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INTRODUCTION

1. This grammar is a descriptive analysis of certain fundamental features of the Estonian language based upon the speech of a native informant. It contains a detailed study of the speech morphophonemic and inflectional systems. Brief sketches of stem expansion and syntax are also provided.

No attempt has been made to avoid eclecticism in presenting the various sections of the grammar. The phonemic system is presented as an independent unit, and the phonemes of the system which I set up are, therefore, biunique. The physically defined, phonetic phenomena of language are susceptible of systematization into distributionally significant classes without reference to so-called higher-level considerations. I choose to reserve the use of the term phonemics for reference to the study of these classes of phonetic phenomena.

The morphemic system is described in terms of morphophonemically constructed stem and affix forms, which undergo successive morphophonemic alterations until a terminal morphophonemic sequence is attained. These terminal morphophonemic sequences are directly translatable into phonemic sequences. The generative processes of stem expansion are poorly understood and I have limited my presentation to a classificatory outline of the major types found in the language.

The syntactical sketch is an attempt to formulate the most fundamental rules necessary for the generation of simple Estonian sentences. I have employed the transformational model of syntax as developed by Noam Chomsky and Robert B. Lees, but I have also made extensive use of ideas presented in the unpublished work of Emmon Bach on German syntax. This sketch consists primarily of a short phrase structure together with the most essential obligatory transformational rules. Optional transformations have been introduced mainly for the purpose of illustrating some of the basic uses of the inflectional and most productive derivational suffixes.

Although the various sections of the grammar have not been rigorously cast in one model, one can, nonetheless, start with

the syntax and produce a terminal sequence of morphemes and boundary symbols which can be referred to the morphemic section of the grammar for the selection of the proper allomorphs. The morphophonemic rules then allow the conversion of this string of allomorphs into segmental (though not suprasegmental) phonemes which may finally be converted into pronounceable phone sequences. The syntactic rules as they now stand will produce ungrammatical as well as grammatical sentences. Indeed, the use of human intelligence is necessary in order to avoid an overwhelming predominance of ungrammatical sentences.

This eclecticism undoubtedly results in a complication of the grammar from the point of view that the sole aim of a grammar is to provide a theory for generating the grammatical sentences of a language. I defend my approach, however, on the practical grounds that more information concerning my own partial analysis of the structure of Estonian can be made accessible to other linguists in this way.

This grammar is based primarily upon the speech of one informant, a woman from the city of Tartu, which lies in the southern Estonian dialect group. My informant received her formal education in Tartu and attended the University of Tartu for three years. She left Estonia in 1944, and, prior to coming to the United States in 1950, lived in Germany. Since the time that she left Estonia, she has continually spoken Estonian both at home and with Estonian friends. Her speech is considered standard by other Chicago Estonians and differs from the prescribed norms of standard Estonian only in minor details. Other informants have been used only to a very limited extent.

In addition to the corpus of data drawn from Estonian speakers, I have made extensive use of available studies of Estonian. In this way, I have endeavored to increase the degree of coverage and reliability of my corpus. Although the general structure of Estonian as presented in this grammar is in accord with that of standard Estonian, differences of detail on all levels are found to exist. These divergences are sometimes noted in footnotes, but I have not attempted to give a systematic comparison of the standard language with that of my informants.

One aspect of Estonian which is widely known is its complicated system of phonetic quantity. This problem of quantity in Estonian has been the source of a century-old debate, largely carried on in European linguistic journals. As many as four and as few as two distinctive degrees of quantity have been

claimed by various scholars. A critical survey of the scholarly literature on this problem is presented in the appendix to the grammar. Those portions of this grammar which pertain to my own analysis of this problem are: 3, 4.11, 4.21, 4.22, and 5.11.

CHAPTER I. PHONEMICS

2. The phonemes of Estonian are:

I. Supra-laryngeal

A. Consonants

	labial		dental		post-alveolar		palatal		velar		cavity	
stops	/	p	t		ʈ				k			
fricatives		f	s		ʃ						h	
nasals		m	n		ɲ				ŋ			
laterals			l		ɭ							
trill			r									
semivowels		v						j				/

B. Vowels

	front		central		back	
	unrounded	rounded	unrounded	unrounded	rounded	rounded
high	/	i	ɨ			u
mid		e	ø		õ	o
low		ä		a		/

II. Sub-laryngeal

A. Stresses

primary /˘/

secondary /˙/

B. Open transition /+/

C. Terminal contours

terminal fading /./

sustained /:/

supplementary /-/

D. Pitches

high	/3
mid	2
low	1/

3. Sub-laryngeal phonemes

3.1. Stress and open transition

Definitions:

Vocable. — A vocable is any sequence of phonemes containing an initial /+ / and bounded by a subsequent /+ / or terminal contour.

Phonemic syllable. — The phonemic syllable in Estonian contains at least one vowel. The occurrence of /+ / always indicates the beginning of a syllable. Other syllable boundaries are defined in terms of the constituent segmental phonemes of each vocable. The rules for determining the phonemic syllables are as follows:

(1) Sequences of vowel plus vowel immediately following /+ / or separated from /+ / solely by consonants do not contain an intervening syllable boundary; e. g. , /+koèr/ 'dog,' /+peàp/ 'he must.'

(2) Single vowel plus /i / sequences do not contain an intervening syllable boundary; e. g. , /+ràamattuit/ 'some books.'

(3) In all other vowel plus vowel sequences a syllable boundary falls between the two vowels; e. g. , /+muùseum/ 'museum.'

(4) In a sequence of two stops not immediately followed by /+ , /, the syllable boundary falls between the two stops; e. g. , /+èlektri/ 'of electricity,' /+vaŋkkri/ 'of the cart.'

(5) For all other sequences of phonemes each CV marks the beginning of a new syllable.

For a more detailed description of the phonemic syllable see section 5.3 below.

Syllabic nucleus. — The syllabic nucleus is the first vowel of the phonemic syllable plus an immediately following vowel or consonant of the same syllable; i. e. , V(C/V).

Stress and open transition are closely related in Estonian, and my description of these phonemes relies upon phonetic stress together with other sub-laryngeal activity. I distinguish five phonetic degrees of stress: [' ^ ` ' ~] (primary, secondary, tertiary, weak, and minimal), in descending rank.

3.11. Open transition. The recognition of a phoneme of open transition, i. e., /+/, is necessitated by the nonpredictability of syllable boundaries in certain instances; e. g., /tə+tù:ji/ [tə. tū. ʃi] 'he came', /+nat+d̪i:t/ [nət. ɔ. ʃit] 'they were'; /+vɔttan+əmət/ [vɔt. tən. ɛ. mət] 'I take the mothers', /+vɔtta+nəmət/ [vɔt. tã. nɛ. mət] 'take these! (imperative)'.¹ These non-predictable syllable boundaries occur only when the following syllabic nucleus has a phonetic degree of stress which is tertiary or higher. If the following syllabic nucleus has weak or minimal stress, then the syllable boundaries are always predictable in terms of the constituent phones. With the most frequent transition types, the syllable boundaries fall between segmental phones and are clearly distinguishable. Thus, in a short sample of connected speech containing 143 syllable transitions followed by weak or minimal stress, 141 were of this type; i. e., (V)V.CV, (V)VC.CV, and VRC.CV. Those types for which the boundary is not clearly distinguishable phonetically involve clusters of three or four consonants between vowels; but for any given cluster the boundary is, nonetheless, predictable.

The phoneme of open transition is, then, defined by stress and phonetic syllable boundaries—i. e., the phonetic syllable phenomena in terms of syllable crests and troughs—and these defining phenomena are its allophonic features. /+/ occurs in linear sequence with the supra-laryngeal phonemes, but differs from them in that its domain extends up to, but not including, the next /+/ or a terminal contour.

3.11.1. Open transition as determined by stress. Open transition is defined by the tertiary and weaker degrees of stress. The two higher degrees of stress, [´ ^], are treated as segments of stress which occur superimposed upon the tertiary stress allophone of /+/. Thus, stress phenomena are segmented both horizontally (those phonetic stresses which define /+/) and vertically ([´], [^] as apart from all other stress phones). It may be noted that only the vertical segmentation is phonemically significant.

- (a) if the antepenult syllable is open and the penult does not have a syllable-closing stop, then the penult has ['];
- (b) if a vocable with ['] on the penult syllable is followed by / ' / (see § 3.21 below), then the final syllable also has ['].

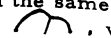
[']—elsewhere.

Examples: [kân.Đĩ.ĩ.sť.Gũ] = /+kânĩliseka/ 'with a square one,' [hē.lē.Dđs.ŷ] = /+hēletaŷi/ 'brightly,' [kēlk.kũ.Dđ.Gđ'] = /+kēlkkuteka/ 'with sleds.' My use of weak stress should not be confused with the fact that long "words" in Estonian are often composed of several vocables; e.g., [ār.măt.sť.mis.tť.kũ.Gĩ] = /+ārmatsemiste+kaki/ armatsemistegagi 'also with love affairs'; [kũ.ñk.sđn.Đĩk.kũ.tť.lť.Gĩ] = /+kãheksañkku+teleki/ kaheksandikudelegi 'also to the eighths'; [kũññ.kãn.nũ] = /+kũññ+kãna/ kuninganna 'queen.'

3.11.2. In terms of other syllabic phenomena, /+ / is defined by an initial syllable boundary followed by tertiary stress and all subsequent syllable boundary phenomena up to, but not including, the next syllable boundary before tertiary stress.

The specification of the various syllable boundary phenomena, though obviously non-phonemic and conditioned by the simultaneously occurring supra-laryngeal and stress phonemes, is an extremely difficult task. I shall limit myself, therefore, to a token attempt to indicate some of the major transition types and to point up a few of the problems involved. In the main I have had to rely upon my own kinesthetic hunches and information gleaned from the more precise acoustic investigations of other scholars who were dealing with other aspects of Estonian. The results can, thus, only be considered to be rough approximations.

Estonian appears to distinguish at least two types of phonetic syllable boundaries. The first type I shall call major syllable boundaries; the second type, minor syllable boundaries. The major syllable boundaries occur between phonetic syllables which are defined by a single chest pulse (or stress pulse). These syllable boundaries, for the most part, are clearly and unquestionably perceived and correspond to the boundaries of phonemic syllables as defined in 3.1 above.

Minor syllable boundaries are found to occur within the major syllables (as defined by a single stress pulse) following a first vocoid of the syllable, which takes a primary time bulge of the stress pulse, and preceding a second vocoid (or perhaps contoid), which receives a secondary time bulge within the same stress pulse. This may be diagrammed as follows: , where the major syllable boundaries are marked by periods and the minor syllable boundary by a slant bar.

This type of minor syllable boundary is typical in vocabulary-initial phonemic syllables which end in two vowels, especially when these syllables take postposed stress (see 3.12 below); e.g., /+tævas/ 'sky,' /+peap/ 'he must,' /+kuiva/ 'dry (part-sg.),' This same phenomenon may also be observed, though less clearly, with consonants in the position of the second vowel above with postposed stress; e.g., /+jihna/ 'to the city.' In a careful acoustic study of Estonian quantity Ilse Lehiste finds that a syllable may contain one, two and three "clearly discernible peaks of energy."² These peaks of energy measured by Lehiste may, perhaps, in some way—though not on a one for one basis—correspond to the relatively more easily perceivable minor syllables.

Also of relevance here is the historical-descriptive study of diphthongs by Andrus Saareste in which he states his conviction, based upon auditory impressions, that the new diphthongs differ from the original diphthongs in that "between both elements of the new diphthong is heard some sort of voiced, very brief break, and that the second element begins with a new breath pulse."³ Saareste's statement is also further qualified to point up the occurrence of these phenomena in essentially the environments stated above as typical for the occurrence of minor syllable boundaries. My own experience, however, does not bear out Saareste's statement with regard to a contrast based upon the history of the diphthongs, nor does the syllable break seem quite as pronounced as Saareste's language might indicate.

The minor syllable will be ignored in the phonetic descriptions which follow. Accordingly, the second vocoid of a major syllable, which receives the secondary time bulge, will be indicated as being non-syllabic; e.g., [tʰx.väs] = /+tævas/ 'in the sky.'

A graphic representation of the most important of the major-syllable transition types is given in Figure 1.⁴ Sub-laryngeal and supra-laryngeal activity are indicated on two parallel lines; relative duration is indicated by the length of

the lines. I have not attempted to cope with the relative intensity of the sub-laryngeal syllable-initiating and syllable-closing activity. In the main I have had to rely upon kinesthetic hunches, and the results can only be considered to be rough approximations. Consonant lengths are relative to other consonant lengths, vowel lengths to other vowel lengths; but vowel lengths and consonant lengths are not represented on the same absolute scale.

Phonetic symbols used below:

V	unobstructed escape of air
C	obstruction by upper channel action
Cf	formation of C-obstruction
Cr	removal of C-obstruction
.....	free ballistic movement
/////	sub-laryngeal syllable-initiating action
xxxxx	sub-laryngeal syllable-closing action
č, ǰ	extra-short contoid or vocoid
C', V'	half-long contoid or vocoid
č̄, ǰ̄	long contoid or vocoid
ǰ̄:	extra-long vocoid
˙	a phonemic stress is obligatory, i.e., /' /, which occurs with the second element of the syllabic nucleus
	secondary or primary phonetic stress is obligatory
	at least a tertiary degree of stress is obligatory

(single dot) = syllable boundary.

A definition of the phonetic major syllable is now possible. The syllable nucleus is marked by free ballistic movement (....), the onset by sub-laryngeal syllable-initiating action (/////), and the coda by sub-laryngeal syllable-closing action (xxxx). The point of syllable division is the point at which the syllable-closing action stops (e.g., before the completion of Cr in type 3b of Figure 1).

Examples:

- 1 /+tema/ = [t̄. mǎ] 'he, she'
- 2 /+ta+mâkas/ = [t̄. mǎ. Gǎs] 'he lay'
- 3a /+mâjat+o|it/ = [mǎ. Eǎt. ð. |it] 'the houses were ...'
- 3b /+mâjas+o|i/ = [mǎ. Eǎs. š̄ð. |i] 'in the house was ...'
- 4 /+rikkas/ = [rik. kǎs] 'rich'

Phonemic Type	Phonetic Type	Relationship of Sub-laryngeal Activity to Upper Channel Activity
1. VCV	[V.CV]	$\left \begin{array}{c} v \\ \dots xx \end{array} \right \left \begin{array}{cc} Cf & Cr \\ // // // // // // // // \end{array} \right \left \begin{array}{c} V \\ // \dots \end{array} \right $
2. V+CV	[V.CV̆]	As for 1.
3. VC+V	(a) [VC.V̆]	$\left \begin{array}{c} v \\ \dots \end{array} \right \left \begin{array}{cc} Cf & Cr \\ xxxxxxxx // // \dots \end{array} \right \left \begin{array}{c} V \\ // \dots \end{array} \right $
	(b) [VC.C̆V̆]	$\left \begin{array}{c} v \\ \dots \end{array} \right \left \begin{array}{cc} Cf & Cr \\ xxxxxx. // // \dots \end{array} \right \left \begin{array}{c} V \\ // \dots \end{array} \right $
4. VCCV	[VC.CV]	$\left \begin{array}{c} v \\ \dots \end{array} \right \left \begin{array}{cc} Cf & Cr \\ . xxxxxxx // // // // // // // // \end{array} \right \left \begin{array}{c} V \\ // \dots \end{array} \right $
5. VC+CV	[VC.CV̆]	As for 4.
6. V̆CCV	[V̆C̆.CV]	$\left \begin{array}{c} v \\ \dots \end{array} \right \left \begin{array}{c} Cf \\ \dots \dots \dots xxx // // // // // // // // \end{array} \right \left \begin{array}{c} Cr \\ // \dots \end{array} \right \left \begin{array}{c} V \\ // \dots \end{array} \right $
7. V̆C̆+CV	[V̆C̆.CV̆]	As for 6.
8. VV	[V̆.] or [V̆Y̆.]	$\left \begin{array}{c} v \\ // // // \dots \end{array} \right \left \begin{array}{c} v \\ . xxxxx \end{array} \right $
	9. V̆V̆	[V̆.] or [V̆V̆.]
10. V+V		[V.V̆]
11. VVCCV VVC+CV	[V̆C̆.C̆V̆]	$\left \begin{array}{c} v \\ // // // \dots \end{array} \right \left \begin{array}{c} v \\ \dots \dots \dots xxx // // // // // // // // \end{array} \right \left \begin{array}{cc} Cf & Cr \\ // // // // // // // // \end{array} \right \left \begin{array}{c} V \\ // \dots \end{array} \right $
	12. V̆V̆CCV V̆V̆C+CV	[V̆C̆.C̆V̆]

Fig. 1. — Major-syllable transition types.

- 5 /+nat+tùlit/ = [nát.tù.lít] 'they came'
 6 /+rìkkas/ = [rìk'.kás] 'in a rich one'
 7 /+pik+kāp̃t/ = [pìk'.kāp̃t] 'a long box'
 8 /+tāevas/ = [tā^ˈE.vás] 'sky'
 9 /+taevas/ = [tā^ˈE.vás] 'in the sky'
 10 /+ta+oli/ = [tā.ò.li] 'he was'
 11 /+àuttut/ = [a^ˈŭt.tút] 'cars'
 12 /+vālk̃ses/ = [vā^ˈlk̃.sēs] 'in a small one'

3.12. Stress

- /ˈ/ - [ˈ], primary stress
 /˘/ - [˘], secondary stress

Phonemic stress may occur only once between instances of /+/, since it is manifested within the vocable-initial syllable, superimposed upon the [˘] allophone of /+/, it is best assigned sequentially to that syllable. All syllable types occur with and without phonemic stress.

Definitions:

Short syllable - a syllable ending in a single vowel; i.e., (C)V

Long syllable - a syllable ending in any single consonant, a vowel cluster, or one or two vowels followed by a resonant (R) plus one other consonant; i.e., (C)V(R)C, (C)VV(R)(C)

Extra-long syllable - any other syllable ending in two or more consonants; i.e., (C)VCC(C), (C)VVCC(C)

Plain stress - the occurrence of phonemic stress on the first vowel of a syllabic nucleus; i.e., V(C/V)

Postposed stress - the occurrence of phonemic stress on the consonant or second vowel of a syllabic nucleus; i.e., VC, VV

Stress may be either plain or postposed.

- Short syllables take only plain stress (i.e., the only possibility).
- Long syllables occur with both plain and postposed stress; e.g., /+tāevas/ 'sky,' /+taevas/ 'in the sky,' /+rìkkas/ 'rich,' /+rìkkas/ 'in a rich one,' /+àuttut/ 'cars,' /+vālk̃ses/ 'in a small one' (cf. page 16 and Table 1).
- Extra-long syllables take only postposed stress.

The phonetic basis for distinguishing plain and postposed stress is that the free ballistic movement has a relatively longer, unchecked action followed by a late onset of the syllable-checking action with postposed stress as compared with the shorter, closely controlled degree of ballistic movement found with plain stress (cf. Figure 1). A further support for the phonetic distinction between plain and postposed stress may be found in Lehiste's discovery of an additional third peak of energy which characterizes syllables with postposed stress, whereas syllables with plain stress contain only one or two such peaks.⁵ It should be emphasized, however, that the place of maximum intensity for both plain and postposed stress is during the syllable onset.

The longer period of ballistic movement and the late onset of the syllable-checking action with postposed stress are accompanied by an additional phonetic lengthening of long syllables; i.e., the phonemic segments of the syllable nucleus and coda have longer allophones. The phonemes of the syllable which absorb this allophonic length and the relative degree of length which is allotted to each segmental phone are determined by the syllable type.

The reasons for my above analysis of what is traditionally called the extra-long degree of vowel and consonant length are:⁶

(a) This extra length is not a matter of vowel length and consonant length, taken separately, but rather of syllable length; i.e., given the segmental phonemes of a syllable, it is possible to predict which segments will take the extra length in all cases. It should further be noted that the extra-length phenomena affect not only individual consonants and vowels, but consonant and vowel clusters as well.

(b) Extra-long syllables occur only as the first syllable of a vocable.

(c) Syllables with the extra degree of length occur only when accompanied by a phonemic degree of stress; i.e., with primary or secondary stress. This fact is the most powerful single argument for assigning stress to the first syllable.

(d) The features shared by all syllables with extra-length are: (1) a phonemic degree of stress; (2) the sub-laryngeal ballistic movement and syllable-checking action as noted above.

Other phenomena, which are restricted to one or more types of long syllable (e.g., intonation contours), I consider to be secondary.

In the citation of examples in this description, forms are often taken from an utterance with the stress which they received in that particular utterance. Thus, the morphophonemic expectation of a given stress may or may not be realized. Primary stress is treated as a more emphatic stress and does not occur with normal citation forms, in which case we find secondary stress; i.e., the relative scale of stress preception is here marked from weakest to strongest, rather than vice versa.

For the morphophonemic behavior of stress see 6.21 below.

3.2. For the description of Estonian intonation and phrase-terminal phenomena I recognize three phonemic degrees of pitch and three terminal contours.⁷

3.21. Terminal contours

/./ (fading) is marked by a rapid drop of pitch and intensity.

/,/ (sustained) is marked by a maintenance of the same intensity and level of pitch.

/'/ (supplementary) accounts for vowel allophones of immediately preceding syllables which are half-long. /'/' occurs only in conjunction with /./ and /,/ to be written /:/ and /;/'.

3.22. The three phonemic pitches indicate a maximum of three distinctive relative levels of pitch within any given utterance. The absolute range of phonetic pitch varies considerably from utterance to utterance within a connected string of such utterances produced by the same speaker; and in some utterances within a given connected discourse it seems that the absolute level of /2/ is equal to the absolute level of /3/ in others; i.e., that /1 2 3/ have the allophones [1 2 3] in some instances and the allophones [2 3 4], respectively, in others.

In describing the allophonic characteristics of the pitch phonemes the following allophonic pitch contours are to be noted.

(1) A quick rise is found to occur for each pitch at the early onset of the first vowel of a syllabic nucleus of VV or VC with

postposed stress; e.g., $\overset{\curvearrowright}{V} \overset{\curvearrowright}{V}$, $\overset{\curvearrowright}{V} \overset{\curvearrowright}{C}$. A rise from one phonemic pitch to another occurs with a sharp, scarcely noticeable transition.

(2) In syllabic nuclei consisting of two vowels, a drop from one pitch level to another occurs as a steady fall in pitch, beginning during the first vowel. With postposed stress this fall begins relatively later than with plain stress, and the fall is more noticeable—perhaps as a result of the above-mentioned allophonic rise of the pitch of the first vowel of such nuclei.

Elsewhere, the drop from one pitch level to another occurs quickly and with a sharp transition.

In the phonemic transcriptions pitch will be indicated over vowels where a change in pitch occurs and over the syllables which immediately precede or follow silence or a terminal contour. All unmarked syllables have the same pitch as the ones which immediately precede them.

