaṇätta* 'climb': *kuṇtäm* : *kiṇta*, (5) *wañtta* 'pick berries': *wuñtäm* : *wiñta*, (6) *atta* 'say': *utäm* : *ita*, (7) *wayälta* 'climb, come or go down': *wiyläm* : *wiyla*, (8) *wayla* 'ask, call': *wiypäm* : *wiypä*; (c) transitive verbs in the infinitive, the definite perfect 1sg and the imperative 2sg for a singular object: (9) *artta* 'divide': *urtim* : *irti*, (10) *čatča* 'sweep, wipe': *čučim* : *čiči*; (11) *amätta* 'seat': *imtim* : *imti*. Cf. also the cases with no alternation of *a*: (12) *wakäntta* 'scratch (iV)': *wakäntäm* : *wakänta*, (13) *arita* 'break (tV)': *arijim* : *ariji*.

Alternations of *o* (< ɔ), \check{a} and \ddot{o} (< ɔ̇) are uniform, cf. (14) *op* 'head': *upäm*, (15) *nopta* 'peck (iV)': *nuupäm* : *nuupa*, (16) *lotta* 'buy': *lutim* : *luti*, (17) *kočäptäta* 'put (nets) in (tV)': *kučäplim* : *kučäpti*; (18) *ämp* 'dog': *impäm*, (19) *äprän* 'ide, *Leuciscus idus*': *iyränäm*, (20) *päpältä* 'forge metals': *piyläm* : *piylä*, (21) *kästä* 'seek (iV)': *kisäm* : *kisä*, (22) *päpättä* 'let fall (tV)': *piytim* : *piyti*; (23) *lök* 'track, trail': *lükäm* (24) *lökäntä* 'get out': *lüpnäm* : *lüpnä*, (25) *löṅktä* 'cover (tV)': *lüṅkim* : *lüṅki*.

B. *o* becomes \check{a} : (a) in one noun with possessive suffixes and (b) either (i) in the imperative or (ii) in forms other than those of the definite perfect. Cf. (26) *lop* 'fish hook and line': *läwäm*; (27) *wostä* 'jump': *wäsa*, (28) *joyarta* 'mix, wrap, wind': *jäyri*, (29) *joyärpältta* 'cheat': *jäpärpältti*; (30) *täpτα* 'throw (iV)': *toypäm* : *täpa*, (31) *läṅata* 'enter (iV)': *loṅpän* (3sg).

C. *e* and \ddot{o} become \check{a} in the imperative, cf. (32) *wertä* 'do, make': *wärä*, (33) *weltä* 'kill': *wäli*; (34) *jeritä* 'draw lines': *järiji* (35) *öyältä* 'believe': *äplä*, (36) *öpättä* 'cut': *äpti*.

As the alternations are connected with certain morphological forms, it is highly probable that there are or have been some phonemic, or more precisely, some vocalic properties of certain suffixes that have conditioned the alternations. Therefore one must check up the possessive, imperative and definite perfect suffixes.

1.2.1. For vocalic singular noun stems, except those ending in \check{a} ~ $\check{ä}$, the 1sg and 2sg suffixes are *-m* and *-n*, respectively. For monosyllabic

consonantal stems, the 1sg and 2sg suffixes begin normally with $\check{a} \sim \check{ä}$ (i. e. add \check{a} or $\check{ä}$ depending on vowel harmony) only if the stem contains i, u, i, \ddot{u} (including those from $a, o < \gamma, \check{a}, \check{o} < \mathcal{S}$), or \check{a} from o . If a monosyllabic consonantal stem morpheme contains a vowel other than i, u, i, \ddot{u} , the 1sg and 2sg suffixes begin in $a \sim \check{a}$; note that this holds also for the otherwise disyllabic noun stems ending in $\check{a} \sim \check{ä}$ cf. *pärä* 'herd, flock, shoal, raft' : *päram*. The latter fact suggests that there exists a certain interdependence between the suffixal vowel of the 1sg and 2sg suffixes and the vowel of the preceding syllable, cf. the following table based on Tereškin's data:

Px	-am	-äm	-äm	-ääm	-im	-im
	\check{o} $\check{ä}$ $\check{ä}$ \check{o}		u i i \ddot{u}		u	i
	o e \check{o}		$\check{ä}$			
	$\check{ä}$					

In this table the selection of the possessive suffix is ambiguous only for u, i and $\check{ä}$. For u the possessive suffix begins in i (a) in two alternational cases (*maif* 'myth' : *muifim*, *pam* 'grass, hay' : *pumim* and (b) for five unalternating stems (*lul* 'mouth', *put* 'kettle', *puyläm* 'cheek', *puyal* 'bosom', *tur* 'throat'); however, Tereškin himself believes it is possible that the possessive forms for u may be erroneous (personal communication), and therefore the alternational cases are not considered here. The possessive suffix begins with i in the 3rd or 4th syllable, cf. *ilim* 'shame' : *ilimim*, *pükini* 'hare' : *pükiniim* and in *lil* 'breath; soul' : *lilim*. For $\check{ä}$ the possessive suffix begins in $\check{ä}$ only in *lop* 'fish hook and line' : *läwäm*, a case which is exceptional also in two more points: it is the only noun where o becomes $\check{ä}$ (note that also for o the possessive suffixes do not begin in $\check{ä}$) and it is the only stem where w becomes p word-finally. There is one case of a possessive suffix beginning with $\check{ä}$ for $\check{ä}$ in the first syllable, cf. *pän* 'cranberry' : *pänäm*. However, one must suspect that for a native speaker the situation 'my (one!) cranberry' is abnormal enough to force him to ignore normal grammar.

All other possessive suffixes are either constant (disregarding the regular variance under vowel harmony), cf. 1pl suffix for singular nouns $-\check{o}\gamma \sim -\check{o}\gamma$ or vary depending on the stem-final phonemes. Thus, for singular nouns, the 3sg suffix, the dual and 2pl and 3pl suffixes (a) begin in a consonant if the stem begins in a vowel and (b) add the initial $\check{a} \sim \check{ä}$, if the stem ends in a consonant. For dual nouns the possessive suffixes (a) begin in a consonant (more exactly: in the cluster γl where γ is the dualizer and l the pluralizer if the stem ends in a vowel or in a single consonant, and (b) add the initial $\check{a} \sim \check{ä}$ if the stem ends in a consonant cluster. Plural nouns have possessive suffixes beginning in a consonant (the pluralizer l); in order to avoid certain three consonantal clusters some stems ending in two consonants insert an epenthetic vowel $\check{a} \sim \check{ä}$.

1.2.2. The imperative mood has only forms of the second person singular, dual and plural. The 2sg in the intransitive conjugation has the suffix $-a \sim -\check{ä}$. In all other imperative forms the suffixes begin with $i \sim i$, the 2sg suffix in the transitive conjugation being $-i \sim -i$.

1.2.3. In the perfect forms in the intransitive conjugation the 3sg suffix is $-a\check{p}\check{a}n \sim -\check{ä}\check{y}\check{ä}n$ (at least for monosyllabic stems containing u from a and i from $\check{ä}$) or $i\check{y}\check{ä}n \sim -i\check{y}\check{ä}n$ (at least for monosyllabic stems

containing *o*, *ä*, *e*), the 1pl suffix is $-\ddot{o}\gamma \sim -\delta\gamma$ whereas all the other suffixes begin in $\ddot{a} \sim \check{a}$. In the definite perfect of the transitive conjugation the 1sg, 2sg, 1du and 3pl suffixes begin in $\check{i} \sim i$ and the 1pl suffix is $-u\gamma \sim -\ddot{u}\gamma$ for a singular object; all the other suffixes, i. e. 3sg and 3du = 2du&pl suffixes for a singular object and all suffixes for dual and plural objects, begin in $\check{a} \sim \check{ä}$. It is unknown whether vowels alternate in transitive verbs for dual and plural objects.

1.2.4. Considering the Tremjugan Hanti data (cf. Karjalainen-Vértes 1964 : 278—279), it is possible that even in Vach Hanti vowels (a) alternate or have alternated also in the passive definite perfect (whose suffixes are $-\check{i} \sim -i$ (3sg) and $-at \sim -\check{a}t$ (3pl) or begin in $-uj-$ that remains outside vowel harmony) and (b) do not alternate in the past participle forms whose suffix is $-\check{a}m \sim -\check{ä}m$. (One case of alternation in the passive definite perfect 3sg occurs in Tereškin (Терешкин 1961 : 90), cf. *liwti* 'he was fed' from *läwäätä* 'to feed'.)

1.2.5. As can be seen, the present vowel qualities in suffixes or on the border of stems and suffixes may be innovational, the present vowels may be epenthetic, the original vowels may be syncopated, apocopated or changed. However, the fact that in the imperative *a* may become only \check{i} , whereas most imperative suffixes begin in $\check{i} \sim i$ and all imperative suffixes begin in a vowel, suggests that at least the alternations of *a*, *o*, *ä*, *ö* with high «full» vowels result from assimilation, more exactly: from umlaut.

2. Vowel alternation: internal reconstruction. Although the core of Vach Hanti vowel alternation is inherited from Proto-Ob Ugric, it is expedient to ignore Proto-Ob Ugric and to deal with the internal reconstruction of Vach Hanti. The present attempt is, with insignificant exceptions, restricted to the alternational stems, hence, it by no means pretends to exhaustiveness.

2.1. Environments. Given that the vowel alternations result partially from umlaut, the following conditioning environments can be postulated.