3.23. Examples of the pitches and terminal contours:

- (1) /t²äevast¹on+pl²ives./ 'The sky is clouded over.'
- (2) /p²ilvet¹on+ta²evas./ 'The clouds are in the sky!'
- (3) /t²ma+p²äp¹in+t³a+p²ikka+k²aš¹ti./ 'I put it into the long box.'
- (4) /p³l²ka+k²aš¹ti+k¹aän./ 'the lid of the long box'
- (5) /t²ma+l²äksin+m¹èret+r¹änta./ 'I went to the seashore.'
- (6) /t²ma+l²äksin+m³èret+r²änta./ 'I went to the seashore.'
- (7) /v³aras+l²äks+l³äp²itakna+v¹ä]ja./ 'The thief left through the window.'
- (8) /t³²m¹eije+teeme+h¹ümalattest+k²ä]ja./ 'We make kvass from hops.'
- (9) /t²kas+saatt¹eš²ti+keelest³äru./ 'Do you understand Estonian?'
- (10) /t¹kas+te+k²õnelette+èš¹ti+keeltt./ 'Do you talk Estonian?'
- (11) /t¹kas+te+r²ääkitt¹eš¹ti+keeltt./ 'Do you speak Estonian?'
- (12) /t³ütleš²it¹sa+seta+m²ülle./ 'Did you say that to me?'
- (13) /v²õttis+ta²uhe; t³ina+ko²õnla.t¹ja+k¹èeruttas+s¹äl+ta²umper
+p²ää,t²ja,t²²š²iis,+v²iskas+ta+m¹aha:t²sellest+sait+k²alevit+poek
t³äru;t²et²èmat²ant¹is+selle+m³ärkku;t²et²võtku+s²ärvikkul,
+p²õlvetest+ki³ipit¹ja+v¹isakku+ta+m³aha.t¹ja,t²k²alevit+poek
t³ékit²niil,t²ja+niitsait²ta+s²ärvikkust+v¹õitu:/ 'She took a strand of linen fiber and wound it there around her head. And then she threw it down. From this Kalevi Poeg understood that his mother had given him a sign that he should grab the horned devil by the knees and throw him to the ground. And Kalevi Poeg did so; and thus he gained the victory over the horned devil.'

4. Supra-laryngeal phonemes

4.1. Consonants.—The consonants have already been listed under §2. The contoid qualities which are used in my descriptions of the allophones of the Estonian consonants are given in Figure 2.

/v/ and /j/ also have the following rising non-syllabic vocoids as allophones: [u], [i], [ɨ], [E]. These occur only in the syllable onset and will be distinguished from the corresponding fading non-syllabic vocoids in the syllable coda (to be marked [u], [i], [E]), which I assign to the vowel phonemes /u i e/.

A clear contrast exists between /v/ and /u/; cf. /+karv/ 'fur' and /+karu/ 'bear.' The contrast between /j/ and /i/ is not so transparent. One contrast is found between /+maĵja/ 'into the house' and /+naĵja/ 'one who weds,' which my informant consistently pronounced differently. On the other hand, my own attempts to test this difference by pronouncing */+maĵja/ and */+naĵja/ did not evoke the desired negative reaction on the part of my informant. A further contrast is found between such types as /+pāĵju/ 'much' and /+kāĵion+happu./ 'the kvass is sour,' in which the copula /+on/ loses its juncture and is attached to the preceding word-final -i. Such distributional features as syllable structure and clustering of vowels also weigh heavily in favor of recognizing separate /j/ and /i/ phonemes.

4.1.1. Contoids occur in the following lengths: short [C], half-long [C̄], long [C̄̄], extra-short [C̄̄̄], and minimal [C̄̄̄̄]. Those contoids which extend across phonetically distinguishable syllable boundaries are segmented as two phones; e.g., [VC̄V] = [VC.CV].

Fricatives, laterals, /r/, and /v/ have allophones of the type [C.C̄], short plus minimal, in the environment V +V; i.e., [VC.C̄V] = /VC+V/; for example, [mā.Eūs.šō.ĵi] = /mäjas+oĵi/ 'in the house was,' [pǣ.gy.šō.ĵi] = /päēv+toĵi/ 'the day was....' In all other cases, geminate phones of the same contoid are phonemicized as consonant clusters; e.g., [āĵ.lū] = /alla/ 'downward,' [pāt.ĵi] = /paätĵi/ 'into the boat,' [kāt.nūt] = /kaätnut/ 'covered.'

Half-long and long fortis stops with an aspirated release, [C^F], and long fricatives except /h/ are phonemicized as clusters; e.g., [vēt^F] = /+vētt/ 'some water,' [jāĵk^F] = /+jāĵkk/ 'disgusting' (cf. [jāĵG] = /+jāĵk/ 'trace, track'), [d.sēt^F] = /asett/ 'some place, room' (cf. [d.sēt] = /+aset/ 'places'), [mīs] = /+mīss/ 'where,' [hīrs] = /+hīrss/ 'millet,' [lārř] = /+lārřf/ 'mug, snout.' These only occur immediately before terminal contours.

	labial	labio-dental	pre-alveolar	alveolar	post-alveolar	alveo-palatal	pre-palatal	velar	cavity ⁹
stops									
voiceless	p		t	ṭ	t̡	tʃ	k		
fortis			D	Ḍ	D̡	Dʃ	G		
voiceless	B		d	ḍ	d̡	dʃ	g		
lenis									
voiced	b		d	ḍ	d̡	dʃ	g		
lenis ⁸									
fricatives & spirants									
voiceless		f					x	h	
fortis									
voiceless			z	ẓ	z̡	zʃ		} ^h	
lenis									
voiced	β	v				ɣ			
nasals									
voiceless	ɱ		ɳ						
voiced	m	ɱ	n		ɳ̣	nʃ	ŋ		
laterals									
voiceless			l̥						
voiced			l		ḷ	lʃ			
trills									
voiceless									
voiced				r		rʃ			

Fig. 2. — Roster of contoid qualities

Other half-long and long syllable-final contours are phonemized as single consonants; e.g., [ã] = /tã/ 'under,' [tãm] = /tãm/ 'some water was ...'

- 4.12. The following general observations concerning allophone distributions of the consonant phonemes may be made:
- (1) All consonants have allophones of the type [C'] in the environment V₋(+)C. For the stops and fricatives this allophone is always voiceless.
 - (2) All post-alveolar phonemes have alveopalatal allophones before /j/. Elsewhere they have post-alveolar allophones before /r/ has alveopalatal allophones before /j/ and /i/. All stops and fricatives except /f/ have voiceless lenis allophones in the environments (a) V₋V, (b) VV₋#, (c) R₋, (d) RV. /h/ is not found in environments (b) and (c); /š/ is not found in (d).
 - (4) The following parallel distributions of allophonic length and voicing not covered above may be noted for:

(a) single stops

$\frac{/p/}{[p]}$	$\frac{/t/}{[t]}$	$\frac{/tʃ/}{[tʃ]}$	$\frac{/k/}{[k]}$	<u>in the environments:</u> ¹⁰ + V, V ₋ # (except for /t/, V ₋ CV, C ₋ V, VV ₋ CV, R ₋ # (except for /p tʃ/)
[b]	[d]	[dʃ]	[g]	R ₋ R, VV ₋ R
[p̃]	[t̃]	[tʃ̃]	[k̃]	C ₋ , C ₋ C ₋
[p̃]	[t̃]	[tʃ̃]	[k̃]	p/t/tʃ/k ₋ N

(b) geminate stops

$\frac{/pp/}{[p^F]}$	$\frac{/tt/}{[t^F]}$	$\frac{/tʃtʃ/}{[tʃ^F]}$	$\frac{/kk/}{[k^F]}$	<u>in the environments:</u> - V # (except for /tʃtʃ/), R ₋ #, VV ₋ #
[p̃ ^F]	[t̃ ^F]	[tʃ̃ ^F]	[k̃ ^F]	V ₋ #

(c) geminate fricatives

$\frac{/ff/}{[f̃]}$	$\frac{/ss/}{[s̃]}$	$\frac{/ʃʃ/}{[ʃ̃]}$	$\frac{/šš/}{[š̃]}$	<u>in the environments:</u> V ₋ #, R ₋ #
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(d) single resonants (except /ŋ v j/:

$\frac{/m/}{[m]}$	$\frac{/n/}{[n]}$	$\frac{/l/}{[l]}$	$\frac{/r/}{[r]}$	$\frac{/l/}{[l]}$	$\frac{/ŋ/}{[ŋ]}$	<u>in the environments:</u> C # VV ₋ # elsewhere
[m̃]	[ñ]	[l̃]	[r̃]	[l̃]	[ŋ̃]	
[m]	[n] ~ [ŋ]	[l]	[r]	[l]	[ŋ]	

4.13. Palatalization. — The post-alveolar consonants /tʃ ʃ ʒ ʒ/ indicate what are called palatalized or soft consonants in traditional Estonian linguistics. These consonants are produced by the contact of the tongue blade against an area beginning from the top of the alveolar ridge and extending back as far as the prepalatal region. The allophones of these consonants which do not extend noticeably into the prepalatal region are here called post-alveolar, whereas those which clearly extend into that region are called pre-palatal.

If the term palatalization is used to indicate the relative range and intensity of tongue-blade contact and also the effect upon preceding and following vocoids, the following pattern may be observed:

(a) Palatalization is strongest with consonants occurring in the coda (cf. 5.3 below) of a vocable-initial phonemic syllable. When accompanied by postposed stress, it is even stronger. Post-alveolar consonants in this position normally call for an i-colored off-glide after a preceding /u o õ a/ (cf. 4.23 below).

(b) Palatalization is also strong in the second syllable onset of two-syllable vocables of the type (C)VÇi.

(c) Elsewhere palatalization is noticeably weaker and appears solely in allophones conditioned by a following /i/ or /j/.

In traditional treatments of palatalization in Estonian primary attention has been given to the stronger types (a) and (b) above, and type (c) is most generally treated as non-palatalized.¹¹

It should further be noted here that Lehiste has pointed out that half-long and long contoids "lose their palatalization gradually during the hold of the consonant."¹²

My own informants did not have a separate /ɹ/ phoneme. The presence or absence of an /ɹ/ phoneme apparently varies a great deal from speaker to speaker in no predictable fashion, and, in general, /ɹ/ seems to be on its way out as a phoneme of standard Estonian.¹³

4.14. A more detailed presentation of the consonant phonemes and their allophones follows:

<u>phoneme</u> <u>or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>
/p/	[p]	+ V V_# V_CV	/+pãèv/ 'day' /+tulep/ 'he comes' /+kàpsas/ 'cabbage' /+kàpten/ 'captain'

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>	
/p/ (cont.)	[p] (cont.)	C_V	/+lápittil/ 'with the flat-side,' /+táppan/ 'I kill'	
		V [̣] V_CV	/+saáppas/ 'in the boot'	
		V_V	/+jùpa/ 'even'	
		V [̣] _#	/+võip/ 'he can,' /+saàp/ 'he will'	
		R_	/+ümp [̣] er/ 'around,' /+ha [̣] mpat/ 'teeth,' /+ha [̣] lp/ 'bad'	
		_RV	/+sõprat/ 'friends,' /+líp [̣] likkas/ 'butterfly,' /+pril [̣] lit/ 'glasses'	
		[b]	R_R	/+ümpr [̣] itsep/ 'surrounds,' /+vårplane/ 'sparrow'
		[p']	V [̣] _(+)CV	/+hüppama/ 'to jump,' /+ta [̣] ppa/ 'to kill'
		[p̥]	C_	/+sõppra/ 'friend (part.-sg.),' /+pa [̣] ppi/ 'of poplar'
				_C
/pp/	[p̥] [p [̣] .F]	p_N	/+ta [̣] ppma/ 'to kill'	
		-V [̣] _#	/+rã [̣] tsepp/ 'tailor'	
		R_#	/+ki [̣] pp/ 'shield,' /+ki [̣] mp/ 'bunch'	
/t/	[p̥ ^F] [t]	V [̣] #	/+ka [̣] úpp/ 'merchandise,' /+e+roópp/ 'Europe'	
		V [̣] #	/+ka [̣] pp/ 'cabinet'	
		+_V	/+t [̣] ema/ 'he'	
		V_#	/+nat/ 'they,' /+tu [̣] lit/ 'they came'	
		V_CV	/+mittu/ 'several,' /+katkes/ 'he broke off (stopped)'	
		C_V	/+tistus/ 'he sat,' /+kã [̣] pten/ 'captain'	
		V [̣] _CV	/+a [̣] itta/ 'into the storage shed'	
		-R_#	/+sajant/ 'century'	

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>	
/t/ (cont.)	[D]	V_V	/+keta/ 'whom (part.-sg.),' /+mööta/ 'along'	
		VV_#	/+meit/ 'us (part.-pl.),' /+kuit/ 'but'	
		R_	/+eñtale/ 'to oneself,' /+äärite/ 'to,' /+kort/ 'time,' /+keert/ 'circular motion'	
		_RV	/+tütvustama/ 'to get acquainted,' /+treima/ 'to lathe'	
		R_R	/+lehtles/ 'it flew,' /+ahtma/ 'to give,' /+võrtlust/ 'comparison (part.-sg.)'	
	[d]	VV_R	/+hoitma/ 'to care for,' /+leitnut/ 'found'	
		V_*(+)CV	/+vette/ 'into the water,' /+ofsa/ 'to the top,' /+vettoji/ 'some water was'	
	[t̥]	C_		/+koõstma/ 'to answer for,' /+tähtsus/ 'importance,' /+paavst/ 'pope,' /+vaattas/ 'he watched,' /+kaõttama/ 'to lose,' /+üftlesit/ 'they said'
			_C	/+autto/ 'car,' /+roõtslane/ 'Swedish,' /+ahtke/ 'give (2-pl. imperative),' /+spõrttlane/ 'athlete'
			t_N	/+mittmes/ 'in several,' /+kaõtnut/ 'covered,' /+heftma/ 'to throw'
[t̥ ^F]		-V_#	/+kesett/ 'amidst'	
		R_#	/+põõltt/ 'from the side of,' /+hifrtt/ 'mouse (part.-sg.),' /+ainultt/ 'only'	

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>examples</u>
/tt/ (cont.)	[t ^F] (cont.)	V ⁺ #	/+tátt/ 'storage shed'
	[t ^F]	V ⁻ #	/+tveft/ 'some water,'
/t/	[t]	+_i	/+ett/ 'that (conj.)'
		+_C	/+tíkk/ 'a small stick'
		V ⁻ CV	/+tʃírk/ 'bird'
		C ⁻ i	/+katki/ 'broken'
		V ⁺ C ₁	/+lahti/ 'open,'
	[D]	V ⁻ i	/+hásti/ 'well'
		VV ⁻ #	/+paatti/ 'into the boat'
		R ⁻ _	/+patti/ 'pillow'
			/+laati/ 'sort'
	[d']	R ⁻ j	/+moltt/ 'trough,'
		VV ⁻ j	/+märtikkas/ 'bug'
			/+kañtja/ 'carrier'
			/+leñtja/ 'finder,'
	[tʃ]	V ⁺ (+)CV	/+teñtja/ 'knower'
	[tʃ]	_C	/+keñti/ 'chain (part.-sg.)'
		C ⁻ _	/+ahtsin/ 'I gave,'
			/+loots/ '(boat) pilot'
			/+pultt/ '(bundle of) rags,'
	[tʃ]	C ⁻ j	/+kuñstnikk/ 'artist'
			/+niittja/ 'reaper,'
			/+koñtja/ 'defendent'
		_Cj	/+poittjon/ 'portion'
	[tʃ]	t ⁻ N	/+kiittma/ 'plateau'
/tt/	[tʃ ^F]	R ⁻ #	/+sultt/ 'meat jelly,'
			/+sentt/ 'cent'
		VV ⁻ #	/+paatt/ 'boat,' /+jodtt/ 'iodine'
	[tʃ ^F]	V ⁺ #	/+kettt/ 'chain'
/k/	[k]	+_V	/+kes/ 'who'
		V ⁻ #	/+näkik/ 'he saw also,'
			/+kirik+koli/ 'the church was'
		V ⁻ CV	/+mäksan/ 'I pay,'
			/+pikkas/ 'in a long ...'
		C ⁻ V	/+räske/ 'heavy,' /+eñkd/ 'perhaps'
		VV ⁻ CV	/+vääkses/ 'in a small ...'

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>examples</u>	
/k/ (cont.)	[k] (cont.) [G]	-R #	/+ùhĩŋk/ 'union'	
		V V	/+ìlka/ 'each'	
		VV #	/+taek/ 'time'	
		R _	/+ãrke/ 'don't!' /+ìlkus/ 'infamy,' /+haŋk/ 'snow- drift'	
		RV	/+klaaã/ 'glass'	
	[g]	R_R	/+jãrkmĩne/ 'following,' /+iŋkĩt/ 'angels'	
		VV_R	/+liúklema/ 'to slide,' /+ãeklane/ 'slow'	
		V#(+)CV	/+piKka/ 'into a long ...,' /piK+kaãt/ 'long box'	
		[k']	C_	/vaŋkkri/ 'of the farm wagon,' /+laãkma/ 'to let,' /+lahkme/ 'at the fork (of road)'
			_C	/+jodksma/ 'to run,' /+tekt/ 'text,' /+sakslane/ 'German'
/kk/	[k'] [k ^F]	k_N	/+aKkna/ 'of the window'	
		-V_#	/+kĩrikk/ 'church,' /+ãmettnikk/ 'clerk'	
	[k ^F]	R_#	/+jãkk/ 'disgusting,' /+kiŋkk/ 'gift'	
		V#	/+kõkk/ 'all'	
		V#	/+piKk/ 'long'	
/f/	[f]	V#(+)CV	/+šeffi/ 'chef (part. -sg.)'	
	[f]	elsewhere	/+laãf/ 'top (of tree),' /+saft/ 'juice,' /+tsuñft/ 'trade-guild,' /+lãrfis/ 'in the face'	
	[f]	V#	/+šeff/ 'chef'	
/ff/	[f]	R_#	/+laãff/ 'mug (face)'	
/s/	[s]	+V	/+seè/ 'that'	
		V_+	/+tmãjas/ 'in the house'	
		V_R#	/+kãn/ 'wart'	
		C_	/+òtse/ 'straight,' /+kãpsas/ 'cabbage,'	
		C_		

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>	
/s/ (cont.)	[s]	C_ (cont.)	/+roòtslane/ 'Swedish'	
		_-C	/+värške/ 'fresh,'	
			/+prañssuse/ 'French,'	
			/+pułst/ 'from the trees'	
			/+ise/ 'oneself'	
		[Z]	V_V	/+sees/ 'inside,' /+kãès/
			VV_#	'in the hand'
			R_	/kãrsatta/ 'to smoulder,'
			_-RV	/kõrs/ 'stubble'
				/+kaàslane/ 'companion,'
		/+tõüsmine/ 'rising,'		
		/+prañslane/ 'French'		
/ss/	[s']	V ^s (+)CV	/+sišse/ 'inside'	
	[š]	V ^s _#	/+ap+tišs/ 'abbess'	
/š/	[š]	R_#	/+hišs/ 'corn'	
		+_i	/+šilka/ 'pig'	
		C_	/+lõdšš/ 'pilot,' /+sõrtššit/	
		_-C	'devils,' /+laàkššin/ 'I	
			allowed'	
		_-C	/+màššiline/ 'massive,'	
			/+pułšš/ 'tatters,'	
			/+laàkja/ 'one who lets'	
	[š]	C_j	/+makšja/ 'payer'	
	[Z]	V_i	/+kãšš/ 'hand'	
		VV_#	/+klaàšš/ 'glass'	
		R_i	/+kuuļššin/ 'I heard'	
	[Z']	R_j	/+mõššja/ 'bride'	
	[š']	V ^s (+)CV	/+kašški/ 'birch trees	
			(part. -pl.),' /+kašš+šõļi/	
			'the cat was'	
/šš/	[š]	V ^s _#	/+kaššš/ 'cat'	
/š/	[š]	R_#	/+puļššš/ 'pulse'	
		+_	/+šššif/ 'chef'	
		C_,-_C	/+tùššš/ 'shower (gen. -	
			sg.)'	
		[š']	V ^s (+)CV	/+tùššš/ 'shower (part. -
		sg.)'		
[Ž]		elsewhere	/+pešš/ 'beige,'	

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>
/š/ (cont.)	[š̌] (cont.)	elsewhere	/+ka+ràašis/ 'in the garage,' /+seřš/ 'serge'
/šš/	[š̌]	V ^s #	/+tušš/ 'shower'
/h/	[x] [ħ]	R ^s #	/+puħšš/ 'punch (drink)'
		r ^s #	/+mo+narħ/ 'monarch'
		V ^s V	/+jùhe/ 'lead,' /+tèha/ 'to do,' /+nàha/ 'to see'
		V ^s j	/+àhju/ 'of the oven'
	[h ^s]	V ^s _	/+àhju/ 'into the oven,' /+e+poh/ 'epoch,' /+tšèhhi/ 'Czech (part. - sg.)'
	[h]	elsewhere	/+hàmmas/ 'tooth,' /+nòh/ 'well,' /+lèhma/ 'of the cow,' /+mahh/ 'juice'
/m/	[m̌]	C ^s _ #	/+lehm/ 'cow,' /+vìhm/ 'rain'
	[m ^s ']	V ^s (+)CV	/+ho ^s mme/ 'tomorrow'
	[m̌]	V ^s #	/+ta ^s m/ 'oak'
	[m]	elsewhere	/+mi ^s hna/ 'to go,' /+èma/ 'mother,' /+hàmmustama/ 'to bite,' /ènam/ 'more,' /+salm/ 'verse,' /+se ^s sma/ 'to stand'
/n/	[ň]	C ^s _ #	/+tā ^s hn/ 'spot,' /+kāšn/ 'wart'
	[m̌]	V ^s f	/+tsu ^s hft/ 'trade-guild'
	[n ^s ']	V ^s (+)CV	/+š ^s i ^s hna/ 'thither'
	[ň]	V ^s #	/+l ^s i ^s h/ 'city'
	[n]	elsewhere	/+nahk/ 'leather,' /+m ^s l ^s nema/ 'to go,' /+lā ^s hen/ 'I go,' /+ve ^s èmma/ 'to persuade,' /+ku ^s rn/ 'sieve,' /+l ^s hnur/ 'miser'
/ŋ/	[ŋ̌]	_ j	/+kas+tā ^s ŋe+puu/ 'chestnut tree'
	[ŋ ^s ']	V ^s _ (+)CV	/+ko ^s ŋ ^s tis/ 'he strolled'

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>
/p/ (cont.)	[p̄]	V ^s #	/+jōp̄/ 'stubbornness'
	[p̄]	elsewhere	/+ŋ̄na/ 'nose,' /+pāŋ̄i/ 'he put,' /+āŋ̄t̄s̄in/ 'I gave,' /+kūŋ̄st̄nikk/ 'artist,' /+vāŋ̄kka/ 'Russian (derog.),' 'stubborn' /+jōŋ̄nakkas/ 'stubborn'
/ŋ/	[ŋ̄]	V ^s (+)CV	/+vāŋ̄ki/ 'prisoner (part. -sg.)'
	[ŋ]	elsewhere	/+rōŋ̄k/ 'train,' /+kuniŋ+k̄anna/ 'queen,' /āŋ̄kkur/ 'anchor' (Cf. /+j̄iŋ̄ki/ 'also a city' and /+vāŋ̄ki/ 'also a bath' for the contrast of /n ŋ/ and /ŋ/.)
/l/	[l̄]	C ₋ #	/+māhl/ 'juice,' /+kāhl/ 'swarm'
	[l̄']	V ^s (+)CV	/+ālla/ '(to) under'
	[l̄]	V ^s #	/+al/ 'under'
	[l]	elsewhere	/+l̄umi/ 'snow,' /+olen/ 'I am,' /+l̄illet/ 'flowers,' /+k̄orval/ 'beside,' /+kāal/ 'weight,' /+hālp/ 'bad,' /+p̄ōõrlema/ 'to spin'
[j]	[j̄]	_ _j	/+h̄l̄ja/ 'late'
	[j̄']	̄ _j	/+vāj̄ja/ 'away'
	[j̄]	V ^s (+)CV	/+hāj̄i/ 'grey (part. -sg.)'
	[j̄]	V ^s #	/+hāj̄/ 'grey,' /+lōj̄/ 'foolish'
	[j]	elsewhere	/+l̄õllus/ 'foolishness,' /+l̄iha/ 'meat,' /+t̄uli/ 'fire,' /+kāal/ 'turnip,' /+īlm/ 'air,' /+k̄ũlm/ 'cold'
/r/	[r̄]	C ₋ #	/+k̄õkr/ 'cartilage'
	[r̄']	V ₋ i	/+k̄uri/ 'bad'

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>
/r/ (cont.)	[r'] (cont.)	<u>j</u>	/+màrja/ 'berry (gen.-sg.)
	[r ^h]	<u>s</u> <u>j</u>	/+ma ^h rja/ 'berry (part.-sg.)'
/v/	[r']	V ^s (+)CV	/+pe ^r ra/ '(to) after'
	[r]	V ^r #	/+na ^r / 'fool'
	[r]	elsewhere	/+rèki/ 'sledge,' /+àra/ 'cowardly (gen.-sg.)'
			/+a ^r k/ 'cowardly,' 'around,'
			/+tùmp ^r / 'fools'
			/+pnàrrit/ 'Mrs.,'
			/+kùuves/ 'sixth'
			/+sùvi/ 'summer'
			/+ki ^v vi/ 'into stone'
			/+v ^à lu/ 'pain,' /+kùiv/ 'dry,' /+tùkev/ 'firm,' '(tree) top' (gen.-sg.),' /+ka ^r v/ 'fur,' 'winter'
/j/	[E]	V ¹ <u>a</u>	/+màja/ 'house,' /+àjaja/ 'driver,' /+òja/ 'ditch'
	[I]	V ¹ <u>e, u</u>	/+kòje/ 'of the rope,' 'willow,' /+mòju/ 'influence'
	[Y]	h, j <u>V</u>	/+àhju/ 'of the oven,' 'into the house'
	[Y ^h]	<u>j</u>	/+ma ^h ja/
	[j]	elsewhere	/+jää/ 'ice,' /+viljes/ 'fifth,' /+nàkija/ 'one who sees,' /+hijja/ 'late'

4.2. Vowels. — The vocoid qualities shown in Figure 3 on page 30 are used in the description of the Estonian vowels. These vocoid qualities are used together with the following qualifying diacritical marks:

V ^w	o-colored on-glide or off-glide
V ^y	i-colored off-glide
V [^]	raised
V ^{<}	fronted

	front rounded	unrounded	central unrounded	back-central unrounded	back rounded
high	ū	i			u
lower-high					U
higher-mid	ō	e		ɛ	o
mean-mid		E		Ē	ɔ
lower-mid		ɛ			
higher-low		æ			
low		a	ɑ		

Fig. 3. — Roster of vocoid qualities

ṽ	extra-short
Ṽ	long
V̄	half-long
V̄̄	extra-long
Ṳ	fading non-syllabic vocoid

4.21. Long and extra-long vocoids are phonemized as clusters of like vowels; e.g., [sūn] = /+saan/. In support of this solution are (a) the large number of clusters of unlike vowels, and (b) the similar behavior of all /VV/-clusters thus obtained with respect to stress, length, intonation, effects upon following consonants, and distribution in the vocable.