A. Suffixal environments. There are, in principle, six possible ways (1)—(6) of reconstructing the 1sg and 2sg suffixes of the definite perfect and the 2sg suffixes of the imperative of the intransitive conjugation (iV), and of the possessive suffixes beginning in \check{a} or $\check{ä}$ of singular nouns. The corresponding suffixes of the transitive conjugation (tV) have one single reconstruction:

	dpf 1sg	imp 2sg
iV	(1) $*-\check{u}m \sim *-\check{ü}m$	$*-\check{ü}a \sim *-\check{ü}ä$
	(2) $*-\check{u}m \sim *-\check{ü}m$	$*-\check{i}a \sim *-\check{i}ä$
	(3) $*-\check{u}m \sim *-\check{i}m$	$*-\check{i}a \sim *-\check{i}ä$
	(4) $*-\check{i}m \sim *-\check{i}m$	$*-\check{i}a \sim *-\check{i}ä$
	(5) $*-\check{i}m \sim *-\check{i}m$	$*-a \sim *-\check{ä}$
	(6) $*-m$	$*-a \sim *-\check{ä}$
tV	$*-\check{i}m \sim *-\check{i}m$	$*-\check{i} \sim *-\check{i}$

B. Radical environments. Depending on the reconstruction (1)—(6) of suffixal environments (of the suffix-initial vowels), the role of the stem-final vowels is more or less important in vowel alternation. The stem-finals respectively, can be reconstructed as follows:

Basic vowel	a			ä	o	ö
	u	i	—	i	u	ü
Stem-final: iV (1)	*C	* <i>i̇</i>	*C	* <i>i̇</i>	*C	*C
(2a)	*C	* <i>i̇</i>	*C	*C	* <i>ü̇</i>	* <i>ü̇</i>
(2b)	*C	* <i>i̇</i>	*C	*C	*C	*C
(3)	*C	* <i>i̇</i>	*C	*C	*C	*C
(4a)	* <i>ü̇</i>	*C	*C	*C	* <i>ü̇</i>	* <i>ü̇</i>
(4b)	* <i>ü̇</i>	*C	*C	*C	*C	*C
(5)	* <i>ü̇</i>	* <i>i̇</i>	*C	* <i>i̇</i>	* <i>ü̇</i>	* <i>ü̇</i>
(6)	* <i>ü̇</i>	* <i>i̇</i>	*C	* <i>i̇</i>	* <i>ü̇</i>	* <i>ü̇</i>
tV	* <i>ü̇</i>	*C	*C	*C	* <i>ü̇</i>	* <i>ü̇</i>

Note that the reconstructions (2b) and (4b) differ from (2a) and (4a) in that they presuppose shorter stems for cases with the alternations *o* : *u* and *ö* : *ü*. The cost of such shortness in both cases is an extra rule $\{i̇ \ i̇\} \rightarrow \{ü̇ \ ü̇\} / \{ɔ \ ɔ\}C_1^3$ —; this rule is also characteristic of reconstruction (3). (Rules are presented in terms of phonemes; the entities in braces are ordered, e.g. the preceding notation means that $i̇ \rightarrow ü̇$ ($i̇$ becomes $ü̇$) after $ɔC_1^3$ and $i̇ \rightarrow ü̇$ after $ɔC_1^3$.) Reconstructions (1), (5) and (6) have a characteristic rule $\{ü̇ \ ü̇\} \rightarrow \{i̇ \ i̇\} / _3$.

For reconstructions (1)—(4), the imperative forms have vowel clusters of three vowels: **i̇ü̇ä*, **i̇ü̇ä* (1), **ü̇ü̇ä*, **ü̇i̇ä*, **ü̇i̇ä* (2) and (3), **ü̇i̇ä*, **ü̇i̇ä* (4). As there is no ground for reconstructing diphthongs, it must be assumed that each vowel belongs to a separate syllable. This makes the reconstructions (1)—(4) less preferable. (5) and (6) are rather similar, while (6) is somewhat simpler as it has no vowel clusters in the definite perfect of the intransitive conjugation. Besides that, personal suffixes in the definite perfect of the intransitive conjugation (and the possessive suffixes) can be then regarded as unmarked. Hence, the reconstruction (6) offers a ready solution to the problem of how the personal suffixes have developed. Below only the reconstruction (6) is considered.

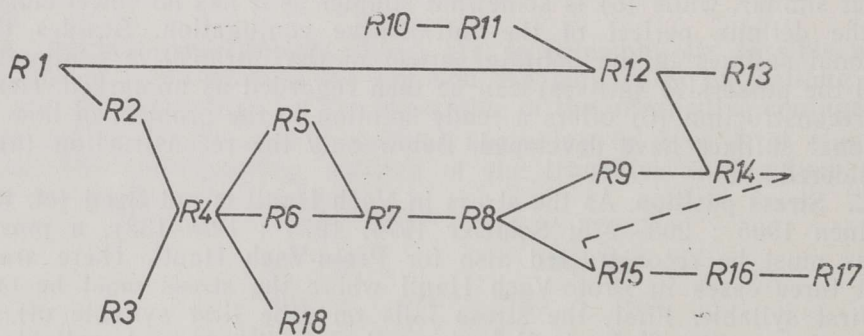
C. Stress position. As the stress in Vach Hanti is not fixed (cf. Karjalainen 1905 : 268—275; Schiefer 1974; 1975 : 125—138), a moving stress must be reconstructed also for Proto-Vach Hanti. There are at least three cases in Proto-Vach Hanti where the stress must be on a nonfirst syllable. First, the stress falls on (the first syllable of) the imperative suffix. Second, the stress is on the second syllable of disyllabic **a*- and **ä*-stems if the stem vowel is not directly followed by a suffixal vowel. Third, the stress is on the second syllable of the word for monosyllabic stems containing a reduced vowel, if the second syllable contains a «full» vowel.

2.2. Rules. As the conditioning environments of the vowel alternations are postulated and not proved, the rules that have caused the alternations cannot be proved either. They can only be estimated by ordering a set of imaginary rules so that the modern forms are generated from some protoforms. Needless to say, the protoforms are entirely ad hoc.

2.2.1. In order to explain the development of Vach Hanti vowel alternations, the following rules on vowels are estimated.

- R1. Syncope: $\ddot{z} \rightarrow \emptyset / \#C_0^1zC_1^2_ | t\ddot{z}$ where $|$ is the morpheme boundary.
 R2. First apocope: $\ddot{z} \rightarrow \emptyset / \#C_0^1zC_1^3_ \# _$ where \ddot{z} belongs to the root.
 R3. First high reduced vowel lowering: $\ddot{z} \rightarrow \{\ddot{a} \ddot{ä}\} / OC^2t_tO$
 R4. Low round vowel rising: $\{o \ddot{o}\} \rightarrow \{u \ddot{u}\} / _C_1^3\{\ddot{u} \ddot{u}\}$
 R5. Final vowel cluster simplification: $O \rightarrow \emptyset / _ \{i \ddot{i}\} \#$
 R6. Cluster unrounding: $\{\ddot{u} \ddot{ü}\} \rightarrow \{\ddot{i} \ddot{ï}\} / _z$
 R7. Low unround vowel rising: $\{a \ddot{ä}\} \rightarrow \{i \ddot{i}\} / _C_0^3\{\ddot{i} \ddot{i}\}$ where $[\ddot{i}] = \{\ddot{i} \ddot{ï}\}$, $[i] = \{i \ddot{ï}\}$.
 R8. *a*-rounding: $a \rightarrow u / _C_1^3[u]$ where $[u] = \{u \ddot{u}\}$
 R9. Vowel cluster simplification: $O \rightarrow \emptyset / _O$.
 R10. Mid vowel reduction: $\{\ddot{o} \{e \ddot{ö}\}\} \rightarrow \{\ddot{ä} \ddot{ä}\} / \#C_0^1_ (C_1^3O) \circ^1 C_1^3z$.
 R11. Stress shift: $OC^1u \rightarrow O.C^1u$
 R12. Unstressed high vowel reduction: $\ddot{z} \rightarrow \ddot{z} / O.C^1_ -$ where $- = \{ | \# \}$
 R13. Second apocope: $\ddot{z} \rightarrow \emptyset / z.C^1_ \#$
 R14. Second high reduced vowel lowering: $\{\{\ddot{u} \ddot{ü}\} \{i \ddot{i}\}\} \rightarrow \{\ddot{ä} \ddot{ä}\} / C_0^1O(C_1^3O) \circ^2 C_1^3_ C_\alpha$
 R15. First epenthesis: $\emptyset \rightarrow \{\ddot{ä} \ddot{ä}\} / \gamma R_R$
 R16. Second epenthesis: $\emptyset \rightarrow \{\ddot{ä} \ddot{ä}\} / C_\alpha _ C_\beta C_\gamma$ where $C_\alpha C_\beta \neq RP$
 R17. Third epenthesis: $\emptyset \rightarrow \{\ddot{ä} \ddot{ä}\} / C_\alpha _ C_\beta$ where $C_\alpha C_\beta \neq RP$
 R18. Low round vowel bleeding: $\{o \ddot{o}\} \rightarrow \{o \ddot{ö}\}$

Rules R1—R18 are partially ordered. The order is, from left to right, as follows:



Note that R10 and R11 are critically ordered only in relation to each other and R12, R12 is not critically ordered in relation to R2—R9 and R15—R17, R18 is critically ordered only in relation to R1—R4. R14 precedes R15 conditionally.