4.22. The following vocoid types with respect to length and syllabicity are found in the following environments:¹⁴

	<u>type</u>	<u>environment</u>
(a) for /V/:	[ṽ]	V
	[Ṳ]	V̄
	[V̄]	—ṽ, —; —
	[V]	elsewhere
(b) for /VV/:	[Ṽ̄]	with postposed stress
	[Ṳ]	elsewhere

/ū ö ä ø/ do not have allophones of the types [Ỹ] and [Y].
 Otherwise all types occur for all vowels. In my description of
 the allophones of each vowel below, I shall include only those of
 the above types which are pertinent to the description of quali-
 tative differences.

4.23.

<u>phoneme</u> <u>or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>
/i/	[i]	all positions	/+itu/ 'sprout,' /+piti/ 'he had to,' /+kuiv/ 'dry,' /+kiut/ 'fibers' 'quarrel,' /+viijes/ 'fifth'
/ii/	[i^]	all positions	/+niit/ 'now,' /+hulltis/ 'he shouted' 'one,' /+kupsē/ 'ripe' 'to request' 'wolf,' /+uqsait/ 'worms'
/ū/	[ū^]	<u>i</u>	
	[ū]	elsewhere	
/ūü/	[ū^]	all positions	
/u/	[U] & [U^y]	<u>CC</u>	
	[u]	<u>C</u> elsewhere	
/uu/	[ū^]	all positions	
/e/	[e]	<u>i</u>	
	[E]	<u>a, o</u>	
	[Ē]	<u>o</u>	
	[Ē̃]	a, o <u> </u>	
	[Ē]	a, o <u> </u>	
	[Ē]	a, ã <u> </u>	

<u>phoneme or cluster</u>	<u>allophone</u>	<u>environment</u>	<u>example</u>
/e/ (cont.)	[ɛ̃]	ā_	/+nāet/ 'you see'
	[ɛ]	elsewhere	/+tēma/ 'mother,' /+teki/ 'he made,' /+rāhe/ 'hail,' /+pōkeneta/ 'to flee'
/ee/	[ē]	all positions	/+eēsēl/ 'mule,' /+eēltap/ 'he supposes'
/ō/	[ō]	all positions	/+lōrts/ 'slush,' /+ōēl̥ti/ 'one said'
/ōō/	[ō̄]	all positions	/+ōō/ 'night,' /+sōōja/ 'eater,' /+mōōta/ 'along'
/o/	[ɔ̃] & [ɔ̃ʸ]	-CC	/+koṭṭja/ 'defendant,' /+koṭṭi/ 'into the bag,' /+jōṇṇakkas/ 'stubborn'
		-C̣	/+loṭi/ 'foolish,' /+joṇṇ/ 'stubbornness'
	[ɔ]	C ^k /hC	/+roṭṭk/ 'train,' /+sōkkis/ 'in a sock,' /+noṭṭka/ 'onto the beak'
	[ɔ̃ʸ]	-V_	/+āhion+kuūm/ 'the oven is hot'
/oo/	[o]	elsewhere	/+oṭi/ 'he was,' /koṭṭ/ 'place,' /+koṭi/ 'moth,' /+kaṭ/ 'loss (gen. -sg.),' /+oà/ 'bean (gen. -sg.)'
		all positions	/+loṭ/ 'mown hay (gen. - sg.),' /+toṭppis/ 'entirely,' /+kōṭli/ 'of the school'
	[a] & [aʸ]	-C̣(C)	/+kaṭṭi/ 'into the box,' {ha}/ 'grey'
/a/	[a] & [aʸ]	-CC	/+taṭṭsin/ 'I gave,' {kaṭṭis/ 'in a box,' {kaṭṭki/ 'broken'
	[a]	elsewhere	/+ṭapi/ 'aid,' /+ṭitama/ 'to hold,' /+jūmalait/ 'gods (part. -pl.),'
/aa/	[ā]	all positions	/+laṭ/ 'wide' {kaṭṭ/ 'leech,' /+maṭ/ 'land'

phoneme or cluster	allophone	environment	example
/ä/	[æ [^]]	—r, l, }	/+äri/ 'store,' /+väjja/ 'away,' /+jälle/ 'again'
	[æ]	elsewhere	/+äkki/ 'suddenly,' /+kägi/ 'hand,' /+näb/ 'of the face,' /+täla/ 'full'
/ää/	[ä]	all positions	/+ääres/ 'beside,' /+hää/ 'good,' /+jäama/ 'to remain'
/ö/	Allophones of /ö/ and /öö/ are often accompanied by a slight [w] on-glide after /p m v/ and by a slight [w] off-glide before /p m v/, the presence or absence of [w] being a matter of free variation.		
[s] & [sʏ]	—C		/+vögin/ 'I took,' /+kösä/ 'stroll'
	—C̣		/+sösä/ 'bull,' /+plösä/ 'small boy'
	[E]	elsewhere	/+ölu/ 'beer,' /+lötevi/ 'lax,' /+löä/ 'tether (gen. -sg.),' /+löö/ 'lark,' /+ös/ 'of sister'
/öö/	[ö]	all positions	/+löök/ 'teether,' /+rööni/ 'joy,' /+vööras/ 'strange'

5. Phonotactics. — Those aspects of phonotactics which I consider to be of primary significance are: the distribution of vowels and consonants, the syllable, and the vocable.

5.1. The Distributions of Vowels and Consonants

5.1.1. The problem of geminate clusters. — Central to the treatment of vowel and consonant distributions is the decision to phonemicize long, extra-long, and, in certain instances, half-long contours and vocoids as geminate clusters. The relatively high number of possible clusters of unlike consonants (79 of 306 possible medial C_1C_2 -clusters) and unlike vowels (26 of 72) provides the strongest support for the geminate solution.

With regard to the distribution of geminate consonants, it is noteworthy that in no instance does the establishment of geminate consonants produce a cluster which is not closely paralleled by a cluster of mixed consonants both in length (in terms of the number of constituent consonants) and in overall make-up with regard to the distribution of obstruents and resonants. The only instances

of mixed obstruent clusters not paralleled by geminate obstruent clusters are in vocable-initial position (e.g., /+tsuñft/) and in medial clusters of three obstruents (e.g., /+joðksku/). The former type is limited primarily to words of foreign origin and the second type is relatively rare—my entire corpus contains eight examples. The only environment which mixed resonant clusters do not share with geminate resonant clusters is vocable final position. Such clusters are restricted, however, to the type: liquid plus nasal or /v/.

One further support for the geminate vowel cluster solution is that it makes possible the system of normal and postposed stress posited above, which accounts for all types of extra syllable length. On the other hand, this solution results in a certain amount of skewness. Only clusters of mixed vowels are found beyond the first syllable, and the vowels /ū ò ā ò/ occur as V_2 only in geminate clusters.

5.12. Sequences of vowel and consonant. — Vowel-consonant sequences occur without apparent restriction within the same syllable as well as in consecutive syllables. Only two-thirds of all possible VC and V.C (the period indicates syllable boundary) combinations are actually attested in my corpus, but this may be attributed, in part, to the size of my corpus, especially with regard to the less frequent vowel phonemes /ū ò/, and the skew distributions of the phonemes /f ä/; and, in part, to more general restrictions of syllable and cluster constituency; e.g., /ŋ/ does not occur in the syllable onset.

With regard to consonant-vowel sequences, however, we find that /j/ and the dentals /t s n l/ do not occur before /i/. On the other hand, all post-alveolar consonants occur before /i/ and rarely occur before other vowels. Other consonant-vowel possibilities occur freely within the general framework of limitations given above for vowel-consonant sequences.

5.13. Vowel distributions. — All single vowels and geminate clusters of vowels are found in the vocable-initial syllable. Beyond the first syllable, geminate clusters and the single vowels /ū ò ā ò/ do not occur, nor do these latter occur before /+/. /o ā/ rarely occur beyond the first syllable. /o/ is found in loanwords (e.g., /+kino/ 'movies,' /+kilo/ 'kilo') or as the result of the fusion of the copula /on/ 'is' with the preceding word without an intervening /+/ (e.g., /+kà:ion/ 'the kvass is ...'). /ā/ is found in free variation with /e/ in the second syllable of words of the type /+lähäp/ 'he goes' (cf. 6.13 below).

Thirty-six per cent of all possible clusters of unlike vowels are attested (26 of 72).¹⁵ V_2 in such clusters is never / \bar{u} \bar{o} \bar{a} \bar{o} /. Beyond the first syllable, however, only three monosyllabic clusters are found; i.e., /e u a/ plus /i/. Figure 4 indicates those clusters of unlike vowels which are found to occur. (The geminate cluster /ee/, which the figure also produces, should be ignored here.)

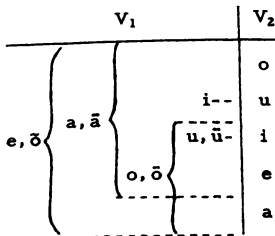


Fig. 4. — Clusters of unlike vowels

Examples of vowel clusters (listed by V_1 in the following order: / \bar{u} u \bar{o} o i \bar{a} a e \bar{o} /): /+nũlt/ 'now,' /+kũlv/ 'dry,' /+rãamattuit/ 'some books,' /+kõls/ 'rope,' /+õõ|fi/ 'one said,' /+põån/ 'I cut,' /+kõl/ 'moth,' /+koèr/ 'dog,' /+oà/ 'of the bean,' /+kiù/ 'fiber,' /+nãükuma/ 'to miaow,' /+nãõ/ 'of the face,' /+tãl/ 'louse,' /+kãè/ 'of the hand,' /+aù/ 'honor,' /+kað/ 'of the loss,' /+laì/ 'wide,' /+llusalm/ 'most beautiful,' /+aèk/ 'time,' /+teò/ 'of the snail,' /+lelp/ 'bread,' /+ihneit/ 'stingy (part.-pl.),' /+peàp/ 'he must,' /+õù/ 'courtyard,' /+lõð/ 'lark,' /+võl/ 'butter,' /+õè/ 'of sister,' /+lõà/ 'of the tether.'

Beyond the first syllable certain other vowel clusters occur in which the two vowels belong to separate phonemic syllables. Attested clusters of this type are /ea eu ae ie io/; e.g., /+õkkaani/ 'ocean (gen. -sg.),' /+muuseum/ 'museum,' /+kãelache/ 'necklace,' /+àpiellus/ 'he got married,' /kãlion/ 'the kvass is ...'

A graphic representation of the nine-vowel system of Estonian presents certain problems which are not immediately apparent. The vowel pairs /i/ - /e/, / \bar{u} / - / \bar{o} /, and /u/ - /o/ form a 3 x 2 pattern which is justifiable on phonetic, distributional, and morphophonemic grounds. The remaining three vowels (/ī a \bar{o} /), however, are not so easily accounted for if we attempt to fit them into the bottom row of a 3 x 3 pattern. All three are unrounded, and there are not compelling distributional features

in favor of any one particular arrangement. The column /i/ - /e/ might conceivably contain /a/ or /ä/ as a third member; the column /ü/ - /ö/, /ä/ or /õ/; the column /u/ - /o/, /a/ or /õ/.¹⁶ Consequently, I reject any attempt to select arbitrarily any particular 3 x 3 mold, and propose the 5 plus 4 schematization shown in Figure 5 as the most satisfactory from a phonetic as well as a distributional point of view.

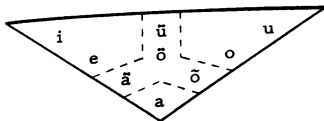


Fig. 5. —Graphic representation of the Estonian vowel phonemes

5.14. Consonant distributions. — The recognition of /f š/ as phonemes is necessitated by their occurrence in a handful of recent foreign loans; and, consequently, they do not have a wide or symmetrical distribution. Once established, however, /f/ also comes to occur in native Estonian words in morphophonemic alternation with /v/ in those positions for which voiced consonants otherwise have voiceless allophones. The result is an additional skewness in the distribution of /v/ as well. /ŋ/ has the most restricted distribution, occurring solely before /k/ or before /t/ followed by /k/, in which positions it is in contrast with all other nasals.

All single consonants except /ŋ/ occur post-juncturally; medially all except /ŋ š f/; and before juncture, all except /j/. All geminate clusters occur medially except */ŋŋ/. Before a terminal contour and after a single vowel, geminate clusters of all obstruents except /h/ are found; after a vowel cluster or vowel plus resonant all geminate stops and /ss/ are found.

Post-juncturally clusters of two consonants are found, usually in obvious loanwords; e.g., /+proùva/ 'Mrs.', /+p]ikka/ 'girl.' The attested initial clusters of two consonants are indicated by Figure 6.

Before juncture, clusters of two and three consonants are found. With C₁C₂-clusters the following restrictions may be observed: /v j š/ never occur as C₁; /j ŋ ʃ ŋ (h) (š)/ are not C₂ (/h/ only in the loan /+mo+nařh/ 'monarch'; /š/ in the loan

C ₁	C ₂	
p	- l̥	} l
k	- v-	
	- s	} s
	- t	
s	- s	
	- t	

Fig. 6. — Initial clusters of two consonants

/tseɣš/ 'serge'); nasals occur only before homorganic stops with the exception of /mf/ and /ŋš/ in obvious loans (e.g., /trituŋf/ 'triumph'); C₂ is post-alveolar only if C₁ is also post-alveolar; dental consonants other than /r/ do not combine with post-alveolar consonants; voiced consonants do not follow stops or the fricatives /s f/; /p v/ occur as C₂ only after the liquids /l ɭ r/; /l r/ are found as C₂ only after /h/; /f/ is attested only after the obstruents /t s h/ and /m/. Of the remaining possible C₁C₂ sequences 79% (38 of 48) is attested.

With final 3-consonant clusters C₁ is found to be /k/ or any resonant except /j/. C₂ and C₃ consist of one of the geminate clusters permissible in final position (i.e., all geminate obstruents except /hh/) or of two different obstruents as indicated by Figure 7.

C ₂		C ₃
	s	- t
	t	- s
p t k		- s
s f		} t

Fig. 7. — Non-geminate C₂C₃ in Final 3-consonant clusters

In medial position clusters of two, three, and four consonants are attested. Four-consonant clusters only occur immediately following a single vowel in the vocable-initial syllable. With medial C₁C₂ clusters /j v š/ are never C₁ and /ŋ/ is never C₂. /h š/ occur as C₂ only in one loanword apiece, and /ŋ/ occurs as C₁ only before /k/. Forty per cent of the remaining possible C₁C₂ clusters are found to occur.

Clusters of three consonants in medial position fall into four general patterns as indicated by the formula $R_1/C \text{ } \zeta \text{ } R_2/C$, in which C is any obstruent except /š/, R_1 is /m n ŋ p l ʃ r/, and R_2 is /m n ŋ p l ʃ r j/. One exception to this is /+kohvritesse/ 'into the rucksacks.' Clusters of four consonants follow the pattern $R_1\zeta\zeta R_2$.

Figure 8 indicates all attested binary sequences of consonants. Sequences which occur only across syllable boundaries are separated by a dot. Thirty-nine per cent of all possible combinations are attested (127 of 324). Following non-initial syllables, however, only 12% (39 of 324) are found. It may be noted that this reduction closely parallels the restriction of mixed vowel clusters beyond the first syllable; i.e., 36% of V_1V_2 occurs in vocable-initial syllables, but only 11% in other syllables (including disyllabic clusters).

5.2. Syntactotonomics. — The following general observations concerning the behavior of the pitch phonemes in relation to the other sub-laryngeal phonemes may be made. Typically the phrase begins with relatively higher pitches, followed by successively lower pitches, and ends with pitch /1/ just before /./ . Rises in pitch occur only with vocable-initial syllables, and a rise of more than one degree beyond the first vocable of the phrase is always accompanied by primary stress. When a fall in pitch occurs, it usually accompanies the second vowel of the vocable, i.e., with the second vowel of a vowel cluster or the first vowel of the second syllable, though it does not always fall in such positions. Pitch /3/ rarely occurs with syllables having secondary or no phonemic stress.

5.3. The syllable. — The Estonian syllable (S) contains an optional onset (O) consisting of one or two consonants; a nucleus (N) made up of a single vowel, a vowel cluster or a vowel plus a consonant; and an optional coda (D) of one to three consonants. The syllable may thus be described by the following formulae:

$$S = (O)N(D)$$

$$O = (C_{-2})C_{-1}$$

$$N = V_1(V_2/C_N)$$

$$D = (1) -C_1(-C_2[-C_3]) \text{ in a syllable containing } /+/ \text{ in the onset}$$

$$(2) -C_1(-C_2) \text{ elsewhere}$$

t	tt	ts	tl	tn	tm	t.v	t.p
s	st	ss	s.l	sn	s.m	s.v	
l	lt	l.s	l.l	l.n	lm	lv	lp
n	nt	ns	n.l	n.n	n.m	n.v	
m		ms	m.l	m.n	m.m		mp
p	pt	ps	pl	pn			pp
k	kt	ks	kl	kn	k.m	kv	
h	ht		hl	hn	hm	hv	
r	rt	rs	r.l	rn	rm	rv	rp
l					lm	lv	lp
q							
f					fm		
p							
f	ft						
v		vs				v.v	
o							
j							
a							

Fig. 8. — Binary

tr	tk			tł	t.n	tf			
	sk			s.l		sf			
l.r	lk								
	n.k					nf			
	m.k					mf			
pr	p.k	p.ą	p.ł	p.j	p.l				
kr	kk	ką		k.j	k.l				
hr	hk		hł	h.j		hf		h.h	
r.r	rk	rą	rł	r.j		r.n	rf	rš	rh
	łk	łą	łł	ł.j	ł.l				
	ąk	ąą	ął	ą.j					
	ł.k	łą	łł	ł.j	ł.l	ł.n			
	ńk	ńą	ńł	ń.j	ń.l	ń.n	ff	ńš	
			f.ł						
v.r	ńk								
				j.j				šš	

sequences of consonants

The segmental phonemes which are found in the above positions for syllables immediately following /t/ are indicated by the following list:

- C₋₁ all consonants except /ŋ/ when not preceded by C₋₂; after C₋₂, C₋₁ = /t s ʃ l ʎ r v/
 C₋₂ = /p t ʃ k s/
 V₁ all vowels
 V₂ = see limitations of vowel clusters above, §5.13
 C_N all consonants; with the exception of combinations involving /ð/ as V₁ or /ʃ f v j/ as C_N, all possible sequences of V₁C_N are found to occur
 -C₁ all consonants except /ŋ j/
 -C₂ all obstruents except /h/; C₁ and C₂ combine to produce all possible geminate obstruents, all combinations of /ʃ/ with /ʃ/ and /p t k s/ with /t s/, and the pairs /ft nt rt vs/
 -C₃ is found in one vocable in final position; i.e., /t paàvst/ 'pope.'

All syllable types provided for by the above formulations up to a length of six segmental phonemes are found to occur. Syllables of six phonemes, those which end in three consonants, and the type VVCC are attested only as monosyllabic vocables. All other syllable types also occur as monosyllabic vocables.

Examples: 6 phonemes: /t paàvst/ 'pope,' /t suùft/ 'trade-guild,' /t riiikk/ 'ironing'; 5 phonemes: /t tekst/ 'text,' /t plekk/ 'smudge,' /t paàʃʃ/ 'boat,' /t plaàŋ/ 'plan,' /t suùfʃit/ 'trade-guilds,' /t paavʃʃi/ 'of the pope,' /t riiikki/ 'some ironing'; 4 phonemes: /t aʃst/ 'doctor,' /t ððst/ 'from the night,' /t kuʃk/ 'crane,' /t kaàŋ/ 'leech,' /t trei/ 'use a lathe! (imperative),' /t plòŋ/ 'small boy,' /t jàrkmine/ 'following,' /t suùrte/ 'into the large one,' /t klàaʃit/ '(drinking) glasses,' /t prillit/ '(eye) glasses'; 3 phonemes: /t akt/ 'act,' /t aèk/ 'time,' /t nàt/ 'they,' /t tri+uùmf/ 'triumph,' /t tðð/ 'work,' /t ohtliikk/ 'dangerous,' /t ðutte/ 'of the new ones,' /t kèʃʃit/ 'chains,' /t krʃkin/ 'squeak,' /t sððma/ 'to eat'; 2 phonemes: /t tà/ 'he,' /t ðð/ 'night,' /t tèma/ 'he,' /t eèsel/ 'ass'; 1 phoneme: /t a+vaùss/ 'advance (payment),' /t èma/ 'mother.'

The segmental phonemes attested for the onset, nucleus, and coda of syllables not immediately after /t/ are as follows:

- C₋₁ = all consonants except /ŋ/ when not preceded by C₋₂; after C₋₂, C₋₁ = /m n l ʎ r j/

C ₋₂	/p t t̥ k/
V ₁	/i e ā a o u/ when not followed by V ₂ ; before V ₂ , V ₁ is /e a u/
V ₂	/i/
C _n	all consonants except /h j f š/
-C ₁	/p t k s š/
-C ₂	/t/ after /t/ as -C ₁ and a nucleus of V ₁ plus /n l r/.