2.2.2. In order to correctly obtain the surface forms from their protoforms in the framework of the examples presented in 1.2., some rules which change consonants are needed:

- R19. $\omega \rightarrow p / o_ \#$

- R20. $j \rightarrow \emptyset / _C$
 R21. $\{p k\} \rightarrow \{\omega \gamma\} / O_C$
 R22. $\{t n l\} \rightarrow \{\acute{t} \acute{n} \acute{l}\} / \{\acute{t} \acute{n} \acute{l}\} _$
 R23. $\acute{c}t \rightarrow t\acute{c}$

Here R20—R23 function even synchronically. There are some more synchronical rules in Vach Hanti, e. g.

- R24. $\gamma \rightarrow k / B_$, cf. *kōtvǎn* → *kōtkǎn* 'two hands';
 R25. $\{\omega \omega \gamma \gamma\} \rightarrow \{pp kk\}$, cf. *kōγγǎn* → *kōkkǎn* 'two stones';
 R26. $l \rightarrow \acute{l} / \{\acute{c} n l\} _$, cf. *čáčlǎm* → *čáčlǎm* 'I sweep, wipe';
 R27. $tt \rightarrow t / R_0^1 O^1 _$ facultatively, where O^1 is unstressed, cf. *amǎtta*
 > *amǎta* 'seat (inf)'.

There is no internal evidence about the precedence of R19—R27 over R1—R18.

2.3. The formal correctness of (a) the Proto-Vach Hanti vowel system, (b) the environments that are supposed to condition the vowel alternations, and (c) the historical rules can be proved by means of their noncontradictority. In the present case it is sufficient to reconstruct (postulate) the development of the set of forms given as examples of the types (1)—(36) in 1.2. Note, however, that the stress has been reconstructed only in such paradigms where it has triggered a change.

2.3.1. Nouns offer no problems.

- (1) **awtǔ* R2 **awt* R17 *awǎt*; **awtǔm* R8 **uwtǔm* R14 *uwtǎm*.
 (2) **kalγǐ* R2-R17 *kalǎγ*; **kalγǐm* R7 **kilyǐm* R14 *kilyǎm*.
 (14) **ɔγǔ* R2 **ɔγ* R18 *oγ*; **ɔγǔm* R4 **uγǔm* R14 *uγǎm*.
 (18) **ämpǐ* R2 *ämp*; **ämpǐm* R7-R14 *impǎm*.
 (19) **äyrnǐ* R2 **äprn* R15 *äprǎn*; **äyrnǐm* R7-R14 **iyrnǎm* R15 **iyrǎnǎm*.
 (23) **lǝkǔ* R2-R18 *lök*; **lǝkǔm* R4-R14 *lükǎm*.
 (26) **lowu*. R11—R12 **lowǔ* R13 **low* R27 *lop*; **lowu*.m R10 **lǎwu*.m
 R11 *lǎ*.wum R12 *lǎwǔm* R14 *lǎwǎm*.

It is conceivable that the stems **awtǔ* and **äyrnǐ* came from **aplǔ* and **äkrnǐ* by R21. Then R21 was applied before R15.

2.3.2. For verbs, (1) the cases with *a*, (2) the cases with *ǎ*, (3) the cases with **ɔ* or **ɔ̃*, (4) the cases with *o* and (5) the cases with *e* or *ö* in the first syllable are presented separately.

2.3.2.1. The cases with *a* in the first syllable are grouped into: (A) those with the alternation *a : u : i*, (B) those with the alternation *a : i*, and (C) those with no alternation of *a*.

A. *a : u : i*

a. Intransitive conjugation.

- (3) **amsǔta* R1 **amsta* R16 *amǎsta*; **amsǔm* R8 **umsǔm* R14 *umsǎm*;
 **amsǔa*. R6 **amsǎ* R7 **imsǎ* R9 *imsa*.
 (4) **kañtǔta* R1-R16 *kañǎtta* (R27 *kañǎta*); **kañtǔm* R8-R14 *kuñtǎm*;
 **kañtǔa*. R6-R7-R9 *kĩnta*.
 (5) **wañtǔta* R1 **wañtǎ* R22 *wañtǎ*; **wañtǔm* R8-R14 *wuñtǎm*; **wañtǔa*.
 R6-R7-R9 *wĩnta*.
 (6) **atǔta* R1 *atǎ*; **atǔm* R8-R14 *utǎm*; **atǔa*. R6-R7-R9 *ĩta*.

b. Transitive conjugation.

- (9) **artǔta* R1 *artǎ*; **artǔm* R8 **urtǔm* R9 *urtǎm*; **artǔi*. R5 **arti*
 R7 *irtǎ*.
 (10) **čacǔta* R1 **čacǎ* R24 *čatča*; **čacǔm* R8-R9 *čučǎm*; **čacǔi*. R5-R7
čiči.

B. a : i.

a. Intransitive conjugation.

(7) **wapliṭa* R1 **wapḷta* R16 *wapälta*; **wapliṃ* R7 **wiṷliṃ* R14 *wiṷläṃ*;
**wapliä* R7 **wiṷliä* R9 *wiṷla*.

(8) **wapita* R1 **wapta*; **wapiṃ* R7-R14 *wipäm*; **wapiä* R7-R9 *wiṷa*.

b. Transitive conjugation.

(11) **amta* R16 *amätta* (R27 *amäta*); **amtiṃ* R7 *imtiṃ*; *amti* R7
imti.

C. a with no alternation.

a. Intransitive conjugation.

(12) **wakänta* (R27 *wakänta*); **wakäntm* R17 *wakäntäm*; **wakänta*
≡ *wakänta*.

b. Transitive conjugation.

(13) **aräijta* R9 **arijta* R20 *arita*; **aräijim* R9 *arijim*; **aräiji* R9 *ariji*.

2.3.2.2. Verbs with ä in the first syllable.

a. Intransitive conjugation.

(20) **päplita* R1 **päpltä* R16 *päpältä*; **päplim* R7 **piṷlim* R14 *piṷläṃ*;
**päplia* R7 **piṷliä* R9 *piṷlä*.

(21) **käsitä* R1 *kästä*; **käsiṃ* R7-R14 *kisäm*; **käsia* R7-R9 *kisä*.

b. Transitive conjugation.

(22) **päpittä* R16 *päpättä* (R27 *päpättä*); **päptim* R7 **piṷtim*; **päpti*
R7 *piṷti*.

2.3.2.3. Verbs with *ɔ and *ɔ̃ in the first syllable.

a. Intransitive conjugation.

(15) **ṇɔṷṷta* R1 **ṇɔṷta* R18 *ṇoyta*; **ṇɔṷüm* R4 **ṇuyüm* R14 *ṇuyäm*;
**ṇɔṷüa* R4 **ṇuyüa* R6 *ṇuyia* R9 *ṇuya*.

(24) **l̥ɔknütä* R1 **l̥ɔkntä* R16 **l̥ɔkñtä* R18 *l̥okñtä*; **l̥ɔknüm* R4-R14
**l̥üknäm* R21 *l̥üṷnäm*; **l̥ɔknüä* R4-R6-R9 **l̥üknä* R21 *l̥üṷnä*.

b. Transitive conjugation.

(16) **lotüta* R1-R18 *lotta*; **lotüim* R4 **lutüim* R6 *lutüim* R9 *lutim*; **lotüi*
R4 **lutüi* R5 *luti*.

(17) **kočṷṷtita* R3 **kočṷṷtäta* R16 *kočṷṷtäta*; **kočṷṷtüm* R4-R6-R9 **kučṷṷtim*
R16 *kučṷṷtim*; **kočṷṷti* R4-R5 **kučṷṷti* R16 *kučṷṷti*.

(25) **l̥ɔṇkütä* R1-R18 *l̥oṇktä*; **l̥ɔṇküim* R4-R6-R9 *l̥üṇkim*; **l̥ɔṇküi* R4-R5
l̥üṇki.

2.3.2.4. Verbs with o in the first syllable are grouped into (A) those with ä only in the imperative and (B) those with o only in the definite perfect.

A. ä only in the imperative, o elsewhere.

a. Intransitive conjugation.

(27) **wosta* ≡ *wosta*; **wosm* R17 *wosäm*; **wosa* R10 *wäsa*.

b. Transitive conjugation.

(28) **joṷṷṷta* R16 *joṷṷṷta*; **joṷṷṷim* ≡ *joṷṷṷim*; **joṷṷṷi* R10 *jäṷṷi*.

(29) **joṷṷṷältta* R16 *joṷṷṷältta*; **joṷṷṷältim* R16 *joṷṷṷältim*; **joṷṷṷälti*
R10 **jäṷṷälti* R16 *jäṷṷälti*.

B. o only in the definite perfect, ä elsewhere. All sure cases of o occurring only in the definite perfect are intransitive. If (27) is a normal case of intransitive verbs with o in the first syllable, then group B must be in some way exceptional. For (30), the definite perfect forms probably

make the case exceptional: they may have arisen on the analogy of (27), cf. *wäsa*· (imp 2sg) : *wosäm* (dpf 1 sg) and *täpa*· : *x* with *x* : = *to-γäm* instead of the original **täγäm* (cf. also Steinitz 1944 : 17).
 (30) **täpta*· ≡ *täpta*; **täγm* (R16 **täγäm*) → *toγäm* (<| *wosäm*);
**täpa*· ≡ *täpa*.