All syllable types provided for by the above formulation up to a length of five segmental phonemes are attested, with the exception of the type C₂V₁V₂. Syllables not in vocable final position are restricted to four or less phonemes. Examples: 5 phonemes: /+kùllaltt/ 'enough,' /+àmettņikk/ 'clerk,' /+akknait/ 'some windows'; 4 phonemes: /+pārast/ 'after,' /+kūšittles/ 'he inquired,' /+àkašja/ 'acacia,' /+hālkeisse/ 'into the sick ones,' /+àmettņikkut/ 'clerks'; 3 phonemes: /+kūņņkas/ 'king,' /+hālkeile/ 'to the sick ... -s,' /+elektri/ 'of the electricity,' /+tmèkšikklane/ 'Mexican'; 2 phonemes: /+tēma/ 'he,' /+lūkema/ 'to read.'

5.4. The vocable consists of /+/ followed by a sequence of one to five syllables, extending up to a subsequent /+/ or terminal contour. The first syllable of a vocable may optionally contain a stress phoneme (St). Thus, vocable = +S₁(St)(S₂-5).

When sequences of suffixes following a stem produce a "word" of more than five syllables, the resultant "word" is composed of two or more vocables.

Notes

1. Contoid phones which extend across phonetic syllable boundaries are segmented as two phones. In phonetic transcriptions syllable boundaries, where relevant, are indicated by a period.
2. Ilse Lehiste, "Segmental and Syllabic Quantity in Estonian," *Uralic and Altaic Series*, I (Bloomington, 1960), p. 51.
3. Albert Saareste, "N. n. hilisdiftongitest," *EK VIII* (1929), p. 5.
4. This presentation is based upon the discussion of such phenomena by W. F. Twaddell in his "Stetson's Model and the

Supra-segmental Phonemes," Language, XXIX (1953), pp. 415-53. Several changes have been made, however. The linear model set up by Twaddell for the description of American English transition phenomena (§37.460) does not allow as accurate a picture as might be desired in the case of Estonian. Without adopting a rather cumbersome set of symbols, it is difficult to give a clear linear representation of such pertinent information as duration (common to both sub- and supra-laryngeal activity) and different degrees of overlapping of sub-laryngeal and supra-laryngeal activity. I feel that a multi-dimensional representation of the data is more appropriate here. A further change is necessitated by the fact that the sub-laryngeal syllable-initiating and closing activity can no longer be considered to be a direct, simple function of the intercostal muscles (as assumed by Stetson) and reference to such specific articulatory organs is, therefore, best avoided in a rough sketch such as this.

5. Lehiste, pp. 51-52.
6. For a critical survey of the scholarly literature on the problem of quantity in Estonian see Appendix I below.
7. A fourth, terminal rising, contour has been noted by Lehiste "in one special type of question requesting confirmation" (Lehiste, p. 81). The same phenomenon is indicated by Felix J. Oinas in his "Spoken Estonian" (Bloomington, Indiana 1961), p. 1.14 (Mimeographed). Repeated attempts to elicit this type of contour from my own informants did not prove successful.
8. Voiced lenis is used here to indicate that the phones in question are voiced over the greatest part of their length, devoicing, if any, occurring only for an extremely short time.
9. [h] and [ʰ] are used as cover symbols. When followed by a consonant, /+ / or terminal contour they have the same oral resonance quality as the preceding vowel; otherwise they have the same oral quality as the following vowel.
10. The environments indicated in the description of allophones vary in scope. Those environments which indicate more of the phonemic surroundings take precedence over those which indicate less; e.g., VV_# takes precedence over V_#, R_R and -R_# over R_.

The following symbols are used in indicating allophones and environments:

C	consonant	C	post-alveolar consonant
V	vowel (VV = vowel cluster)	N	nasal
#	open transition or a terminal contour	V ¹	= any vowel other than /i ū/
		ˑ	postposed stress

C	stop or fricative	-R (-V)	R (V) not in vocable-
R	consonant other than stop or fricative	&	initial syllable free variation

11. Cf. F. J. Wiedmann, Grammatik der estnischen Sprache (St. Petersburg 1875), p. 121; Lauri Kettunen, Lautgeschichtliche Untersuchung über den kodaferischen Dialekt (MSFOu XXXIII; 1913), pp. 8-10; and G. Laugaste, "Konsonantide palatalisatsioon eesti keeles," Tartu Riikliku Ülikooli toimetised, No. 43 (Tallinn 1956), pp. 74-88. Laugaste's article contains an excellent survey of the various methods of marking palatalization in Estonian by earlier scholars.

12. Lehiste, p. 37.

13. Laugaste, p. 74.

14. It should be remembered that minor syllable boundaries are not taken into consideration in the treatment of vowel allophones presented here. Cf. 3.11.2 above.

15. These figures do not apply to standard Estonian as spoken in the Tallinn area (as described by Lehiste, pp. 25, 35), for which only 22 clusters occur, clusters with /o/ as V₂ not occurring. Also, for that dialect area /õ/ apparently do not occur beyond the first syllable under any circumstances.

16. The following systematizations of the Estonian vowels may be considered. Table A is based upon the relative degree of clusterability. Each vowel of column I participates in more clusters than any vowel in column II, each vowel of column II in more clusters than any vowel in column III. Table B is determined by the freedom of occurrence within the vocable. The

A			B		C		D		
I	II	III	I	II	I	II	I	II	III
i	u	ü	i	u ü	i	u ü	i	u	ü ä õ
e	o	-	e	o õ	e	o õ	e	o	õ a
a	õ	ä	ä	a õ	a	ä õ			

vowels of group I occur beyond the first syllable, whereas those of II do not. Table C relies upon freedom of occurrence within mixed-vowel clusters. Group I is found as both V₁ and V₂; group II as V₁ only. Table D is based upon morphophonemic criteria, the vowels of each column in group I being in regular morphophonemic alternation.

CHAPTER II. MORPHOPHONEMICS

6. The description of the processes of suffixation in Estonian necessitates a rather lengthy and often complex system of morphophonemic transformations. With most base morphemes no single stem composed entirely of segmental phonemes would be adequate for the description of all the various shapes which each base morpheme assumes. I consider the most efficient solution to this problem to be the establishment of morphophonemic stem forms which are altered in accordance with certain processes and rules for combination. Suffixes, in turn, may consist of elements which call forth these processes, segmental morphophonemes, combinations of the two, or "zero." In terms of the system of morphophonemically established stems and suffixes, "zero" suffixes have a definite selector function and are in contrast with the morphophonemic processes which affect the stem. In certain instances, "zero" suffixes also account for changes in the stem to which they are affixed; e.g., põlWE- \emptyset > põlve (see the rules for syncope below).

The transcriptions used below in the description of both the morphophonemic and morphemic systems are, for the most part, morphophonemic. I establish three major types of morphophonemes. The first type indicates processes which may act upon the stem and alter its shape; e.g., -X (apocope), -L (gradation), and -G (gemination). The second type consists of capital-letter morphophonemes and (+) which are transformed into lower-case morphophonemes or are lost, depending upon their morphophonemic environment; e.g., T becomes one of /t s ʃ n r l/ or is lost depending upon its environment. The third type consists of lower-case morphophonemes (including +), which have as their values the phonemes indicated by the correspondingly same symbols. In addition to the major types stands the morphophoneme ' (raised _), which indicates the morphophonemic position of stress.

Sequences of the lower-case morphophonemes which are established after (a) all processes have been applied, (b) all

capital-letter morphophonemes have been transformed or lost, and (c) the rules for morphophonemic combinations have been applied, shall be called terminal morphophonemic sequences. Terminal morphophonemic sequences, which are equal to phonemic sequences, may be transformed directly into phone sequences.

The following definitions and symbols are pertinent to the description of the morphophonemic system:

Word is used to designate a minimal free form.

Morphophonemic vocable indicates a sequence of morphophonemes bounded by a preceding morphophonemic juncture and a following juncture or terminal contour. (All non-hyphenated forms may be assumed to be morphophonemic vocables.)

Terms such as "vowel," "consonant," "juncture," "stress," "syllabic nucleus," "obstruent," "stop," "resonant," "nasal," "dental," etc., which were used in the phonemic description above shall be used here with reference to the corresponding capital and lower-case morphophonemes. In this respect, capital-letter morphophonemes are defined as belonging to the same sound classes as the corresponding lower-case symbols; e.g., $\sqrt{N}/$, which becomes one of $\sqrt{n s \vartheta}$ is classified as a resonant, nasal, and/or dental—but not as an obstruent, fricative, or post-alveolar—morphophoneme.

The following general symbols are used:

V	vowel
C	consonant
Ç	obstruent
C ^f	cluster-final consonant
R	resonant
N	nasal (only in general formulae)

6.1. The following morphophonemic features are significant morphologically; i.e., in the inflection and derivation of stems.

Morphophonemic stems are simple or complex. A complex stem contains one or more medial junctures of internal open transition, which divide it into two or more morphophonemic vocables. All other stems, including those with the morphophoneme $\sqrt{(+)}//$, are simple.

Complex stems are classified as vocable compounds or word compounds. A vocable compound consists of two vocables, of which neither is found to occur independently of the other, and

only one of which contains a morphophonemic stress; e.g., au+kušti- 'August,' tēle+foqi- 'telephone,' e+roḅpaH- 'Europe,' kul+tuūrīne- 'cultural,' plat+vorml- 'platform,' infor+meēri- 'to inform,' mušittseēri- 'to make music.' A word compound consists of two or more vocables, each of which is clearly assignable to an independent base morpheme; e.g., ette+maksU- 'advance payment,' pere+koḅTA- 'family,' kūlas+kāikkU- 'visit,' vēe+alune- 'underwater,' raūt+teē- 'railroad.'

The addition of suffixes to complex stems and the morphophonemic changes which result from suffixation affect only the stem-final vocable. Consequently, in establishing stem classes below the stem-final vocable alone is used as the basis for assignment; e.g., the complex verb stem mušittseēri- is assigned to the appropriate subclass of two-syllable verbs.

In those instances which call for the application of more than one of the morphophonemic rules given below, the rules are to be applied (a) in the order in which they occur in the suffix in question (reading from left or right), or, in all other instances, (b) in the order in which they are presented below.

6.11. Morphophonemic Processes

(1) Apocope. — Apocope is indicated by postposed -X. √X/ causes an immediately preceding stem-final capital-letter morphophoneme to be lost, with the exception of stems of the shape (C)VCV-. √X/ may be applied only once. Examples:

aēKA-X > aēk 'time'
 līnA-X > līn > līn 'city'
 oūWE-X > oūW > oū 'courtyard'
 kaḅJA-X > kaḅJ > kari 'cattle'
 rohITU-X > rohIT > rohi 'grass'
 ōluH-X > ōlu 'beer'
 kaḅTE > kaḅs 'two'
 kaḅsII-X > kaḅsII > kaḅsel 'pulpit'
 rēstoranI-X > rēstoran 'restaurant'
 oḅtīkkU-X > oḅtīkk 'dangerous'
 aḅTA-Xta- > aḅtta- 'give (impersonal)'
 teāTA-Xta- > teātta- 'know'
 lāḅTE-Xs- > lāḅs-s- > lāḅs- 'went'
 aḅTA-Xḅi- > aḅt-ḅi > aḅḅi- 'gave'
 sōḅPrA-LX > sōḅrA-X > sōḅr > sōper. 'friend'
 kīrja(+ḅ)ikkU-LX > kīrjaikkU-X > kīrjaikk 'writer'
 sūi-X > sūji 'lap'

tema-X > tema 'he'
 ma-X > ma 'I'
 maä-X > maä 'earth'
 häämmas-X > häämmas 'tooth'
 aja-Xši- > ajaši- 'drove'

(2) Gemination. — See the illative-singular allomorph -G below.

(3) Syncope. — Forms which contain two capital-vowel morphemes lose the first of these unless the second capital vowel is lost by means of apocope, e.g.,

kiñtELA-ϕ > kiñtIA > kiñtla 'of a firm ...'
 täñtIsA-ϕ > täñtsA > täñtsa 'of an important'
 aņkkUrU-ϕ > aņkkUr > aņkkru 'of the anchor'
 elektErI-ϕ > elektrI > elektrI 'of electricity'
 lühikkEsE-ϕ > lühikkEsE > lühikkse > lühikse 'of a short ...'
 kuulUsAH-t > kuulsAtt > kuulsatt 'famous (part. -sg.)'
 lühikkEsE-t > lühikkset > lühikset 'short ... -s'
 naapErIH-te > naaprItte > naapritte 'of the neighbors'
 iņkEIi-it > iņkleit 'some angels'
 kōomEnE-it > kōomneit 'some caraway seeds'
 suūrE-tE > suūrEtE > suūrte > suūrte 'into a large ...'
 laulIA-kEm > laulAkEm > laulkEm > laulkem 'let's sing'
 maķsA-kU > maķsAkU > maķskU > maķsku 'may he pay.'

(Compare the following nominative-singular formations in which the second capital vowel is lost: kiñtELA-X > kiñtEl > kiñtel, täñtIsA-X > täñts > täñtis, aņkkUrU-X > aņkkUr > aņkkur, kōomEnE-X > kōomEn > kōomen.)

Syncope of the first capital vowel morphophoneme causes three-syllable forms with plain stress to shift their stress to the postposed position; e.g.,

pōLIWE -ϕ > pōlve 'part of a state of life'
 pōLIWE-L > pōlWe-L >> pōlve 'of the state of life'
 rohITU-L > rohTu-L > rohu 'of the grass'
 veri-tE > verĳtE > verĳte 'into the blood.'

(4) Palatalization. — Palatalization of the dental consonants $\sqrt{t s n l}$ to the corresponding post-alveolar consonants $\sqrt{t \# \eta \#}$ takes place when such dentals come to occur before:

(a) the vowel \sqrt{i} (as a result of $L, \mathbf{l} > i$ or vowel plus $-I > i$)

- (b) $k > \phi$ (caused by -X or due to vowel syncope)
 (c) $j/$ or other post-alveolar consonant as a result of suffixation.
 This palatalization of dentals is found with:

(1) single dental consonants; e.g.,

mōni-X > mōpi 'some'
 tule-I > tuli- 'came'
 laūIA-Is- > laūjis- 'sang'
 kanali- ϕ > kanali 'of the canal'
 kūsimusE-I > kūsimusi 'some questions'
 mañttEli- ϕ > mañttEli > mañttli 'of the coat'
 hoōli-X > hoōli 'care (nom. -sg.)'
 jāKE-L > jālje 'of the track'
 teāTA-Xja > teātja 'one who knows'
 leiTA-Xsi- > leiṯsi- 'found'

(2) clusters of two consonants after a short vowel; e.g.,

oṯsA-I > oṯsi 'some ends'
 pañTA-I > pañti 'one put'
 vōṯTA-Is- > vōṯtis- 'took'
 kōnelTa-I > kōnelti 'one talked'
 rāākitta-I > rāākiṯti 'one spoke'
 leñTE-I > leñti 'some leaves'
 kašKI-I > kaški 'some birch trees'
 kašKI-X > kašk 'a birch'
 taṯvi-X > taṯv 'winter'
 ma+kiṯṯri- ϕ > ma+kiṯṯri 'of the master (holder of M.A. degree)'
 tañTA-Xja > tañtja 'one who wants'
 añTA-Xsi- > añṯsi- 'gave.'

(3) other clusters in which dentals are not separated from the above conditions of palatalization (a, b, and c) by an intervening non-dental consonant; e.g.,

aṯsti- ϕ > aṯṯi 'doctor (part. -sg.)'
 tsuñṯti- ϕ > tsuñṯti 'part of the trade guild'
 suñsKA-I > suñski 'some skis'
 peṯṯa-I > peṯṯi 'one held'
 añṯta-I > añṯti 'one gave'
 kañṯEli- ϕ > kañṯEli > kañṯeli 'of the pulpit'
 keṯṯTa-Xsi- > keṯṯsi > keṯṯsi- 'cooked'

With stems containing two capital-vowel morphophonemes (i.e., syncopating stems) palatalization as a result of stem-final I > i is restricted to consonant(s) immediately before I; e.g., mañttEli- ϕ > mañttEli > mañttli. If the stem-medial capital vowel is itself capable of causing palatalization, then it will also do so; e.g., kañtsEli- ϕ > kañtsEli > kañtsli (I > i by virtue of [a] and [l] above and nts > nts by virtue of [b] and [3]).

(5) Gradation. — Gradation is indicated by postposed -L, which causes the following morphophonemic changes:

(a) upon the following capital-letter obstruents of the syllable to which it is added:

P > v after a syllabic nucleus of VV or /l r/ in the syllabic nucleus; e.g., tiⁱPA-L > tiiva 'of the wing,' ku^fPA-L > kúrva 'of the terrible ...,' ha^lPA-L > há^lva 'of a bad ...'

m after /m/ in the syllabic nucleus; e.g., ku^mPA-L > kúmma 'of which of two'

ϕ elsewhere; e.g., tu^aPA-L > to^a 'of the room,' piⁱPU-L > piⁱpu 'of the pipe,' ka^rPI-L > ká^rpi 'of the shell,' kiⁱPI-L > kíⁱpi 'of the shield,' ki^mPU-L > kí^mpu 'of a bunch,' so^pPrA-L > só^pra 'of the friend'

T > r following /r/ in the syllabic nucleus; e.g., ko^fTA-L > kórra 'of a time,' mu^fTA-L > múrra- 'breaks'

l following /l/ in the syllabic nucleus; e.g., ku^lTA-L > kúlla 'of gold'

n following /n/ in the syllabic nucleus; e.g., liⁿTU-L > líⁿnu 'of the bird,' kaⁿTA-L > kánna- 'carries'

ϕ elsewhere; e.g., ma^aTu-L > ma^ao 'of the snake,' ve^aTA-L > ve^a- 'pulls,' noⁱTA-L > nōija 'of the witch,' te^aTA-L > te^a- 'knows,' hū^uTA-L > hū^uja- 'shouts,' la^uTA-L > lá^uva 'of the table,' la^uTA-L > lá^uta 'of the stable,' sa^aTA-L > sá^ata- 'sends,' ko^hTA-L > koha 'of the place,' ta^hTA-L > taha- 'wants,' ke^elTU-L > ké^elu 'of the ban,' su^unTA-L > sú^una 'of the direction,' a^tTrA-L > á^tra 'of the plow,' ka^artTI-L > ká^arti 'of the card,' ū^hTE-L > ū^he 'of one,' lá^hTE-L > lá^he- 'goes'

- T^j > j saT^ju-L > saju 'of precipitation,' sōT^ja-L > sōja 'of war,' saT^ja-L > saja- 'rains,' aēT^jA-L > āija 'of the garden'
- T[;] > l following /l/ in the syllabic nucleus; e.g., mo[;]l[;]T[;]I-L > mō[;]lli 'of the trough'
- ŋ following /ŋ/ in the syllabic nucleus; e.g., kō[;]ŋ[;]T[;]I-L > kō[;]ŋŋi 'of a walk,' sū[;]ŋ[;]T[;]I-L > sū[;]ŋŋi- 'is born'
- ∅ elsewhere; e.g., pa[;]ā[;]T[;]I-L > pā[;]ā[;]ti 'of the boat,' pru[;]ū[;]T[;]I-L > prū[;]ū[;]ti 'of the bride,' to[;]h[;]T[;]I-L > tohi- 'ventures,' pi[;]l[;]T[;]I-L > pi[;]l[;]ti 'of the picture,' hu[;]ŋ[;]T[;]I-L > hū[;]ŋ[;]ti 'of the wolf'
- K > j after /r l l/ with /ä ü e/ in the first syllable; e.g., hā[;]r[;]KA-L > hārja 'of the bull,' se[;]l[;]KA-L > sé[;]l[;]ja 'of the back,' kū[;]l[;]KE-L > kū[;]l[;]je 'of the side,' jā[;]l[;]KI-L > jā[;]l[;]je 'of a track'
- ∅ elsewhere; e.g., jō[;]KI-L > jō[;]ē 'of the river,' lu[;]Ke-L > lo[;]ē- 'reads,' aē[;]KA-L > aja 'of time,' lo[;]ōKA-L > lo[;]ā 'of the tether,' ri[;]l[;]kKI-L > ri[;]l[;]ki 'of the kingdom,' rā[;]ā[;]kKI-L > rā[;]ā[;]ki- 'speaks,' a[;]f[;]KA-L > ara 'of a cowardly ...,' jā[;]l[;]KA-L > jala 'of the foot,' lō[;]h[;]Ku-L > lōhu- 'breaks,' su[;]ū[;]sKA-L > sū[;]usa 'of a ski,' u[;]s[;]Ku-L > usu- 'believes,' mū[;]f[;]kKI-L > mūr[;]ki 'of poison,' he[;]l[;]kKI-L > hē[;]l[;]ki 'of a bright light,' hul[;]kKA-L > hū[;]lka 'of a bunch,' ki[;]ŋ[;]kKA-L > ki[;]ŋ[;]ka 'of the mountain'
- F > ∅ Examples: la[;]f[;]FI-L > lār[;]fi 'of a mug (face),' vur[;]f[;]FI-L > vūr[;]fi 'of a state of dress'
- S > ∅ Examples: va[;]f[;]sSA-Lt > vār[;]sat 'foals,' kā[;]f[;]sSA-L > kā[;]rsa 'of the snout'
- š > ∅ Examples: poi[;]š[;]SI-L > pō[;]i[;]ši 'of the boy,' pu[;]š[;]SI-L > pū[;]i[;]ši 'of the pulse'
- š̃ > ∅ Example: pu[;]š̃[;]SI-L > pū[;]p̃[;]ši 'of the punch.'
- (b) upon the morphophonemic juncture /(+)/ and the occurrence of stress:
- (i) where the loss of a consonant reduces a two-syllable stem to one syllable containing a vowel cluster, that

- vowel cluster takes postposed stress; e.g., ʃiTu-Lta- > seõtta- 'tie,' maTu-L > maõ 'of the snake.'
- (ii) one-syllable stems and all other two-syllable stems with postposed stress shift their stress to the plain position; e.g., kaʃʃi-Lt > kãʃʃit 'boxes,' tõõsE-L- > tõuse- 'gets up,' nai-Lku > nãiku 'may he marry,' miñ-Lku > miñku 'may he go.'
- (iii) stems of four or more syllables containing the stem-medial morphophonemic juncture $\sqrt{+}/$ before the penultimate syllable lose both the juncture and the stress; e.g., kirja(+)ñikkU-L > kirjañikku 'of the writer.'

With three-syllable stems containing two capital-vowels, the changes necessitated by -L are applied only following the syncopation of such stems to two syllables, and the resultant two-syllable forms are treated as two-syllable stems; e.g., põlIWE-L > põlIWe-L > põlve 'of the state of life,' rohITU-L > rohTu-L > rohu 'of the grass.'

6.12. Segmental Morphophonemes

6.12.1. Morphophonemic consonant changes

(1) The capital consonant morphophonemes have the following segmental values not covered under the above morphophonemic processes.

P > **p** Examples: tiiPA-X > tiip 'wing,' $\text{haIPA-}\phi$ > halpa 'some bad ...'