For (31) the situation is even more complicated. This is a clear case of *a*-stems, cf. *läŋa*·. I do not know the 1sg or 2sg definite perfect forms of such stems; for 3sg *loŋiγän* the stem vowel may well be dropped by R9 after becoming unstressed by a yet unknown stress rule (e.g. R28: $\alpha C^1\alpha \rightarrow \alpha \cdot C^1\alpha / _ \alpha$) that preceded R9. Note that most of the about twenty *a*- or *ä*-stems are intransitive; the only apparent exception is *täpata* 'throw' : *täγi* in Tereškin (Терешкин 1961 : 193): it is somehow (probably irregularly) related to (30). Third, there is some evidence that *ä* in *a*-stems comes from **o*, cf. *wäjata* 'want to sleep, be sleepy' and *wojämta* 'fall asleep'. Hence, **o* in *loŋiγän* can be original; on the other hand, it may also have arisen on the analogy of (27), cf. *wäsa*· : *wosiγän* and *läŋa*· : *x*. In any case, the following reconstruction is not un conceivable:

(31) **loŋa.ta* R10 *läŋata*; **loŋa-iγän* R28 **loŋaiγän* R9 *loŋiγän*; **loŋaa*·
 R9 **loŋa*· R10 *läŋa*.

2.3.2.5. Verbs with *e* and *ö* in the first syllable.

a. Transitive verbs.

(32) **wertä* ≡ *wertä*, **werm* R17 *weräm*; **werä*· R10 *wärä*.

(35) **öpltä* R16 *öyältä*, **öplm* R15 *öpläm*; **öplä*· R10 *äplä*.

b. Intransitive verbs.

(33) **weltä* ≡ *weltä*, **welim* ≡ *welim*; **weli*· R10 *wäli*.

(34) **jeriγtä* R21 *jeritä*, **jeriji*· R10 *järiji*.

(36) **öpttä* R16 *öyättä* (R28 *öyättä*); **öpti*· R10 *äyti*.

3. Conclusions and further problems. The main results of the above discussion are as follows: (1) the alternations of *a*, **ɔ*, *ä*, **ɔ̃* with *u*, *i*, *i*, *ü* result from umlaut, more exactly: from identical regressive assimilation conditioned by **ü*, **i̇*, **i̇*, **ü̇*; (2) the alternations of *o*, *e*, *ö* with reduced vowels result from reduction in an unstressed position; (3) there are several possibilities of reconstructing the conditioning environments of vowel alternation; (4) umlaut and reduction are not critically ordered in relation to each other.

3.1. The above reconstructions rest, roughly, on two presumptions: (1) 1sg and 2sg suffixes of the definite perfect in the intransitive conjugation are unmarked and begin in consonants, (2) for alternations of the type $O_\alpha C_\beta \check{\alpha} C_\gamma$: $O_\alpha C_\beta C_\gamma O_e$, with C_γ belonging to the stem, the cluster $C_\beta C_\gamma$ continues an original cluster, whereas $\check{\alpha}$ is epenthetic. Presumption (1) yields the most simple protoforms, (2) represents a standard view in Finno-Ugristics. Despite their formal correctness, either one or both of the presumptions can be erroneous. Likewise it is conceivable that the result (1) is not singular and that the alternations of low vowels with high vowels result from umlaut of high vowels under the influence of the low vowels **a* and **ä* of the second syllable. All this makes the result of the present study tentative until the alternative solutions will thoroughly be studied.

3.2. Within the framework of the present approach, several problems regarding the vowel system of Proto-Vach Hanti arise.

3.2.1. First, it appears that *ö̇* and *ö̇* which occur in the first syllable or before *γ* in nonfirst syllables, and **ü̇* and *ü̇* that have been bled by R6

and R14, are complementary. As * \ddot{u} and * \check{u} caused umlaut, * \ddot{u} and * \check{u} (and not * \ddot{o} and * \check{o}) must be accepted for Proto-Vach Hanti. Such a solution is confirmed by the fact that the suffix of 1pl in the transitive conjugation is $-u\gamma \sim -\ddot{u}\gamma$ for singular objects and $-\ddot{o}\gamma \sim -\check{o}\gamma$ (more exactly: $-\check{a}\gamma\ddot{l}\ddot{o}\gamma \sim -\check{a}\gamma\check{l}\ddot{o}\gamma$ (du) and $-\check{a}\ddot{l}\ddot{o}\gamma \sim -\check{a}\check{l}\ddot{o}\gamma$ (pl)) for dual and plural objects; apparently the Proto-Vach Hanti * \ddot{u} and * \check{u} may come from still earlier * u and * \ddot{u} . In any case, the Proto-Vach Hanti reduced vowel system can be viewed as consisting of six entities:

$$\begin{array}{cccc} \ddot{u} & \check{u} & \check{i} & \check{u} \\ & \check{a} & \check{a} & \end{array}$$

3.2.2. Second, in 2.1 consonantal finals were estimated for several types of stems with umlaut; likewise, in 2.3.2.4 and 2.3.2.5 consonantal finals were accepted for stems with reductions of o , e , \ddot{o} . Thus, (a) * \check{o} and * o , (b) * \check{o} and * \ddot{o} and (c) * \check{a} and * \check{o} are complementary in alternating stems. Although it is conceivable that (a) transitive verbs with the alternations $a : \check{i}$ and $\check{a} : i$, or (b) the stems with o , e , \ddot{o} in the first syllable, or (c) both have in their second syllable a vowel (probably * \check{a} or * \check{a} that were dropped by R1, R5 and R9), the complementarity still holds, if only the unalternational stems will yield no essential counter-evidence. Note that if either transitive verbs with \check{a} or verbs with e in the first syllable (and not both) have vocalic stems, even \check{a} and e appear to be complementary in verbs. Hence, unalternational stems must be studied in order to find out which of the following four alternative protosystems of full vowels is the true one:

- | | | | |
|---|-------------------------------|-------------------------------|--|
| (1) $u \check{i} i \check{u}$ | (2) $u \check{i} i \check{u}$ | (3) $u \check{i} i \check{u}$ | (4) $u \check{i} i \check{u}$ |
| $o \quad e \quad \ddot{o}$ | $o \quad e \quad \ddot{o}$ | $o \quad e$ | $o \quad a \quad \check{a} \quad \ddot{o}$ |
| $\check{o} \quad a \quad \check{a} \quad \check{o}$ | $a \quad \check{a}$ | $a \quad \check{a}$ | |

3.2.3. Third, as there exist alternational stems with umlaut, it is tempting to explain the high vowels in some unalternational stems as brought about by umlaut, e. g. *kul* 'fish', *muřäl* 'fish liver', *il* 'lower part; low', *nir* 'cape', *lüřättä* 'go out, come out : (imp 2sg) *lüřtä*, cf. Finnish *kala*, *maksa* 'liver', *ala*, Moksha *ńer* 'nose', Finnish *lähte-* 'depart'. This can be done by estimating * u -, * \check{i} -, * i - and * \ddot{u} -stems, cf. **kalu*, **mařlu* (< **maklu* by R21?), *ali* **ńäri*, **läřtü-* (< **läktü-* by R21?) and an additional rule:

R29 $\{u \check{i} i \check{u}\} \rightarrow \{\check{u} \check{i} i \check{u}\} / \#C_0^1O \cdot C_1^3\text{—}$

At the present stage of knowledge, R29 can be ordered anywhere between R6 and R13 (if there really exist stems with u in the first syllable that add 1sg and 2sg possessive suffixes beginning with i , cf. *put* 'kettle' : *putim* in 1.2.1, then R29 must be ordered after R9, as in such a case the suffix-initial vowels a , \check{a} , \check{i} , i represent the earlier stem-final vowels * a , * \check{a} , * \check{i} , * i). Namely, it is unknown whether the quantitative reduction of high vowels took place before or after umlaut, cf. **kařu* R8 **kulu* R29 **kulü* R13 *kul* versus **kařu* R29 **kařü* R8 *kulü* R13 *kul*. If umlaut really occurred in such cases, R8 also includes the rounding of * \check{a} . Then there is one more problem concerning the verbs that have umlauted * \check{a} into \check{u} : in cases such as the infinitive *lüřättä*, the proform **läřtütä* either underwent syncopation by R1 (then R1 must be corrected: $\check{a} \rightarrow \emptyset$...), or on the analogy of *piřlä* : *päřältä lüřättä* was introduced instead of the regular **lüřtütä*.

For this solution there must have been in Proto-Vach Hanti (or rather in Proto-Ob Ugric, cf. Tawda Mansi *χūl* 'fish') the change {*a ä*} → {*u ü*} in nonfirst stem syllables; by the way, a similar change has taken place in Aunus Karelian. On the other hand, there exist a priori a couple of rather far-going alternatives to this solution: one can suppose that low vowels in corresponding stems of related languages have developed either (a) from high vowels under the influence of **ä* and **ǎ* of the second syllable (e. g. **kulǎ*, **ilǎ*), cf. 3.1, or (b) from diphthongs (e. g. **kualǎ*, **ialǎ* etc.).

Abbreviations

dpf — definite perfect, du — dual, imp — imperative, pl — plural, px — possessive suffix, sg — singular.

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ТИИТ-РЕЙН ВИЙТСО (Таллин)

ЧЕРЕДОВАНИЕ ГЛАСНЫХ В ВАХОВСКОМ ДИАЛЕКТЕ ХАНТЫЙСКОГО ЯЗЫКА

Чередования низких гласных с высокими (*a : u*, *a : i*, *a : u : i*, *ä : i*, (**ɔ* >) *o : u*, (**ɔ* >) *ö : ü*) в первом слове объяснимы умлаутом под влиянием **й*, *й̃*, *й̄*, *й̅* второго слова. Чередования гласных среднего подъема с редуцированными (*o : ä*, *e : ä̃*, *ö : ä̃*) в первом слове могут быть обусловлены прежней безударностью первого слога в соответствующих формах. Историческая первичность того или другого вида чередований не определима. Кроме того, следует считать возможным, что данное объяснение чередований не единственно мыслимое.