T > ϕ in or beyond the second syllable and before a juncture or terminal contour; e.g., rohITU-X > rohIT > rohi 'grass,' heleTA-X > heleT > hele 'bright'

s before the loss of stem-final E when preceded by \sqrt{H} r/ or a vowel cluster; e.g., uUTE-X > uõs 'new,' kõfTE-X > kõfs 'stubble,' kañTE-X > kaks 'two,' lãñTE-Xs- > lãks-s- > lãks- 'went'

ʃ before \sqrt{I} E/ plus -I > i or I-X > i; e.g., uUTE-I > uõsi 'some new ...-s,' kãTI-I > kãsi 'some hands,' kãTI-X > kãsi 'hand'

t elsewhere; e.g., koñTA-X > koft 'time,' $\text{kulTA-}\phi$ > kulõta 'some gold,' teãTA-Xma > teãtma 'to know,' $\text{uUTE-}\phi$ > uõte 'into a new ...,' loiTU-X > loit 'tax' leñTE-X > leñt 'leaf,' tuñTE-Xta- > tuñtta- 'feel'

- T** > **t** Examples: saT^ju-X > satu 'fairy-tale,' saT^ja-s- > satas- 'rained,' a^hT^jA-X > a^ht 'garden'
- T** > **ʃ** Examples: kō^hTI-X > kō^ht 'a walk,' pa^hʃTI-φ > pa^hʃti 'part of a boat,' sū^hTI-s- > sū^hʃis- 'was born'
- K** > **k** Examples: jōKI-X > jōki 'river,' a^hKA-φ > a^hka 'some time,' u^hKu-ke > u^hkuke 'believe!'
- F** > **f** Example: la^hfFI-X > la^hff 'mug (face)'
- S** > **s** Example: vā^hkkeS-t > vā^hkkest 'small (part. -sg.)'
- ʃ** > **ʃ** Example: poi^hʃSI-X > poi^hʃʃ 'boy'
- š** > **š** Example: pu^hšSI-φ > pu^hšši 'some punch'
- H** > **t** before /t T/ beyond the first syllable; e.g., pereH-t > perett 'part of the family,' rāamattuH-t > rāamattutt 'part of the book,' vanemaH-te > vanematte 'of the parents,' hāavaH-Ta- > hāavatTa- 'wound'
- k** before /k/ or before T > s; e.g., pē^hjaH-ku > pē^hjakku 'may he fear,' kū^hlaH-ke > kū^hlakke 'listen!,' ū^hTE-X > ū^hs 'one,' lā^hTE-X_ʃi > lā^hks-_ʃi > lā^hʃi- 'went'
- h** elsewhere; e.g., ū^hTE-L > ū^he 'of one,' ka^hTE-φ > ka^hte 'part of two,' lā^hTE-Lk_ʃi- > lā^hheks_ʃi- 'would go'
- N** > **s** before loss of stem-final E; e.g., lā^hNE-X > lā^hās 'west'
- ʃ** before loss of stem-final I and before /I E/ plus -I > i; e.g., kū^hNI-X > kū^hʃ 'fingernail,' ka^hNI-I > ka^hʃi 'some lids'
- n** elsewhere; e.g., lā^hNE-L > lā^hāne 'of the west,' ka^hNI-L > ka^hane 'of the lid,' lā^hN-tt >> lā^hāntt 'part of the west'
- M** > **m** Examples: sūtaMe-φ > sūtame 'of the heart,' sūtaMeH-te > sūtamette 'of the hearts,' sūtaM-tt > sūtam-tt > sūtāntt 'part of the heart'
- W** > **v** before a vowel; e.g., ke^hWA-φ > ke^hva 'some barley,' ō^hWE-L > ō^huve 'of the courtyard,' pō^hLIWE-φ > pō^hlve 'part of the state of life'
- f** after an obstruent and before a juncture or terminal contour; e.g., ke^hWA-X > ke^hW > ke^hf 'barley'

∅ elsewhere before a juncture or terminal contour;
e.g., $\delta^i\text{WE-X} > \delta^i\text{W} > \delta^i$ 'courtyard,' $p\delta^i\text{IWE-X} > p\delta^i\text{I}$ 'state of life'

J > j (a) before a vowel; e.g., $a^{\#}\text{JA-L} > \dot{a}^{\#}\text{ja}$ 'of the affair,' $a^{\#}\text{JA-}\phi > a^{\#}\text{ja}$ 'some business,' $lo^{\#}\text{TJA-}\phi > lo^{\#}\text{tja}$ 'part of the barge,' $so^{\#}\text{JA-}\phi > so^{\#}\text{ja}$ 'some warm ...'; (b) with postposed stress before J plus vowel; e.g., $la^{\#}\text{JA-}\phi > la^{\#}\text{ja}$ 'some wide ...,' $nu^{\#}\text{JA-E} > nu^{\#}\text{je}$ 'some clubs (trenchcoats)'

i elsewhere; e.g., $a^{\#}\text{JA-X} > a^{\#}\text{J} > a^{\#}\text{i}$ 'affair,' $lo^{\#}\text{TJA-LX} > lo^{\#}\text{TJA-X} > lo^{\#}\text{TJ} > lo^{\#}\text{i}$ 'barge,' $la^{\#}\text{JA-X} > la^{\#}\text{JJ} > la^{\#}\text{i} > la^{\#}\text{i}$ 'wide,' $la^{\#}\text{JA-L} > la^{\#}\text{JJa} > la^{\#}\text{ija}$ 'of a wide ...'

(2) Consonant clusters which arise as a result of suffixation undergo the following changes:

(a) $R^1R^1\# > R\#$. Geminate resonant clusters and \sqrt{hh} (as a result of apocope) before a terminal contour are reduced to a single consonant; e.g., $li^{\#}\text{nnA-X} > li^{\#}\text{nn}$ > $li^{\#}\text{n}$ 'city,' $li^{\#}\text{IE-X} > li^{\#}\text{I}$ > $li^{\#}\text{I}$ 'flower,' $ta^{\#}\text{hmE-X} > ta^{\#}\text{hm}$ > $ta^{\#}\text{m}$ 'oak,' $na^{\#}\text{rI-X} > na^{\#}\text{r}$ 'fool,' $ha^{\#}\text{I-X} > ha^{\#}\text{I}$ 'gray.' Note also the rules for liaison in §6.23 below.

(b) $\text{CR}\# > \text{CeR}\#$. Clusters of stop plus resonant before juncture (as a result of apocope) insert the vowel \sqrt{e} between the two consonants; e.g., $s\delta^{\#}\text{PrA-LX} > s\delta^{\#}\text{pr} > s\delta^{\#}\text{per}$ 'friend,' $a^{\#}\text{TrA-LX} > \dot{a}^{\#}\text{tr} > a^{\#}\text{ter}$ 'plow.'

(c) $\text{C}^1\text{C}^1\text{C}^2$ and $\text{C}^1\text{C}^2\text{C}^2 > \text{C}^1\text{C}^2$. Clusters consisting of a geminate obstruent and an unlike obstruent become clusters of two unlike obstruents by reducing the geminate to a single consonant; e.g., $la^{\#}\text{HTE-Xs-} > la^{\#}\text{ks-s-} > la^{\#}\text{ks-}$ 'went,' $lu^{\#}\text{hikkEsE-}\phi > lu^{\#}\text{hikkse} > lu^{\#}\text{hikse}$ 'of a short ...,' $ta^{\#}\text{pPA-X}\dot{s}\text{i-} > ta^{\#}\text{p}\dot{s}\text{i} > ta^{\#}\dot{s}\text{i-}$ 'killed,' $la^{\#}\text{KE-Xke} > la^{\#}\text{kke} > la^{\#}\text{ke}$ 'let!,' $e^{\#}\text{kk-ki} > e^{\#}\text{kkI}$ 'perhaps,' $v\delta^{\#}\text{tA-Xku} > v\delta^{\#}\text{tku} > v\delta^{\#}\text{ku}$ 'may he take.'

(d) $\text{C}^1\text{C}^1\text{C}^1 > \text{C}^1\text{C}^1$. Clusters of three like obstruents are reduced to geminate clusters; e.g., $\text{tuhatt-t} > \text{tuhatt}$ 'one thousand (part. -sg).'

(e) $s-\dot{s} > \dot{s}$. The postposing of \sqrt{s} to \sqrt{s} results in the loss of \sqrt{s} ; e.g., $la^{\#}\text{HTE-X}\dot{s}\text{i-} > la^{\#}\text{ks-}\dot{s}\text{i} > la^{\#}\text{k}\dot{s}\text{i-}$ 'went,' $seisA-X\dot{s}\text{i-} > seis-\dot{s}\text{i-} > seis\dot{s}\text{i-}$ 'stood,' $t\delta^{\#}\text{usE-X}\dot{s}\text{i-} > t\delta^{\#}\text{us-}\dot{s}\text{i} > t\delta^{\#}\text{us}\dot{s}\text{i-}$ 'arose.'

(f) $N^1-C^2 > N^2C^2$. Nasals are homorganically assimilated to following stops; e.g., $l\acute{u}m-t > lu\acute{t}$ 'some snow,' $n\acute{e}m-te > n\acute{e}nte$ 'of them,' $s\acute{u}taM-tt > s\acute{u}ttantt$ 'part of the heart,' $pa\acute{n}-Lke > pa\acute{n}ke$ 'put!.'

(3) $^*C\acute{N} > ^*N$. In morphophonemic second-syllable onsets of stop plus nasal immediately following a syllable with postposed stress, the stop is lost in the event that the stress is lost (as a result of the syntactical position of the stem in question); e.g., $v\acute{o}tmut > v\acute{o}tm\acute{u}t$ 'taken,' $m\acute{i}ttme > m\acute{i}tme$ 'some,' $ak\acute{k}na > akna$ 'of the window,' $ta\acute{p}pma > ta\acute{p}ma$ 'to kill.'

6.12.2. The morphophonemic vowel changes not covered by the above processes of apocope and syncope are the following:

- (1) Postposition of -i produces the following clusters:
- (a) $V^1\acute{V}^1-i > V^1\acute{i}$. Geminate vowel clusters plus -i are reduced to a single vowel (of the same quality) plus $\acute{i}/$, and the postposed stress is retained; e.g., $ma\acute{a}-i > ma\acute{i}$ 'countries,' $pu\acute{u}-it > pu\acute{i}t$ 'some trees,' $h\acute{a}\acute{a}-it > h\acute{a}\acute{i}t$ 'some good ...-s,' $ne\acute{e}-it > ne\acute{i}t$ 'some of those.'
- (b) $I-i > ei$; e.g., $i\acute{n}kELI-it > i\acute{n}kleit$ 'some angels,' $ihnurI-it > ihnureit$ 'some misers.'
- (c) $V-i > Vi$. All other single vowels plus -i add $\acute{i}/$ to form a vowel cluster; e.g., $mi\acute{n}ija-it > mi\acute{n}ijait$ 'some daughters-in-law,' $t\acute{a}navA-it > t\acute{a}navait$ 'some streets,' $r\acute{a}amattU-it > r\acute{a}amattuit$ 'some books,' $v\acute{a}stuse-it > v\acute{a}stuseit$ 'some answers.'
- (2) Postposition of $\acute{I} U E/$ causes the stem-final vowel to be replaced by $\acute{i}/ u e/$ respectively; e.g., $sa\acute{a}-I > sa\acute{i}$ 'became,' $s\acute{o}\acute{O}-I > s\acute{o}\acute{i}$ 'ate,' $teKe-I > teki$ 'did,' $jo\acute{o}Ta-I > jo\acute{o}ti$ 'one drank,' $a\acute{n}tta-I > a\acute{n}tti$ 'one gave,' $v\acute{o}ttA-Is- > v\acute{o}t\acute{t}is-$ 'took,' $ka\acute{i}tsE-Is- > ka\acute{i}\acute{t}is-$ 'defended,' $oma-I > omi$ 'some of one's own ...-s,' $ki\acute{n}kA-I > ki\acute{n}ki$ 'some shoes,' $j\acute{a}r\acute{v}E-I > j\acute{a}r\acute{v}i$ 'some lakes,' $ka\acute{s}KI-I > ka\acute{s}ki$ 'some birch trees,' $ka\acute{a}NI-I > ka\acute{a}si$ 'some lids,' $te\acute{f}visE-I > te\acute{f}vi\acute{s}i$ 'some greetings,' $l\acute{u}hikkEsE-I > l\acute{u}hik\acute{s}i$ 'some short ...-s'; $vapa-U > vapu$ 'some free ...-s,' $kala-U > kalu$ 'some fish,' $la\acute{J}JA-U > la\acute{J}ju$ 'some wide ...-s,' $ja\acute{i}KA-LU- > jalu$ 'feet,' $ma\acute{r}JA-LU- > ma\acute{r}ju$ 'berries'; $kivi-E > kive$ 'some stones,' $u\acute{s}\acute{s}I-E > u\acute{s}\acute{s}e$ 'some worms,' $ri\acute{i}TU-E > ri\acute{i}tte$ 'some quarrels,' $tupa-E > tupe$ 'some rooms,' $nu\acute{J}JA-E > nu\acute{J}je$ 'some clubs,' $tappA-ELtta- > ta\acute{p}petta-$ 'kill,' $v\acute{o}Ta-ELtta- > v\acute{o}\acute{e}tta-$ 'take.'

- (3) For the vowel morphophoneme $\sqrt{V}^{\bar{v}}$ / see the illative-singular allomorph $-hV^{\bar{v}}$ below.
- (4) The following contractions and alternations of stem vowels result from the loss of single medial stops (due to gradation) and the loss of final vowels with stems in $VVJ-$, $VVW-$, and $VJJ-$:
- (a) $V^1-V^2 > V^X V^Y$. In vowel clusters formed from two single vowels, original stem /u ü i/ are lowered to /o ö e/ respectively. Other vowels do not undergo any change. Examples: $iTu-L > i\bar{u} > s\bar{o}$ 'of the sprout,' $maTu-L > ma\bar{u} > ma\bar{o}$ 'of the worm,' $riTa-L > ri\bar{a} > re\bar{a}$ 'of the row,' $uPa-L > u\bar{a} > o\bar{a}$ 'of the bean,' $luKu-L > lu\bar{u} > lo\bar{o}$ 'of the story,' $\bar{o}Te-L > \bar{o}\bar{e} > \bar{o}\bar{e}$ 'of sister,' $laKi-L > la\bar{e} > \bar{e}$ 'of the law,' $veTi-L > ve\bar{e}$ 'of the water.'
- (b) $V^1 V^2 V^2 > V^1 V^2$. Examples: $te\bar{a}TA-L > te\bar{a}a- > te\bar{a}$ 'knows,' $si\bar{u}KU-L > si\bar{u} > si\bar{u}$ 'of the snake,' $t\bar{o}\bar{u}KU-L > t\bar{o}\bar{u} > t\bar{o}\bar{u}$ 'of the race,' $la\bar{j}JA-X > la\bar{i} > la\bar{i}$ 'wide.'
- (c) $V^1 V^1 V^2 > V^1-V^2 > V^X V^Y$. In resultant clusters of two like vowels other than /i ü u/ followed by an unlike vowel, one of the two like vowels is lost. The remaining two vowels are combined under the same terms as for clusters formed from two single vowels (cf. [a] above). Examples: $ho\bar{o}KU-L > ho\bar{o} > ho\bar{o}$ 'of a burst,' $lo\bar{o}KA-L > lo\bar{o}a > lo\bar{o}a > lo\bar{o}$ 'of the tether,' $po\bar{o}Ti-L > po\bar{o}e > po\bar{o}$ 'of the shop,' $ra\bar{a}KU-L > ra\bar{a}u > ra\bar{a}u > ra\bar{o}$ 'of a small branch,' $sa\bar{a}KE-L > sa\bar{a}e > sa\bar{e}$ 'of the saw.'
- (d) In any resultant cluster of three vowels not covered by (b) and (c) above, in which the middle vowel is one of /u ü i e/, the following changes occur:

$VeV > VjV$
 $VuV > VuvV$
 $ViV > VijV$
 $VüV > VüjV$

Examples: $a\bar{e}KA-L > aea > aja$ 'of time,' $po\bar{e}KA-L \gg poja$ 'of the boy,' $la\bar{u}TA-L > l\bar{a}uva$ 'of the table,' $ku\bar{u}TE-L > k\bar{u}uve$ 'of six,' $j\bar{o}\bar{u}TA-L > j\bar{o}uva-$ 'arrives'; $no\bar{i}TA-L > n\bar{o}ija$ 'of the witch,' $ri\bar{i}TU-Lt > ri\bar{i}jut$ 'quarrels,' $ho\bar{i}TA-L > h\bar{o}ija-$ 'takes care'; $h\bar{u}uTA-L > h\bar{u}uja-$ 'shouts,' $p\bar{u}uTA-L > p\bar{u}uja-$ 'attempts to catch.'

- (5) $Vej > Vij$. Example: $a\bar{e}T^jA-L > \bar{a}eja > \bar{a}ija$ 'of the garden.'

- (6) The capital-vowel morphophonemes of stems have the following values not covered by the above processes and rules for vowel changes:

I > i before -X with CVCV- stems; e.g., jōKI-X > jōki 'river,' mōŋi-X > mōŋi 'several,' meri-X > meri 'sea,' kāTI-X > kāsi 'hand';

elsewhere; e.g., lumi-L > lume 'of the snow,' suvi-L > suve 'of summer,' talvi-L > talve 'of the winter,' kašKI-Lt > kaset 'birch trees,' kaŋtsII-X > kaŋtsel 'pulpit.'

I > i Examples: huŋtTI-Lt > huŋtit 'wolves,' kōōkKI-L > kōōki 'of the kitchen,' tāŋtIsA-X > tāŋtis 'important,' elektEri-φ > elektri 'of electricity.'

E > e Examples: eItTE-L > ēite 'of old woman,' lehtTE-Lt > lehet 'leaves (of tree),' līlIE-ŋit > līlēŋit 'some flowers,' ōŋŋE-φ > ōŋŋe 'some happiness,' iŋkEII-X > iŋkel 'angel,' kōōmEnE-φ > kōōmne 'of caraway seed,' jōōksE-L- > jōōkse- 'runs.'

U > u Examples: aŋJU-L > āhju 'of the oven,' aŋkKU-φ > aŋkku 'into the hole,' jōōTU-φ > jōōtu 'some strength,' keIkkU-te > keIkkute 'of sleds,' kōpsU-Lt > kōpsut 'lungs,' kuŋlUsA-X > kuŋlus 'famous,' aŋkkUrU-φ > aŋkkuru 'of the anchor.'

A > a Examples: aēKA-φ > aēka 'some time,' jalKA-Lt > jalat 'legs,' koŋTA-φ > koŋta 'into the place,' kūnAlA-X > kūnāl 'candle,' ākkEnA-φ > ākkna 'of the window,' laŋlA-L- > lāula- 'sings,' keētTA-L- > kēeta- 'cooks.'

- 6.13. $\check{V}^C/V^\# > V^C/V^\#$. A resultant morphophonemic vocable of one long or overlong syllable with plain stress shifts its stress to the postposed position. Examples:

mēes-X > mēes > meēs 'man'
 lās-t > lāst > lašt 'child (part. -sg.)'
 lūm-t > lūnt > luŋt 'some snow'
 nāis-t > nāist > naišt 'wife (part. -sg.)'
 lāāN-tt > lāāntt > lāāntt 'west (part. -g.)'

6.14. I consider the following morphophonemic alternations, for which I am unable to determine any conditioning factors, to be the result of free variation and fast speech.

(1) $h \sim \emptyset$. With all instances of this alternation it is most economical to regard the $\sqrt{h/}$ of a morphophonemically established form as being lost. The alternation of $\sqrt{h/}$ with loss of $\sqrt{h/}$ is found under the following circumstances:

(a) initially; and with such a large number of forms that I would not care to predict the existence of any initial $\sqrt{h/}$ incapable of being lost; e.g., $h\ddot{o}mmikkul \sim \ddot{o}mmikkul$ 'in the morning,' $ho\ddot{o}ppis \sim o\ddot{o}ppis$ 'entirely,' $hakka \sim akka$ 'to begin,' $h\ddot{u}ppa \sim \ddot{u}ppa$ 'to jump,' $hampa \sim ampa$ 'tooth,' $heleTA \sim eleTA$ 'bright,' $ho\ddot{o}li \sim o\ddot{o}li$ 'care,' $hopune \sim opune$ 'horse.'

(b) medially following an unstressed first syllable; e.g., $l\ddot{a}hen \sim l\ddot{a}en$ 'I go,' $kohe \sim koe$ 'directly.'

(c) in phrase-final position with one-syllable forms ending in Vh ; e.g., $kah \sim ka$ 'also,' $nah \sim na$ 'well, so,' $noh \sim no$ 'well, so.'

(2) $\ddot{u}\ddot{u} \sim \ddot{u}i$. All morphophonemic forms which contain the geminate vowel cluster $\sqrt{\ddot{u}\ddot{u}}$ appear to have alternate forms with the cluster $\sqrt{\ddot{u}i/}$; e.g., $n\ddot{u}\ddot{u}t \sim n\ddot{u}it$ 'now,' $p\ddot{u}\ddot{u}TA \sim p\ddot{u}iTA$ 'to try to catch,' $k\ddot{u}\ddot{u}NI \sim k\ddot{u}iNI$ 'claw, fingernail.'

(3) $e \sim \ddot{a}$. An $\sqrt{e/}$ of the second syllable following an $\sqrt{\ddot{a}/}$ of the first syllable and separated from it solely by $\sqrt{h/}$ is in fast-speech variation with $\sqrt{\ddot{a}/}$ by assimilation; e.g., $l\ddot{a}hep \sim l\ddot{a}h\ddot{a}p$ 'he goes,' $v\ddot{a}he \sim v\ddot{a}h\ddot{a}$ 'little, few.'

(4) $C^1C^2C^3 \sim C^1C^3$. The following types of three-consonant clusters have reduced two-consonant clusters as fast-speech variants:

(a) a stop between two fricatives is lost; e.g., $o\ddot{a}t\ddot{s}in \sim o\ddot{a}t\ddot{s}in$ 'I bought,' $t\ddot{o}\ddot{s}t\ddot{s}in \sim t\ddot{o}\ddot{s}in$ 'I lifted,' $la\ddot{s}k\ddot{s}in \sim la\ddot{s}in$ 'I let.'

(b) a stop between a fricative and a nasal is lost; e.g., $o\ddot{a}t\ddot{n}ut \sim o\ddot{a}t\ddot{n}ut$ 'bought,' $ta\ddot{h}t\ddot{n}ut \sim ta\ddot{h}t\ddot{n}ut$ 'wanted,' $la\ddot{s}k\ddot{n}ut \sim la\ddot{s}k\ddot{n}ut$ 'let,' $ta\ddot{h}\ddot{s}i \sim ta\ddot{h}\ddot{s}i$ 'to dance.'

6.2. Those morphophonemic features which are syntactically significant are morphophonemic stress, morphophonemic juncture, and segmental changes of liaison. My knowledge of the behavior of the first two remains sketchy; and I am not able to state the specific conditions upon which the observed changes

depend. Consequently, it is extremely difficult to obtain terminal morphophonemic sequences which include these phenomena.

6.21. Morphophonemic stress, the position of which is marked by ⁺, is realized either as one of the two phonemic degrees of stress or is lost, depending upon the syntactical position of the stem in question; e.g., *ańta* > /+ańta/, /+ańta/, or /+anta/. At present I am not able to predict the conditions which determine the value of ⁺.

With a first-syllable nucleus of VV or VC, it is necessary to indicate the position of stress. With a nucleus consisting of a single vowel, however, stress has only one possible position and will not be indicated.

In stems which contain two stresses with the intervening morphophonemic juncture $\sqrt{+}$ /, the second stress becomes phonemic if the first stress is at least of the same degrees of strength; and $\sqrt{+}$ / > /+/ if the following ⁺ > /⁺/; e.g., the following possibilities are obtainable from the form *kirja* (+)ńikkU- ϕ : /+kırja+ńikkU/, /+kırja+ńikkU/, /+kırja+ńikkU/, or /+kırjańikkU/.

6.22. Internal open transition. — All simple stems are normally preceded by the juncture $\sqrt{+}$ /, internal open transition, which I have not indicated by any special morphophonemes; e.g., *maja* = $\sqrt{+}$ maja/ (or may be stressed). With compound stems the position of a medial juncture is marked by +; and, as with simple stems, initial juncture is left unmarked.

In certain syntactical environments, it would appear, the expected pre-word juncture is lost. The phenomenon is particularly frequent with the third-person present forms of the root {ole-} 'to be'; e.g., *seń* 'it is' (pro *seń*+on), *karttuńiton* 'potatoes are' (pro *karttuńit*+on), *lámmission* 'the lamb is,' *kańion* 'the kvass is.'

Some morphophonemic words of four or more syllables are found to insert an internal open juncture preceding the penultimate or antepenultimate syllable. This process may be repeated several times, thus producing two or more vocables from a single long word. Examples: /+miftmet+tesse/ 'into several' (from *miftmettesse*), /+matalak+kene/ 'somewhat low' (from *matalakkene*), /+ärmatset+miste+kaki/ 'also with love affairs' (from *armatsemistekaki*), /+kåheksańikkU+teleki/ or /+kåheksań+ńikkU+teleki/ 'also to the eighth ones' (from *kaheksańikkuteleki*). It should be noted that only the eight-syllable word, a sole example, inserts the juncture before the antepenultimate syllable; but I hesitate to claim that the number

of syllables is the sole significant factor in this case. This process of inserting junctures appears to belong to the morpho-phonemic system of the language rather than to the morphology of the stems and suffixes with which it is found to take place. I have insufficient evidence, however, to determine whether or not this process is conditioned, in part, by the morphemes involved. The absence of any vocable attested with more than five syllables would seem to indicate that any resultant morphophonemic word which contains more than five syllables will be broken up into two or more vocables.

6.23. The following segmental changes involving liaison are observed with sequences of morphophonemic words which are separated solely by an internal open juncture.

- (1) $(C)CC^f + V > (C)C + C^fV$. When morphophonemic forms which end in a consonant cluster are followed by a stem with an initial vowel, the last consonant of the cluster is transferred to the beginning of the second stem, on the other side of the juncture; e.g., $kel^1 + lo^1i$ 'the clock was' (from $kel^1 + o^1i$), $jo^1 + non$ 'stubbornness is' (from $jo^1 + on$), $tal^1 + lon$ 'he was' (from $tal^1 + on$), $hu^1 + ton$ 'the wolf is' (from $hu^1 + on$), $kirik + koli$ 'the church was' (from $kirikk + o^1i$), $jo^1 + ton$ 'the iodine is' (from $jo^1 + on$).
- (2) $C^1C^1 + C > C^1 + C$. When morphophonemic forms which end in a geminate cluster are followed by a stem with an initial consonant, the geminate cluster is reduced to a single consonant; e.g., $ikalt + po^1l^1t$ 'from all sides' (from $ikalt + po^1l^1t$), $pi^1k + ka^1t$ 'a long box' (from $pi^1kk + ka^1t$), $pimetat + hi^1rtt$ 'blind mouse (part. -sg.)' (from $pimetatt + hi^1rtt$).
- (3) $CC^1 + C^1 > C + C^1$. When a morphophonemic form ending in a consonant cluster is followed by a stem with an initial consonant of the same quality as the final consonant of the cluster, the final consonant of the cluster is lost; e.g., $ri^1 + te^1t$ 'cross roads' (from $ri^1 + te^1t$), $rahvas + ta^1is$ 'full of people' (from $rahvast + ta^1is$).

7. Inflection. — All inflection in Estonian is by suffixation. In terms of the inflectional suffixes which occur with each stem it is possible to establish three inflectional word classes: nouns, verbs, and particles. Noun stems occur with case-number and secondary case suffixes; verb stems occur with tense-mood and person(-number) suffixes. The class particles contains all other words.

7.1. Inflectional categories. — Inflectional endings with both nouns and verbs indicate the category of number: singular and plural. In addition, noun suffixes also indicate the category of case; verb suffixes, the categories of person, tense, and mood.

With nouns there are fourteen case categories: nominative, genitive, partitive, illative ('into'), inessive ('in'), elative ('out of'), allative ('onto'), adessive ('on'), ablative ('off of'), translative ('becoming, being as'), essive ('being as'), terminative ('up to, as far as'), comitative ('with'), abessive ('without').

The nominative, genitive, and partitive categories always occur with the singular and plural number categories, thus forming six case-number morphemes. All other case categories with exception of the illative, i.e., the secondary case suffixes, occur with number only insofar as they follow the genitive-singular, genitive-plural, or partitive-plural morphemes. In these constructions of case-number plus secondary case suffix, the category of number is determined by the former and the category of case by the latter, and the genitive or partitive meaning is cancelled out. The illative case category is found both with a case-number suffix (in the singular only) and with a secondary case suffix. (See Figure 9.)

With verbs we find four categories of person; two of tense: present and past; and three of mood: indicative, conditional, and imperative. The first, second, and third person categories always occur with the singular and plural number categories, thus forming six person-number morphemes. The fourth person category, which

Case-Number Suffixes		Case Category	Secondary Case Suffixes	
sg.	pl.		sg. (after gen. -sg.)	pl. (after part. -/gen. -pl.)
X	X	Nominative		
X	X	Genitive		
X	X	Partitive		
X	...	Illative	X	X
		Inessive	X	X
		Elative	X	X
		Allative	X	X
		Adessive	X	X
		Ablative	X	X
		Translative	X	X
		Essive	X	X
		Terminative	X	X
		Comitative	X	X
		Abessive	X	X

Fig. 9. — The cooccurrence of the categories of case and number with case-number and secondary case suffixes.

indicates an action performed by an unspecified or indefinite agent, is indifferent with regard to number. The indicative mood category always occurs with the present and past tense categories, thus forming two tense-mood morphemes. The conditional and imperative are indifferent with regard to tense.

8. Nouns. — The fullest form of an Estonian noun may be expressed by the formula $N-S_1(-S_2)$, in which N = noun stem, S_1 = case-number suffix, and S_2 = secondary case suffix, which is non-obligatory.

Estonian has the following seven case-number suffixes:¹

- (1) {-X} 'nominative-singular'
- (2) {-φ} 'genitive-singular'
- (3) {-tt} 'partitive-singular'
- (4) {-G} 'illative-singular'
- (5) {-t} 'nominative-plural'

- (6) {-ta} 'genitive-plural'
 (7) {-ʔit} 'partitive-plural'

The secondary case suffixes, of which there are eleven, occur after the genitive-singular, genitive-plural, or partitive-plural case-number suffixes. They are the following:

- (1) {-s} 'inessive'
 (2) {-sse} 'illative'²
 (3) {-st} 'elative'
 (4) {-l} 'adessive'
 (5) {-le} 'allative'
 (6) {-ltt} 'ablativ'
 (7) {-ks} 'translative'
 (8) {-na} 'essive'
 (9) {-ni} 'terminative'
 (10) {-ka} 'comitative'
 (11) {-tta} 'abessive'

8.1. Nouns are divided into two regular groups and one anomalous group on the basis of the number of stem-allomorphs which it is necessary to posit for each noun and the distribution of their stem-allomorphs with regard to the case-number suffixes.

8.1.1. The anomalous group of nouns is unproductive, consisting of 21 roots with irregular and highly restricted distributions with regard to the case-number suffixes. The roots of this group are assigned to the following eight subclasses on the basis of distributional similarities:³

- 011 {Nema-} 'he, she, it; they' = tema- ∞ te- ∞ nema- ∞ nēm-.
 tema- occurs with the nom. -sg. and gen. -sg.; te-, with the part. -sg.; nema-, with the nom. -pl.; nēm-, with the gen. -pl.⁴
 {Nee-} 'this (one)' = seē- ∞ se- ∞ neē. seē occurs with the nom. -sg. when it is accompanied by stress or immediately followed by /' /; se-, with the nom-sg. elsewhere, with the part. -sg. or gen. -sg. when the latter is followed by a secondary case suffix; neē-, with the nom. -pl. and part. -pl.⁴
 {Noo-} 'that' = toō- ∞ to- ∞ noō- ∞ nōn-; toō- occurs with the nom. -sg.; to- with the gen. -sg. and part. -sg.; noō-, with the nom. -pl. and part. -pl.; nōn-, with the gen. -pl.
 012 {Na-} 'he, she, it; they' = ta- ∞ na-; ta- occurs with the nom. -sg. and gen. -sg.; na-, with the nom. -pl.

- 013 {kes-} 'who' = keš- ∞ keš- ∞ ke-; keš- occurs with the nom. -sg. when the suffix particle {-ki} 'also' follows; keš- with the nom. -sg. elsewhere; ke-, with the gen. -sg. and part. -sg.
 {mis-} 'what, which' = miš- ∞ mi- ∞ mille-; miš- occurs with the nom. -sg.; mi-, with the part. -sg.; mille-, with the gen. -sg.
- 014 {selle-} 'this' = sēlle-; sēlle- occurs only with the gen. -sg.
 {tolle-} 'that' = tōlle-; tōlle- occurs only with the gen. -sg.
 {kelle-} 'who' = kēlle- occurs with the gen. -sg. and gen. -pl.
- 021 {mina-} 'I' = mina- ∞ minu- ∞ miñ-; mina- occurs with the nom. -sg.; minu-, with the gen. -sg.; miñ-, with the part. -sg.
 {gina-} 'you (sg.)' = ḡina- ∞ ḡinu- ∞ ḡiñ-; as for {mina-}.
- 022 {ma-} 'I' = ma- ∞ mu-; ma- occurs with the nom. -sg.; mu-, with the gen. -sg.
 {sa-} 'you (sg.)' = sa- ∞ su-; as for {ma-}.
- 023 {mei-} 'we' = me- ∞ meī-; me- occurs with the nom. -sg.; meī-, with the gen. -sg. and part. -sg.
 {tei-} 'you (pl.)' = te- ∞ teī-; as for {mei-}.
- 024 {meije-} 'we' = mēīje-, which occurs with the nom. -sg. and gen. -sg.
 {teije-} 'you (pl.)' = tēīje; as for {meije-}.
- 031 {ise-} '(one-)self' = ise- ∞ enese- ∞ enes- ∞ eñ-. ise- occurs with the nom. -sg.; enese-, with the gen. -sg.; enes-, with the gen. -pl.; eñ-, with the part. -sg.
- 032 {enTaS-} '(one-)self' = ēnnas- ∞ eñta-. ēnnas- occurs with the part. -sg.; eñta-, with the gen. -sg.
- 040 {mōñta-} 'some, several' = mōñta-; mōñta- occurs with the part. -sg. and ill. -sg. (Cf. also mōn(I)- of the regular noun subclass 21 below.)
- 050 {kōīkKE-} 'all, the whole' = kōīkKE- ∞ kōīkki-; kōīkki- occurs with the gen. -pl.; kōīkKE-, elsewhere except with the nom. -pl. {kōīkKE-} does not occur with the nom. -pl., but rather the nom. -sg. form is used with the nom. -pl. function.

8.12. All other nouns belong to one of the following two regular groups.

- I. Nouns with only one stem-allomorph, which ends in a vowel;
- II. Nouns with more than one stem-allomorph, having at least one consonant and one vowel stem-allomorph (C-stem, V-stem).

Group II is divided into two subgroups: (A) nouns with two stem-allomorphs, and (B) nouns with three stem-allomorphs.

The nouns within group I and the two subgroups of group II are assigned to subclasses on the basis of (a) their morphophonemic stem-allomorph types; and, with regard to group II nouns, (b) the occurrence of the nominative-singular, partitive-singular, and genitive-plural with a vowel or consonant stem-allomorph of the subclass in question. The following are the subclasses of the two regular groups:⁵

- 11 Nouns with stem-allomorphs ending in a vowel cluster.

Examples:

maá- 'land'; õõ 'night'; kuú- 'moon'
 peó- 'palm (of hand)'; saú- 'staff, rod'
 aú- 'honor'; nõú- 'council'; lóó- 'lark'

- 12 Nouns with stem-allomorphs ending in a single vowel.

Examples:

itu- 'sprout'; api- 'aid'; maja- 'house'
 jõKI- 'river'; maTu- 'snake'; tuPa- 'room'
 aáKA- 'time'; aáTI- 'gift'; aámu- 'mercy'
 heinA- 'hay'; keppi- 'cane'; koñTA- 'place';
 kañTE- 'two'; huñTI- 'wolf'; aákKU- 'hole';
 aáJU- 'oven'; kifJA- 'letter'; õúWE- 'yard';
 laáJA- 'wide'; soóJA- 'warm'; keáWA- 'barley';
 laáTWA- '(tree) top'; loáTJA- 'barge'; soáPrA-
 'friend'; rúpla- 'ruble'; káhu- 'damage'; póliWE-
 'stage of life'; rohITU- 'grass'; rehiTE- 'threshing';
 réstoranI- 'restaurant'; kirja(+)-niákKU- 'writer.'

- 21 Nouns with a one-syllable C-stem ending in a resonant after a single vowel. Examples:

lúm(ɨ)- 'snow'; mõn(ɨ)- 'some, a few'; mэр(ɨ)-
 'sea'; túl(ɨ)- 'fire.'

- 22 (1) Nouns with (a) a two-syllable C-stem in $\sqrt{H/}$ with plain stress, and (b) a two-syllable V-stem with plain stress.

- (2) The noun: õluH- ∞ õlle- 'beer.' Examples:
 kuTe(H)- 'weave'; pere(H)- 'family'; lipu(H)-
 'prostitute'; äutto(H)- 'car'; palju(H)- 'much, many';
 nõiþi(H)- 'maiden'; kunig+kanna(H)- 'queen';
 laulþ; äanna(H)- 'singer.'

23 (1) Nouns with a two-syllable C-stem in √H/ with postposed stress.

(2) Nouns with a C-stem in √H/ of three or more syllables.

(3) Nouns with a one-syllable C-stem in √T/ or a resonant (including √N/) after a vowel cluster.

(4) The nouns: lās- ∞ lap̄sE- 'child'; üs- ∞ uk̄sE- 'door.'
 Examples:

- (1) keevA(H)- 'boiling'; voõþi(H)- 'bed'; loõja(H)-
 'creator'; puúsA(H)- 'hip'; aastA(H)- 'year.'
 (2) miþija(H)- 'daughter-in-law'; lõokikka(H)- 'logic';
 kevate(H)- 'spring' (also kevatE(H)-); õnnettu(H)-
 'unhappy'; lüulettaja(H)- 'poet'; humala(H)- 'hops';
 tänavA(H)- 'street'; miljitsA(H)- 'militia';
 põrantA(H)- 'floor'; vanema(H)- 'older'; heletama(H)-
 'brighter'; kosuttava(H)- 'refreshing'; põõrlevA(H)-
 'revolving'; ihnurI(H)- 'miser'; minutti(H)- 'minute';
 raamattU(H)- 'book'; tüttrukkU(H)- 'young girl';
 iþkELI(H)- 'angel'; elektErI(H)- 'electricity';
 keestEvA(H)- 'lasting'; tähtisA(H)- 'important';
 hiimUsA(H)- 'terrible'; aþkkUrU(H)- 'anchor';
 kõõmEnE(H)- 'caraway'; küünALA(H)- 'candle';
 heleTA(H)- 'bright.'
 (3) kät- ∞ kätI- 'hand'; vät- ∞ vetI- 'water';
 düT- ∞ udTE- 'new'; viit- ∞ viitE- 'five';
 kõrT- ∞ kõõTE- 'straw'; hiit- ∞ hiitE- 'perch';
 lääN- ∞ lääNE- 'west'; kääN- ∞ kääNI- 'lid';
 suur- ∞ suurE- 'large'; keel- ∞ keelE- 'language.'

24 (1) Two-syllable nouns with plain stress on the C-stem and postposed stress on the V-stem.

(2) Nouns with a two-syllable C-stem in √H/ and a three-syllable V-stem.

(3) Nouns with two-or-more-syllable C-stems in √s t/.

(4) Nouns with a one-syllable, C-stem in √s/ after a vowel cluster. Examples:

- (1) häämas- ∞ haþpa- 'tooth'; puhas- ∞ puþta- 'clean';
 rikkas- ∞ rikka- 'rich'; täevas- ∞ taeva- 'sky';

- ihneH- \in ifne 'stingy'; hálkeH- \in halke- 'sick';
 kómmeH- \in korpe- 'habit'; kááneH- \in káante- 'case
 (gram.)'; vaher- \in vaiftra- 'maple'; kánnel- \in kañtle-
 'kantele (musical instrument)'; túttar- \in túttre-
 'daughter'; ákken- \in ákkna-.
- (2) aseH- \in aseme- 'place'; hapeH- \in hapeme- 'beard'
 (3) vástus(e)- 'answer'; káttus(e)- 'roof'; póttas(E)-
 'potash'; teífvis(E)- 'health'; seátus(E)- 'law';
 kúšimus(E)- 'question'; háavattu(t)- 'wounded person';
 súrnu(t)- 'a dead person.'
- (4) mées- \in mehE- 'man'; juús- \in juúkse- 'hair';
 teós- \in teóse- '(a) work.'
- 31 Nouns with two V-stems — one in -ne, which occurs only with the nominative-singular, and the other in -se, -sa or -sE — and with a C-stem (1) in -s following a vowel, or (2) in -seH or -saH following a consonant. Examples:
- (1) hopune- \in hopus(e)- 'horse'; ipimene- \in ipimes(E)-
 'person'; punane- \in punas(e)- 'red'; kóllane- \in kóllas(e)-
 'yellow'; téine- \in teísE- \in téis- 'second, other';
 náine- \in naisE- \in nais- 'woman'; lafplane- \in lafplás(E)-
 'Lapp'; lühikkEne- \in lühikkEs(E)- 'short';
- (2) raútne- \in raútse(H)- 'of iron'; moótne- \in moótsa(H)-
 'fashionable'; nelj+nufkkne- \in nelj+nufkse(H)-
 'quadrangular.'
- 32 (1) Nouns with two C-stems, having a C¹-stem in $\sqrt{s/}$ and a C²-stem in $\sqrt{H/}$.
- (2) The noun kuratt- (C¹) \in kuratIH- (C²) \in kurati- 'devil.'
 Examples:
- rušikkas- \in rušikka(H)- 'fist'; máašikkas- \in máašikka(H)-
 'strawberry'; lipikkas- \in lipikka(H)- 'butterfly';
 kuņikka- \in kuņikka(H)- 'king'; kiļļjas- \in kiļļja(H)-
 'plateau'; satas- \in satanta(H)- 'one-hundredth';
 kólmás- \in kólmanta(H)- 'third'; paras- \in paraja(H)-
 'suitable.'
- 33 (1) Nouns with a C¹-stem in $\sqrt{H/}$ with plain stress and a C²-stem in $\sqrt{H/}$ with postposed stress. Examples:
- mittuH- \in mittme(H)- 'some, several'; laheH- \in
 lahke(H)- 'branch, fork'; seemeH- \in seómme(H)-
 'seed.'

- (2) The following nouns with two C-stems:
 tuhatt- (C¹) ∞ tuhanteH- (C²) ∞ tuhante- 'thousand';
 sūtaM- (C¹) ∞ sūtaMeH- (C²) ∞ sūtaMe- 'heart';
 vāḷkkeS- (C¹) ∞ vāḷks- (C²) ∞ vāḷkse- 'small.'

8.12.1. Summary of the morphophonemic stem types of the regular nouns.

I. Nouns with one stem-allomorph:

- 11 -VV
 12 -V

II. Nouns with more than one stem-allomorph:

A. Nouns with two stem-allomorphs:

- 21 $\check{V}R(V)$
 22 V.V(H)
 21(1e/uH)
 23 (1) $V^{\check{V}}V(H)$
 (2) ...V.V.V(H)
 (3) $\check{V}(V/R)T \infty V(V^{\check{V}}/R)TV$
 $\check{V}VR \infty V\check{V}RV$
 (4) $\check{V}s \infty V\check{C}sE$
 24 (1) $\check{V}.VC \infty V^{\check{V}}.V$
 $\check{V}.V_1R \infty V^{\check{V}}.RV_2$
 (2) V.V(H/me)
 (3) ...V.Vs(V)
 ...V.V(t)
 (4) $V\check{V}s(V)$
 $m\check{e}(es/hE)$

B. Nouns with three stem-allomorphs:

- 31 (1) ...Vne ∞ ...Vs(e/E)
 (2) ...Cne ∞ ...Cse(H)/Csa(H)
 32 (1) ...a(s/H)
 ...s/Ca(H)
 (2) kurat(t/I[H])
 33 (1) $\check{V}.VH \infty V^{\check{V}}.Ne(H)$
 (2) tuha(tt/nte[H])
 sūtaM(e[H])
 vāḷk(keS/se[H])

8.12.2. The case-number suffixes are affixed to vowel or consonant stem-allomorphs of the group II subclasses of regular nouns, as indicated in Figure 10.

Subclass	Part.-sg.	Gen.-pl.	Nom.-sg.	Ill.-sg.	Gen.-sg. Nom.-pl. Part.-pl.
21	C	V	V		
22	C	V	C	V	V
23	C	C	V	V	V
24	C	C	C	V	V
31	C	C	V(ne)	... V(sE)	V
32	C ²	C ²	C ¹		V(se/sE/ sa)
33	C ¹	C ²	C ¹		V

Fig. 10. — The occurrence of vowel and consonant stems-allomorphs of the Group II subclasses with the case-number suffixes.

8.2. Noun Suffixes

8.2.1. The case-number suffixes and their allomorphs are:
 {-X} 'nominative singular' = -X ∞ -LX.⁷

-LX occurs with the following two sub-types of subclass 12, which are vowel final:

- two-syllable stem-allomorphs with a second-syllable onset of CC;
- stem-allomorphs with four or more syllables with (+) before the penultimate syllable. Examples:

a¹trA-LX (> a¹trA-X > a¹tr) > ater 'plough'
 s^op^rPrA-LX > s^op^rer 'friend'
 la¹TWA-LX (> la¹tWA-X > la¹tW) > la¹f 'top (of tree)'⁸
 lo¹TJA-LX (> lo¹tJ) > lo¹i 'barge'
 kirja(+)¹qikkU-LX (> kirja¹qikkU-X) > kirja¹qikk 'writer.'

-X occurs elsewhere, hence with both consonant and vowel stem-allomorphs (cf. §8.12.2). Examples:

a^ekA-X > a^ek 'time'
 sa¹lmI-X > sa¹lm 'verse'
 p^olvI-X > p^olv 'knee'
 p^olvE-X > p^olv 'generation'
 li¹nA-X > li¹n 'city'
 o^dWE-X (> o^dW) > o^d 'yard'

la^hJA-X (> la^hJ > la^hi) > la^h 'wide'
 va^hJU-X (> va^hJ) > va^hi 'loud'
 rohiTU-X (> rohiT) > rohi 'grass'
 reHITE-X > rehi 'threshing'
 pōIWE-X > pōi 'state of life'
 heleTA-X > hele 'bright'
 sūli-X > sūli 'lap'
 hoōli-X > hoōli 'care'
 kaāNi-X > kaāṣ 'lid'
 kāTi-X > kāsi 'hand'
 uūTE-X > uūs 'new'
 kō^hTE-X > kō^hs 'straw'
 lāāNE-X > lāās 'west'
 ka^hTE-X > ka^hs 'two'
 ka^htsEli-X > ka^htsel 'pulpit'
 ke^hEvA-X > ke^htev 'lasting'
 tā^htsIsA > tā^hṭis 'important'
 kanali-X > kanal 'canal'
 rōstoranI-X > rōstoran 'restaurant'
 o^hṭi^hkkU-X > o^hṭi^hkk 'dangerous'
 humalA-X > humal 'hops'
 ke^hvA-X > ke^hv 'boiling'
 i^hneH-X > i^hne 'stingy'
 sūtaM-X > sūta 'heart'
 vā^hkkeS-X > vā^hkke 'small'
 tema-X > tema 'he, she, it'
 ma-X > ma 'I'
 ma^hA-X > ma^h 'earth'
 maja-X > maja 'house'
 kari-X > kari 'shoal'
 a^hṭja-X > a^hṭja 'giver'
 hāmmas-X > hāmmas 'tooth'
 tūt^htar-X > tūt^htar 'daughter'
 tuh^hatt-X > tuh^hatt 'thousand'

{-ϕ} 'genitive-singular' = -L ∞ -ϕ, which are suffixed to vowel stem-allomorphs only.

-L occurs with subclasses 12 and 22, all two-syllable E-, I-stem-allomorphs of subclasses 23 and 31, and (ka^hkkE-)

'all' (050). Examples:

api-L > api 'of the aid'

jōki-L > jō^h 'of the river'

saT^ja-L > saja 'of one hundred'
 pikka-A-L > pikka 'of a long ...'
 laulu-L > laulu 'of the song'
 jalka-L > jala 'of the leg'
 lintu-L > lintu 'of the bird'
 huntu-L > huntu 'of the wolf'
 aika-L (> ää) > aja 'of time'
 aetja-L > äija 'of the garden'
 laija-L (> läjja) > laija 'of a wide ...'
 latva-L > latva 'of the treetop'
 pöive-L (> pöive-L) > pöive 'of the state of life'
 kirjja(+)^jpikkU-L > kirjapikku 'of the writer'
 kute-L (> kué) > koé 'of the weave'
 ölle-L > ölle 'of beer'
 paljon-L > paljon 'much'
 lapsE-L > lapse 'of the child'
 vettä-L > vettä 'of water'
 uutE-L > uute 'of a new ...'
 lääne-L > lääne 'of the west'
 naise-L > naise 'of the wife'

-φ occurs elsewhere. Examples:

sille-φ > sille- 'of that, it'
 minu-φ > minu- 'of me'
 meije-φ > meije 'of us'
 enese-φ > enese 'of (one's-)self'
 lumi-φ > lume 'of snow'
 keeva-φ > keeva 'of boiling'
 tänavA-φ > tänavA 'of the street'
 raamattU-φ > raamattu 'of the book'
 ihkiE-L-φ > ihki 'of the angel'
 kantsi-L-φ > kantsi 'of the pulpit'
 heletA-φ > heleta 'of a bright ...'
 hampa-φ > hampa 'of the tooth'
 aseme-φ > aseme 'of the place'
 seatusE-φ > seatusE 'of the law'
 ipimesE-φ > ipimesE 'of the person'
 kuningka-φ > kuningka 'of the king'
 kolmanta-φ > kolmanta 'of the third ...'
 lühikkEsE-φ > lühikse 'of a short ...'

{-tt} 'partitive-singular' = φ = (-ta ä -t ä -tt).

- ϕ occurs with $\text{m}^{\text{h}}\text{õta-}$ 'several years', following two subclass 11 nouns: $\text{a}^{\text{h}}\text{-}$ 'honor' and nõu- 'council.' Hence, it is suffixed to vowel stem-allomorphs only. Examples:
- $\text{a}^{\text{h}}\text{-}\phi > \text{a}^{\text{h}}$ 'some honor'
 - $\text{maja-}\phi > \text{maja}$ 'part of the house'
 - $\text{jõki-}\phi > \text{jõke}$ 'some of the river'
 - $\text{a}^{\text{h}}\text{KA-}\phi > \text{a}^{\text{h}}\text{ka}$ 'some time'
 - $\text{ra}^{\text{h}}\text{TA-}\phi > \text{ra}^{\text{h}}\text{ta}$ 'part of the shore'
 - $\text{la}^{\text{h}}\text{JA-}\phi > \text{la}^{\text{h}}\text{ja}$ 'part of a wide ...'
 - $\text{la}^{\text{h}}\text{TWA-}\phi > \text{la}^{\text{h}}\text{tva}$ 'part of a treetop'
 - $\text{r}^{\text{h}}\text{õstora}^{\text{h}}\text{-}\phi > \text{r}^{\text{h}}\text{õstora}^{\text{h}}$ 'part of the restaurant'
 - $\text{kirja(+)pi}^{\text{h}}\text{kku-}\phi > \text{kirja}^{\text{h}}\text{+pi}^{\text{h}}\text{kku}$ 'the writer (part. -sg.)'
- ta occurs after a one-syllable stem-allomorph in a single vowel. Examples:
- $\text{te-ta} > \text{teta}$ 'him; some of it'
 - $\text{se-ta} > \text{seta}$ 'some of this'
 - $\text{to-ta} > \text{tota}$ 'some of that'
 - $\text{ke-ta} > \text{keta}$ 'whom'
 - $\text{mi-ta} > \text{mita}$ 'some of what, which'
- tt occurs with a stem-allomorph terminating in a resonant which itself occurs beyond the first syllable or after a vowel cluster. Examples:
- $\text{vaha}^{\text{h}}\text{-tt} > \text{vaha}^{\text{h}}\text{rtt}$ 'part of the maple'
 - $\text{t}^{\text{h}}\text{õ}^{\text{h}}\text{ta}^{\text{h}}\text{-tt} > \text{t}^{\text{h}}\text{õ}^{\text{h}}\text{ta}^{\text{h}}\text{rtt}$ 'daughter (part. -sg.)'
 - $\text{s}^{\text{h}}\text{õ}^{\text{h}}\text{ta}^{\text{h}}\text{M-}^{\text{h}}\text{tt} > \text{s}^{\text{h}}\text{õ}^{\text{h}}\text{ta}^{\text{h}}\text{ntt}$ 'part of the heart'
 - $\text{hi}^{\text{h}}\text{r-}^{\text{h}}\text{tt} > \text{hi}^{\text{h}}\text{rtt}$ 'mouse (part. -sg.)'
 - $\text{h}^{\text{h}}\text{a}^{\text{h}}\text{al-}^{\text{h}}\text{tt} > \text{h}^{\text{h}}\text{a}^{\text{h}}\text{altt}$ 'some of the voice'
 - $\text{l}^{\text{h}}\text{a}^{\text{h}}\text{N-}^{\text{h}}\text{tt} > \text{l}^{\text{h}}\text{a}^{\text{h}}\text{ntt}$ 'part of the west'
- t occurs elsewhere, and hence with both consonant and vowel stem-allomorphs (cf. §8.12.2). Examples:
- $\text{me}^{\text{h}}\text{-t} > \text{me}^{\text{h}}\text{t}$ 'some of us'
 - $\text{t}^{\text{h}}\text{õ}^{\text{h}}\text{-t} > \text{t}^{\text{h}}\text{õ}^{\text{h}}\text{t}$ 'some work'
 - $\text{ki}^{\text{h}}\text{-t} > \text{ki}^{\text{h}}\text{t}$ 'some fiber'
 - $\text{e}^{\text{h}}\text{-t} > \text{e}^{\text{h}}\text{t}$ '(one's-)self (part. -sg.)'
 - $\text{mi}^{\text{h}}\text{-t} > \text{mi}^{\text{h}}\text{t}$ 'me'
 - $\text{l}^{\text{h}}\text{u}^{\text{h}}\text{-t} > \text{l}^{\text{h}}\text{u}^{\text{h}}\text{t}$ 'some snow'
 - $\text{v}^{\text{h}}\text{er-}^{\text{h}}\text{t} > \text{v}^{\text{h}}\text{ert}$ 'some blood'
 - $\text{l}^{\text{h}}\text{a}^{\text{h}}\text{s-}^{\text{h}}\text{t} > \text{l}^{\text{h}}\text{a}^{\text{h}}\text{st}$ 'child (part. -sg.)'
 - $\text{v}^{\text{h}}\text{e}^{\text{h}}\text{T-}^{\text{h}}\text{t} > \text{v}^{\text{h}}\text{e}^{\text{h}}\text{tt}$ 'some water'

ðuT-t > uðtt 'some new ...'
 kórt-t > kórtt 'some stubble (of grain)'
 méss-t > méést 'man (part.-sg.)'
 náis-t > naist 'woman (part.-sg.)'
 pereH-t > perett 'part of the family'
 páljuH-t > páljutt 'much (part.-sg.)'
 keévaH-t > keévatt 'some boiling ...'
 ráamattUH-t > ráamattutt 'part of the book'
 iþkEIH-t > iþkjitt 'angel (part.-sg.)'
 heleTAH-t > heletatt 'some bright ...'
 ríkkas-t > ríkkast 'some rich ...'
 aseH-t > asett 'some place'
 punas-t > punast 'some red ...'
 ráttseH-t > ráttsett 'some iron ...'
 kúniþkaH-t > kúniþkatt 'king (part.-sg.)'
 kólmantaH-t > kólmantatt 'some of the third ...'
 háavattut-t > háavattutt 'wounded person (part.-sg.)'
 tuhatt-t > tuhatt 'part of a thousand'
 väkkeS-t > väkkest 'some small ...'

{-G} 'illative-singular' = -G ∅ ∅ -hV̄ ∅ -tE. The illative-singular does not occur with all subclasses, nor does it occur with all members of any given subclass in any predictable fashion. It is necessary, therefore, to list all nouns with which the illative-singular is attested. -G was found with (a) the following CVCV-stem-allomorphs of subclasses 12, 21, 22, and 23: (12) kaTu- 'disappearance,' küla- 'village,' laKI- 'roof,' maja- 'house,' paKu- 'flight, escape,' reKI- 'sled,' tuPa- 'room,' kivi- 'stone'; (21) süI- 'lap,' lumI- 'snow'; (22) pere- 'family'; (23) käTI- 'hand,' veTI- 'water'; (b) the V-stem iþimesE- 'person' of subclass 31. -G causes gemination of the immediately preceding stem consonant and, with two-syllable stem-allomorphs, also moves the stress to the postposed position.

Examples:

küla-G > külla 'into the village, visiting'
 maja-G > majja 'into the house'
 paKu-G > paĳku 'into flight, escape'
 pere-G > peĳre 'into the family'
 lumI-G > lumme 'into the snow'
 veTI-G > vette 'into the water'
 iþimesE-G > iþimesse 'into the person.'

- ϕ was found with {mõnta-} (040) and the following nouns of other vowel-sybtypes of subclasses 12, 23 and 31: (12) ašT^JA- 'garden,' aňJU- 'oven,' ałTA- 'storehouse,' ašJA- 'affair,' hejKKI- 'bright light,' hiŋTA- 'price,' hoóKU- 'burst of effort,' hā||I- 'crib,' jaámA- 'station,' kašT^JI- 'box,' koňTA- 'place,' kūKE- 'side,' lentU- 'flight (in air),' lıvA- 'sand,' jıánA- 'city,' lukU- 'lock,' lähe+koňTA- 'vicinity,' mešA- 'forest,' naňKA- 'leather,' ošA- 'forehead,' pašT^JI- 'boat,' pa||I- 'ball,' paňkKA- 'bank,' piškA- 'long,' põlvE- 'generation,' raŋTA- 'iron,' riıTU- 'quarrel,' sałmE- 'narrows, straits,' sałmI- 'verse,' se||KA- 'back,' sokKI- 'sock,' soóLA- 'salt,' soóRI- 'circle,' koó||I- 'school,' kraávI- 'ditch,' ošWE- 'yard,' soóJA- 'warm,' lašTWA- 'treetop,' réstoranI- 'restaurant'; (23) ušTE- 'new'; (31) tešE- 'second.' Examples:
 ašT^JA- ϕ > ašta 'into the garden'
 aňJU- ϕ > aňju 'into the oven'
 mešA- ϕ > meša 'into the woods'
 ošWE- ϕ > ošve 'into the yard, outside'
 lašTWA- ϕ > laštva 'into the treetop'
 réstoranI- ϕ > réstorani 'into the restaurant.'

-hV⁻ is found with the following stem-allomorphs of subclass 11 with a geminate vowel cluster: mašš- 'earth,' pašš- 'head,' sušš- 'mouth.' The vowel clusters are reduced to a single vowel before h. V⁻ > \sqrt{e} u a / depending on the vowel of the stem; i.e., \sqrt{e} / if the stem ends in \sqrt{a} o /, \sqrt{u} / if the stem ends in \sqrt{u} o /, \sqrt{a} / if the stem ends in \sqrt{a} /. Examples:
 maa-hV⁻ > maha 'to the ground, down'
 pašš-hV⁻ > pähe '(on)to the head'
 suu-hV⁻ > suhu 'into the mouth.'

-tE is found with the following vowel stem-allomorphs of subclasses 21 and 23: (21) verı- 'blood'; (23) suđrE- 'large.'
 Examples:

verı-tE > verıtE > verıte 'into the blood' (syncope rule)
 suđrE-tE > suđrEtE > suušte 'into a large ...'

{-t} 'nominative plural' = -t ∞ -Lt, which are suffixed to vowel stem-allomorphs only.

The paralled distribution of the -Lt ∞ -t allomorphs of {-t} and the -L ∞ - ϕ allomorphs of {- ϕ } 'genitive-singular' should be noted. On the one hand, the allomorphs with \sqrt{L} /

(i.e., -Lt and -L) and, on the other hand, the allomorphs without $\sqrt{L/}$ (i.e., -t and - \emptyset) have nearly identical distributions with regard to the nouns with which they occur.

- Lt occurs with subclasses 12 and 22, and with all two-syllable E-, i- stem-allomorphs of subclasses 23 and 31. Examples:
- isa-Lt > isat 'fathers'
 - jõKI-Lt > jõét 'rivers'
 - kaštI-Lt > kaštit 'boxes'
 - koérA-Lt > koérat 'dogs'
 - kašKI-Lt > kaset 'birches'
 - línTU-Lt > linnut 'birds'
 - põlWE-Lt (> põlve-Lt) > põlvet 'stages of life'
 - réstoranI-Lt > réstoranit 'restaurants'
 - kirja(+) η ikkU-Lt > kirjanikkut 'writers'
 - pere-Lt > peret 'families'
 - pálju-Lt > päljut 'many'
 - lapsE-Lt > lapsset 'children'
 - käTI-Lt > käét 'hands'
 - saarE-Lt > saaret 'islands'
 - naisE-Lt > naised 'wives.'

- t occurs elsewhere. Examples:
- nema-t > nemat 'they'
 - neé-t > neét 'these'
 - na-t > nat 'they'
 - puú-t > puut 'trees'
 - peó-t > peót 'fists'
 - tānavA-t > tānavat 'streets'
 - rāamattU-t > rāamattut 'books'
 - akkna-t > akknat 'windows'
 - heleTA-t > heletat 'bright ... -
 - hampa-t > hampat 'teeth'
 - vāstuse-t > vāstuset 'answers'
 - lühikkEsE-t > lühikset 'short ... -s'

{-te} 'genitive-plural' = (-te ∞ -tte) ∞ -Xte ∞ -LXtte ∞ -Lte.⁹

- Lte, a non-standard allomorph, was attested with two nouns of subclass 12, which are vowel final: loóKU- 'hay making,'
 tiiPA- 'wing.' Example:
 tiiPA-Lte > tiiivate 'of the wings'

- LXtte occurs with the following (C)VVRV stem-allomorphs of subclass 12: kaõrA- 'oats,' koõrA- 'dog.' Example: koõrA-LXtte > kõertte 'of the dogs.'
- Xte occurs with the following (C)VksV stem-allomorphs of subclass 12: saõsA- 'lord,' oõsA- 'branch,' pũksI- 'breeches.' Example: pũksI-Xte > pũkste 'of the breeches'
- tte occurs with (C)VVR consonant stem-allomorphs of subclass 23. Examples:
 hũul-tte > hũultte 'of the lips'
 sũur-tte > sũurtte 'of the large ... -s'
 kũiN-tte > kũintte 'of the fingernails'
- te occurs with all other nouns, hence with both consonant and vowel stem-allomorphs (cf. §8.12.2). Examples:
 puũ-te > puũte 'of the trees'
 kala-te > kalate 'of the fish'
 paõsU-te > paõsute 'of the thick ... -
 loõmA-te > loõmate 'of the animals'
 õnne(+), iõkkU-te > õnne+iõkkute 'of the happy
 mere-te > merete 'of the seas'
 pere-te > perete 'of the families'
 nẽm-te > nẽnte 'of them, these'
 vanemAH-te > vanematte 'of the parents'
 naãpErIH-te > naãpritte 'of the neighbors'
 kãT-te > kãtte 'of the hands'
 õuT-te > õutte 'of the new ... -s'
 lãmmas-te > lãmmaste 'of the sheep'
 kũõimus-te > kũõimuste 'of the questions'
 hãavattut-te > hãavattutte 'of the wounded people'
 mẽes-te > mẽeste 'of the men'
 iõimes-te > iõimeste 'of the people'
 ruõikkaH-te > ruõikkatte 'of the fists'
 sũtameH-te > sũtamette 'of the hearts'
 vãiks-te > vãikste 'of the small ... -s'

{-õit} 'partitive plural' = -it ∞ -õit ∞ -I ∞ (-U ∞ -E ∞ -Lõit) ∞ (-i- ∞ -LI- ∞ -LU-), which are suffixed to vowel stem-allomorphs only. The allomorphs -i- ∞ -LI- ∞ -LU- occur before secondary case suffixes as plural markers; the other allomorphs occur elsewhere. The use of the partitive-plural

before secondary case suffixes appears to be non-productive and is found to occur with only a small number of nouns, which it is necessary to list.¹⁰ The distribution of the other allomorphs of {-*şit*} is easily predictable for all nouns except those of subclass 12, for which considerable listing is necessary.¹¹ The allomorphs -U ∞ -E ∞ -L_{şit} are limited to a list of subclass 12 nouns; all other nouns of that subclass take the allomorphs -I and -*şit*.

-L_{şit}, a non-standard allomorph, is found with the single noun lo_şKU- 'hay-making (session)'; i.e., lo_şKU-L_{şit} > lo_şşit 'some hay-making sessions.'

-U occurs with (a) all disyllabic A-stem-allomorphs with √a/ or √*õ*/ or with √ei ii/ in the first syllable; e.g.,

a _ş KA- 'time'	l _ş KA- 'thread'
a _ş A- 'shaft'	l _ş KA- 'tether'
a _ş JA- 'affair'	ma _ş JA- 'berry'
ha _ş PA- 'bad'	no _ş TA- 'sorcerer'
ja _ş mA- 'station'	pa _ş KA- 'place'
ja _ş KA- 'foot, leg'	pi _ş mA- 'milk'
ka _ş LA- 'neck'	po _ş JA- 'north'
k _õ vA- 'ear'	se _ş IA- 'wall'
la _ş JA- 'wide'	ti _ş PA- 'wing'
la _ş TA- 'table'	õ _ş na- 'apple';
lei _ş PA- 'bread'	

(b) the following disyllabic A-stem-allomorphs with √i e/ in the first syllable: hi_şTA- 'price,' i_şmA- 'weather,' ki_şJA- 'letter,' li_şna- 'city,' se_şKA- 'back,'¹² vi_şJA- 'fruit';

(c) the following disyllabic a-stem-allomorphs with √a õ i/ in the first syllable:

kala- 'fish'	şika- 'pig'
kana- 'hen'	sõna- 'word'
kõva- 'hard'	sõT _{ja} - 'war'
lina- 'linnen'	vaka- 'devout'
maja- 'house'	vana- 'old'
riTA- 'line'	vapa- 'free'
sama- 'same'	viKa- 'fault.'
saT _{ja} - 'hundred'	

Examples:

kala-U > kalu 'some fish'
 şika-U > şiku 'some pigs'

ma^fJA-U > ma^fju 'some berries'
 la^uTA-U > la^utu 'some tables'
 nōⁱTA-U > nōⁱtu 'some witches'

- E occurs with (a) all disyllabic a-stem-allomorphs with $\sqrt{u/}$ in the first syllable; e.g., muna- 'egg,' tuPa- 'room'; (b) all disyllabic stem-allomorphs in -JA with $\sqrt{ü u o e/}$ in the first syllable; e.g., neⁱJA- 'four,' nu^jJA- 'bludgeon,' so^oJA- 'warm,' tū^fJA- 'empty'; (c) all ...(+)ⁱCi^kku-type stem-allomorphs; e.g., kirja(+)ⁱpi^kku- 'writer,' ō^{ne}(+)ⁱpi^kku- 'happy'; (d) the following disyllabic U-stem allomorphs:

jō ^u TAU- 'strength'	pi ^u TAU- 'surface'
ki ^m pu- 'bunch'	rii ^u TAU- 'quarrel'
li ^u TAU- 'bird'	ro ^u TAU- 'medicine'
lo ⁱ TAU- 'loose'	ru ^u TAU- 'square'
ma ^k sU- 'payment'	ti ^k ku- 'stick'

(e) the following i-, I-stem-allomorphs:

kivi- 'stone'	sa ⁱ mi- 'verse'
ki ⁱ ki- 'gift'	so ⁱ tsi- 'wizard'
ko ^o ki- 'cake'	so ^o ri- 'circle'
nō ^o ri- 'twine'	š ^e fi- 'chef'
po ^u ti- 'clay pot'	u ^u ši- 'worm'
rii ^k ki- 'government'	

Examples:

riiⁱTAU-E > riite 'some quarrels'
 ki^mpuE-E > ki^mppe 'some bunches'
 kivi-E > kive 'some stones'
 u^ušiE-E > u^uše 'some worms'
 tuPa-E > tupe 'some rooms'
 nu^jJA-E > nu^jje 'some clubs'

- I occurs with (a) the following disyllabic a-stem-allomorphs with $\sqrt{e o/}$ in the first syllable:

keha- 'body'	osa- 'part'
kena- 'beautiful'	pesa- 'nest'
oma- 'own'	tera- 'grain';

(b) the following disyllabic A-stem-allomorphs with $\sqrt{i e/}$ or with an $\sqrt{ā/}$, $\sqrt{o/}$, or $\sqrt{u/}$ in the first syllable:

hā ⁱ KA- 'bull'	ō ^{ts} A- 'end'
ke ^l LA- 'clock'	pi ^k KA- 'long'
ki ⁱ KA- 'shoe'	po ^e KA- 'son'
ko ^e RA- 'dog'	pā ^e vA- 'day'

leñmA- 'cow'	seppA- 'smith'
lähe+koñTA- 'vicinity'	šilmA- 'eye'
mešsA- 'forest'	sušsKA- 'ski'
māñKA- 'wet'	veñTA- 'brother'
	väärA- 'wrong';

(c) the following E-, i-stem-allomorphs of subclass 12:

jāñvE- 'lake'	sañKE- 'saw'
kašKI- 'birch'	salmE- 'straights'
leñTE- 'leaf'	tāñTE- 'star'
pōñvE- 'generation'	šilKI- 'straw';
pōñvI- 'knee'	

(d) E- and i-stem-allomorphs of all other subclasses with the exception of three-syllable stem-allomorphs of subclass 23.

Examples:

oma-I > omi 'own (part. -pl.)'
 kiñKA-I > kiñki 'some shoes'
 jāñvE-I > jāñvi 'some lakes'
 kašKI-I > kaški 'some birch trees'
 kāñI-I > kāñi 'some hands'
 kañNI-I > kaññi 'some lids'
 lañsE-I > lañši 'some children'
 uñTE-I > uñši 'some new ...-s'
 kōñTE-I > kōñši 'some stubble'
 suñrE-I > suñri 'some large ...-s'
 teñvisE-I > teñviši 'some greetings'
 kūñimusE-I > kūñimuši 'some questions'
 meñE-I > meñi 'some men'
 nañsE-I > nañši 'some women'
 lañplasE-I > lañplaši 'some Lapps'
 apiñisE-I > apiñiši 'some servants'
 iñimesE-I > iñimeši 'some people'
 lühikkEsE-I > lühikši 'some small ...-s'

-šit occurs with (a) all nouns of subclasses 21 and 22; (b) all nouns of subclass 11 ending in a cluster of unlike vowels; (c) all other nouns of subclass 12 (i.e., which do not take one of the allomorphs -U, -E, -I, or -Lsit); e.g.,

api- 'help'	hāta- 'misfortune'
kari- 'shoal'	isa- 'father'
kāpi- 'cone'	oja- 'brook'
tūñi- 'quarrel'	pañTja- 'pot'
itu- 'sprout'	kuñPE- 'jacket'

kupu- 'bale'	lilIE- 'flower'
maTu- 'snake'	puŋJE- 'sail'
talu- 'farm'	õŋWE- 'courtyard'
tiKu- 'snail'	turŋmA- 'dumb'
lakI- 'roof'	kiŋkKU- 'hillock'
väKI- 'force'	raŋKU- 'twig.'
ema- 'mother'	

(The nouns saT^ja- '100,' tera- 'grain,' and riitU- 'quarrel' also have alternate forms in -ŋit; see above under -U, -E, and -I.) Examples:

saŋ-ŋit > saŋŋit 'some staffs'
 lume-ŋit > lumeŋit 'some snows'
 pere-ŋit > pereŋit 'some families'
 õlle-ŋit > õlleŋit 'some beers'
 tüli-ŋit > tüliŋit 'some quarrels'
 talu-ŋit > taluŋit 'some farms'
 laKI-ŋit > lakeŋit 'some roofs'
 tera-ŋit > teraŋit 'some grains'
 lilIE-ŋit > lilieŋit 'some flowers'

-it occurs with all other stem-allomorphs. Examples:

neē-it > neit 'some of these'
 noŋ-it > noit 'some of those'
 hää-it > häit 'some good ... -
 puŋ-it > puit 'some trees'
 keēvA-it > keēvait 'some boiling ... -s'
 miŋija-it > miŋijait 'some daughters-in-law'
 tänavA-it > tänavait 'some streets'
 iŋkELI-it > iŋkleit 'some angels'
 kuŋlUsA-it > kuŋlsait 'some famous ... -
 räämattU-it > räämattuit 'some books'
 tiheTA-it > tihetait 'some close ... -s'
 haŋpa-it > haŋpait 'some teeth'
 laŋkme-it > laŋkmeit 'some branchings'
 västuse-it > västuseit 'some answers'
 hääavattu-it > hääavattuit 'some wounded people'
 punase-it > punaseit 'some red ... -s'
 mäaŋikka-it > mäaŋikkait 'some strawberries'
 sütaMe-it > sütameit 'some hearts'
 väikse-it > väikseit 'some small ... -

-IL- is found with kōŋkKE- 'all' (050); i.e., kōŋkKE-IL- > kōŋk-.

-UL- is found with the following disyllabic stem-allomorphs of subclass 12: ja^hKA- 'leg,' ma^hJA- 'berry.' Examples: ja^hKA-UL- > jalu- 'legs' ma^hJA-UL- > ma^hrju- 'berries.'

-i- is found with the following vowel stem-allomorphs of subclasses 011, 11, 12, 23, 24, and 31: (011) ne^h- 'this,' no^h- 'that (over there)'; (11) ma^h- 'country,' pu^h- 'tree'; (12) vapa- 'free'¹³; (23) ilusA- 'beautiful,' k^höverA- 'crooked'; (24) ha^hke- 'sick,' p^höitla- 'thumb'; (31) punase- 'red.' Examples:
 ne^h-i- > ne^hi- 'these'
 pu^h-i- > pu^hi- 'trees'
 ilusA-i- > ilusai- 'beautiful ... -
 punase-i- > punasei- 'red ... -

8.22. The eleven secondary case suffixes are affixed to the genitive-singular, genitive-plural, or partitive-plural form of the noun. These noun forms shall be called inflected stems.

The secondary case suffixes and their allomorphs are:

{-s} 'inessive,' which has the single allomorph -s. Examples: ses 'in this ...' (se-, 011); selles 'in this ...' (selle-, 014); ma^has 'in a country' (ma^has-, 11); vapates ma^hates/vapais ma^his 'in free countries' (vapa-, 12); itus 'covered with sprouts (in sprout)' (itu-, 12); rahu^h 'in peace' (rahu-, 12); talus 'on the farm' (tal-, 12); tulus 'in a mood' (tulu-, 12); to^has 'in the room' (tuPa-, 12); tupates 'in the rooms'; ä^hijas 'in the garden' (a^hETJA-, 12); ä^hjus 'in the oven' (a^hJU-, 12); jä^hrvetes 'in the lakes' (jä^hrVE-, 12); läuvas 'at the table' (lä^hTA-, 12); öuvas 'outside; in the yard' (ö^hWE-, 12); l^hinnas 'in the city' (l^hinA-, 12); l^hikkus 'locked (in lock)' (lu^hkkU-, 12); pu^hñsis 'in the punch' (pu^hñSI-, 12); pi^hlves 'covered with clouds' (pi^hlVE-, 12); r^héstorapis 'in the restaurant' (r^héstoranI-, 12); meres 'in the sea' (merI-, 21); mures 'in sorrow' (mure-, 22); ko^hés 'in the weave' (kuTe-, 22); etro^höppas 'in Europe' (etro^höppa-, 23); ke^hévas 'in boiling ...' (ke^héVA-, 23); a^hñkkrus 'at anchor' (a^hñkkUrU-, 23); ve^hés 'in the water' (veT^hI-, 23); sä^hapastes 'in the boots' (sä^hapas-, 24).

{-sse} 'illative, which has the single allomorph -sse. Examples: neisse 'into these ...' (ne^h-, 011); s^héllesse 'into that ...' (s^hélle-, 014); kupusse 'into the bale' (kupu-, 12); kuputesse

'into the bales'; sajasse 'into a hundred' (saT^ja-, 12); satatesse 'into hundreds; jõusse 'into the power' (jõ^lUTU-, 12); jõututesse 'into the powers'; ko^lesse 'into the weave'; õllesse 'into the beer' (õlle-, 22); õlletesse 'into the beers'; väiksemattesse 'into the smaller ...-s' (väiksemaH-, 23); kirikkusse 'into the church' (kirikkU-, 23); jumalasse 'belief in God' (jumalA-, 23); keltrisse 'into the cellar' (kel^tERi-, 23); kä^sesse 'into the hand' (kä^TI-, 23); kä^ttesse 'into the hands' (kä^T-); uuttesse 'into the new ...-s' (üu^T-, 23); läänesse 'into the west' (lää^NE-, 23); häämmastesse 'into the teeth' (häämmas-, 23); väiksesse 'into the light' (väikuse-, 24); punasesse 'into the red ...' (punase-, 31); punastesse 'into the red ...-s' (punas-); kümⁿentasse 'into the tenth ...' (kümⁿenta-, 32); väiksesse 'into the small ...' (väikse-, 33); väikstesse 'into the small ...-s' (väiks-).

{-st} 'relative,' which has the single allomorph -st. Examples: neⁱst 'out of these ...' (ne^e-, 011); meⁱst 'from us' (meⁱ-, 023); enesest 'about himself' (enese-, 031); pu^ust 'out of the tree' (pu^u-, 11); puⁱst 'out of the trees'; ärist 'out of the shop' (äri-, 12); kivitest '[made] of stones' (kivi-, 12); majast 'out of the house' (maja-, 12); järvest 'out of the lake' (jä^rvE-, 12); küllast '[made] of gold' (ku^lTA-, 12); pääⁱst 'out of the boat' (pää^tI-, 12); ma^rjatest 'made with berries'; õhtust 'from evening to ...' (õhtu-, 22); humalatest '[made] with hops' (humalAH-, 23); ve^est 'out of the water' (ve^TI-, 23); ra^amatuttest 'from books' (ra^amatUH-, 23).

{-l} 'adessive,' which has the single allomorph -l. Examples: temal 'on it (tema-, 011); n^entel 'on them' (n^em-); sel 'on this ...' (se-, 011); nelⁱ 'on these ...' (ne^e-); tal 'he [has]' (ta-, 012); kel 'who [has]' (ke-, 013); k^el^el 'who [has]' (k^elle-, 014); teil 'you [have]' (teⁱ-, 023); ma^al 'in the country' (ma^a-, 11); õ^öl 'at night' (õ^ö-, 11); kivitel 'on the stones'; r^annal 'on the shore' (raⁿTA-, 12); p^öllul 'in the field' (p^ölⁱTU-, 12); k^ölmantal k^ör^ral 'for the third time' (k^ölmanta-, 32); ko^fTA-, 12); ma^rjatel 'the berries [have]' (ma^rJA-, 12); ma^rjul 'gathering berries (at berries)'; talvel 'during the winter' (talvE-, 12); pojal 'the boy [has]' (po^eKA-, 12); mõnel 'on some ...' (mõnI-, 21); j^üulil '[on the ...-th] of July' (j^üulI-, 22); p^örantal 'on the floor'

(põrantA-, 23); hõmmikkul 'in the morning' (hõmmikkU-, 23); lüülettajattel 'the poets [have]' (lüülettajaH-, 23); tänaval 'on the street' (tänavA-, 23); kaljal 'on the shore' (kalja-, 24); kättusel 'on the roof' (kättuse-, 24); inimesel 'the person [has]' (inimesE-, 31); inimestel 'the people [have]' (inimes-).

{-le} 'allative,' which has the allomorphs -lle and -le. -lle occurs with one-syllable inflected stems which end in a single vowel; -le occurs elsewhere. Examples:

talle 'to her' (ta-, 012); mulle 'to me' (mu-, 022); teile 'to you' (teI-, 023); sellele 'to this ...' (selle-, 014); endale 'to himself' (enda-, 032); maale 'to the country'; tööle 'to work' (töö-, 11); häatele 'to the good ...-s' (hää-, 11); emale 'to mother' (ema-, 12); mārjule 'to gather berries'; poisile 'to the boy' (poisI-, 12); kohale 'to the spot' (kohta-, 12); sõprale 'to the friend' (sõpPrA-, 12); kõnverepõsile 'to the conference' (kõnversensI-, 12); naapriile 'to the neighbor' (naapErI-, 23); naaprittele 'to the neighbors' (naapErIH-); lapsale 'to the child' (lapsE-, 23); lastele 'to the children' (lās-); kaljale 'to the shore'; küsimustele (küsimusE-, 24); mehele 'to the man' (mehE-, 24); meestele 'to the men' (mees-); kümmentatele 'to the tenth ...-s' (kümmentaH-, 32).

{-ltt} 'ablative,' which has the single allomorph -ltt. Examples: neilt 'from them' (neE-, 011); pajalt 'from the workshop' (paja-, 12); vennalt 'from brother' (venTA-, 12); mārjult 'from gathering berries'; tulelt 'away from the fire' (tulI-, 21); põrantalt 'off the floor'; vanemalt 'from the older ...' (vanema-, 23); kõõkalt 'from off the mountain' (kõõka-, 24).

{-ks} 'translative,' which has the single allomorph -ks. Examples: maaks '[to become] a country'; pühateks 'for the holidays' (püha-, 12); vanaks 'to get old' (vana-, 12); mārjaks '[to get] wet' (mārjKA-, 12); jaoks 'for a share, as one's lot' (jaKu-, 12); jõuluks 'for Christmas' (jõulU-, 12); talveks 'for the winter'; viisiks 'as a matter of habit' (viisI-, 12); kottapikkuks '[to become] a citizen' (kottapikkU-, 23); paremaks '[to get] better' (parema-, 23); puhtaks '[to get] clean' (puhta-, 24); haikeks 'to stay sick' (haike-, 24); vastuseks 'for an answer' (vastuse-, 24).

{-na} 'essive,' which has the single allomorph -na. Examples: juhina 'as the leader' (juhTI-, 12); vängkina 'as a prisoner'

(va^hki-, 12); va^hkitena 'as prisoners'; viimasena 'as the last' (viimase-, 31).

{-pi} 'terminative,' which has the single allomorph -pi. Examples: ma^hpi 'up to the ground'; to^hpi 'as far as the room'; j^hopi 'as far as the river' (j^hoki-, 12); ma^hpi 'as far as the mountain' (ma^hKi-, 12); ^hotupi 'until evening'; pu^hsattepi 'up to the hips' (pu^hsAH-, 23); k^uuvepi 'until six (o'clock)' (ku^hTE-, 23).

{-ka} 'comitative,' which has the single allomorph -ka. Examples: n^henteka 'with them'; m^hilleka 'with what' (m^hille-, 013); m^heijeka 'with us' (m^heije-, 024); eneseka 'with himself'; s^honateka 'with words' (s^hona-, 12); kiviteka 'with stones'; so^htsiteka 'with wizards' (so^htsi-, 12); lo^haka 'with a tether' (lo^hAKA-, 12); j^hilleteka 'with flowers' (j^hille-, 12); j^huttuka 'with a story' (j^huttU-, 12); ka^harika 'with scissors' (ka^hARI-, 12); perekaka 'with the family'; ka^htsikkuka 'with a whip' (ka^htsikkU-, 23); na^hapritteka 'with the neighbors'; le^hetritteka 'with the measles' (le^hetErIH-, 23); ko^horeka 'with cream' (ko^horE-, 23); ho^holeka 'with care' (ho^hoI-, 23); hu^hultteka 'with the lips' (hu^hul-, 23); ku^huntteka 'with claws' (ku^hUN-, 23); eh^hmattuseka 'with surprise' (eh^hmattusE-, 24).

{-tta} 'abessive,' which has the single allomorph -tta. Examples: j^hiivatetta 'without wings' (j^hiIPA-, 12); mu^htsitta 'without a cap' (mu^htsiI-, 12); to^hetta 'without the truth' (to^hTI-, 23); lah^hinkuttetta 'without a battle' (lah^hinkUH-, 23); ru^hsikkatta 'without a fist' (ru^hsikka-, 32); ru^hsikkattetta 'without fists' (ru^hsikkaH-); su^htametta 'without a heart' (su^htame-, 33).

9. Verbs. — The inflection of the finite verb in Estonian may be expressed by the formula V(-S₁)(-S₂), in which V = verb stem, S₁ = tense-mood suffix, and S₂ = person(-number) suffix. The occurrence of at least one suffix is obligatory for all verbs except the negative auxiliary {ei}.¹⁴

The four tense-mood suffixes are:

- (1) {- \emptyset -} 'present-indicative'
- (2) {- si -} 'past-indicative'
- (3) {- ksi -} 'conditional'
- (4) {- K -} 'imperative.'

The imperative morpheme combines with the first person plural and second person suffixes to form portmanteau morphs. It does not occur with the first person singular.

The person-(number) suffixes are the following:

- (1) {-n} 'first person singular'
- (2) {-me} 'first person plural'
- (3) {-t} 'second person singular'
- (4) {-tte} 'second person plural'
- (5) {-p} 'third person singular'
- (6) {-vat} 'third person plural'
- (7) {-tta-} 'fourth person.'

The fourth-person suffix indicates an action performed by an unspecified or indefinite agent. The sequential order of the fourth-person suffix is different from that of the other person-number suffixes in that it precedes rather than follows the tense-mood suffixes.¹⁵

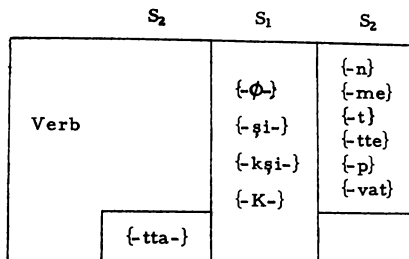


Fig. 11. — The order of inflectional verb suffixes.

9.1. Verbs are divided into one regular group and one anomalous group on the basis of the number of stem-allomorphs which it is necessary to posit for each verb and the distribution of their stem-allomorphs with regard to the voice and tense-mood suffixes.

9.11. The anomalous group of verbs contains six roots, which are assigned to the following four subclasses (numbered 01-04) on the basis of their distribution and number of stem-allomorphs. The roots of subclasses 01 and 02 have highly restricted distributions. The roots of subclasses 03 and 04 have unique sets of three and four stem-allomorphs respectively.

- 01 The roots of this subclass do not occur with person(-number) suffixes in the present- and past-indicative.
 {ei-} 'negative auxiliary' = ei- ∞ e- ∞ āra- ∞ ār-.

- eĭ- occurs with the present-indicative and where no suffix follows; e-, with the past-indicative; āra-, with the 2-sg. imperative portmanteau morph; ār-, with the other imperative portmanteau morphs.
- {pole-} 'not to be' = pole ∞ pōl-.
pole- occurs with the present-indicative; pōl-, with the past participle.
- 02 {lase-} 'to let' has the single allomorph lase-, which occurs only with the past-indicative (plus person-number suffixes). This verb is felt to be more literary than the regular verb lašKE- 'to let' of subclass 13.
- 03 {ūtĭle-} 'to say' = ūtĭle- ∞ ūttel- ∞ ōēl-.
ūtĭle- occurs with the present-indicative, past-indicative, conditional, and the 2-sg. imperative portmanteau morph; ōēl-, with the other imperative portmanteau morphs and the fourth person suffix; ūttel-, with the past participle.
- {ole-} 'to be' = ole- ∞ olĭ- ∞ oñ-.
oñ- occurs with the present-indicative followed by the 3-sg. or 3-pl. person-number suffixes; olĭ-, with the fourth person suffix and those imperative and imperative-person portmanteau morphs other than the 2-sg. imperative; ole-, with all other inflectional endings.
- 04 {mine-} 'to go' = mine- ∞ miñ- ∞ lāĤTE- ∞ lāĭ-.
mine- occurs with the 2-sg. imperative portmanteau morph; miñ-, with the other imperative(-portmanteau) morphs and the fourth person suffix; lāĤTE-, with the present-indicative, past-indicative, and the conditional; lāĭ-, with the past participle.

9.12. Regular verbs are assigned to nine subclasses on the basis of their morphophonemic stem-allomorph types and the number of stem-allomorphs, one or two, which it is necessary to posit for each verb. Verbs with a single stem-allomorph (subclasses 11, 12, 13, 14, 15, and 16) end in a vowel. Verbs with two stem-allomorphs have either a vowel and a consonant stem-allomorph (subclasses 21 and 22) or two vowel stem-allomorphs (subclass 23). To the consonant stem-allomorphs of subclasses 21 and 22 are affixed the fourth-person suffix and those imperative and imperative-person portmanteau morphs other than the

2-*sg.* imperative. All other inflectional suffixes are added to vowel stem-allomorphs. The subclasses of regular verbs are the following:¹⁴

(a) Verbs with a single stem-allomorph:

11 Verbs with stem-allomorphs ending in a vowel cluster.

Examples:

jää- 'to remain,' saá- 'to become, get,' keé- 'to boil (intrans.),' nai- 'to marry,' voi- 'to be able,' kaé- 'to watch,' müü- 'to sell,' käi- 'to visit, come,' vii- 'to take, carry,' pöö- 'to hang,' jöö- 'to drink,' loo- 'to create.'
For stems in OO and ÖÖ: (a) immediately before $\sqrt{a/}$, OO > uu and ÖÖ > üü; (b) OO and ÖÖ plus the suffix -I- both become öi; (c) elsewhere OO > oo and ÖÖ > öö.

12 Verbs with stem-allomorphs of the type (C)VCV-. Examples:

asu- 'to dwell,' ela- 'to live,' küsi- 'to ask,' lisa- 'to add to,' luKe- 'to read,' lupa- 'to promise,' maka- 'to sleep,' palu- 'to request,' piTa- 'to have to,' saT^a- 'to rain,' řiTu- 'to tie,' veTa- 'to pull,' pese- 'to wash,' pure- 'to bite,' uju- 'to swim.'

13 Two-syllable verbs with a single stem-allomorph ending in A, E. Examples:

añTA- 'to give,' heitTA- 'to throw,' hoñTA- 'to preserve,' joóksE- 'to run,' kaitsE- 'to defend,' laüLA- 'to sing,' muñTA- 'to break,' peñTA- 'to deceive,' saátTA- 'to accompany,' tappA- 'to kill,' teáTA- 'to know,' tuñTE- 'to feel,' tóštA- 'to raise,' tóúsE- 'to rise,' tañTA- 'to want.'

14 Two-syllable verbs which do not take suffixal allomorphs containing $\sqrt{L/}$. Examples:

jäñkne- 'to follow,' kaóttA- 'to lose,' muşittseeri- 'to play music,' puúttu- 'to concern,' tóóttA- 'to work,' aéle- 'to idle about,' meññi- 'to announce,' meéññi- 'to please,' muúttu- 'to change,' puhke- 'to come open,' loétta- 'to read out loud,' lañku- 'to separate from,' juñtu- 'to take place,' hoñtu- 'to be preserved,' hiilka- 'to shine,' eéltA- 'to presuppose,' taóttle- 'to strive.'

15 All other two-syllable verbs. Examples:

iñtu- 'to sit,' kañva- 'to grow,' kónñi- 'to walk,' löñKu- 'to break (intrans.),' löppu- 'to end,' ráákKi- 'to speak,' suññi- 'to be born,' uñKu- 'to believe.'

- 16 Verbs with stem-allomorphs of three or more syllables.
 Examples:
 ärmasta- 'to love,' ehitta- 'to build,' ešine- 'to appear,'
 ešittile- 'to present,' hälljenta- 'to get green,' häälitse- 'to
 make sounds,' kalasta- 'to fish,' kirjutta- 'to write,'
 kummarta- 'to bow,' põkene- 'to flee,' usalta- 'to dare,'
 õppetta- 'to instruct,' mõttiskle- 'to ponder.'

(b) Verbs with two stem-allomorphs:

- 21 Verbs with a one-syllable consonant stem-allomorph.

Examples:

pane- ∞ pañ- 'to put,' sure- ∞ suř- 'to die,' tule- ∞ tul- 'to
 come,' näKe- ∞ nãh- 'to see,' teKe- ∞ teh- 'to do,' pese- ∞
 peš- 'to wash.'

The verb pese- ∞ peš- was felt to be more literary than the
 above verb pese- 'to wash' in subclass 12.

- 22 Verbs with a two-syllable consonant stem-allomorph.

Examples:

alka- ∞ alaH- 'to begin,' arva- ∞ arvaH- 'to think,' korja- ∞
 kõrjaH- 'to gather,' kuula- ∞ küulaH- 'to listen,' käřssa- ∞
 käřsaH- 'to smoulder,' lakka- ∞ lãkkaH- 'to stop,' lehta- ∞
 lennaH- 'to fly,' oška- ∞ osaH- 'to know how,' peřka- ∞ peřjaH-
 'to fear,' vaatta- ∞ vãataH- 'to watch,' ärkka- ∞ ärkaH- 'to
 awaken,' ootta- ∞ ootaH- 'to wait,' hüpple- ∞ hüppel- 'to jump
 around,' kãantle- ∞ kãanel 'to turn,' mõttile- ∞ mõttel- 'to
 consider,' nuhtle- ∞ nuhel- 'to punish,' võttile- ∞ võrrel- 'to
 compare,' põõrle- ∞ põõrel- 'to spin,' kõnele- ∞ kõnel- 'to
 talk.'

- 23 Verbs with two vowel stem-allomorphs. The second stem-
 allomorph of these verbs (in -Ta-) occurs only with the
 fourth person suffix. Examples:

aja- ∞ aTa- 'to drive,' kattA- ∞ kaTa- 'to cover,' küttA- ∞
 küTa- 'to heat,' võttA- ∞ võTa- 'to take.'

9.12.1. Summary of the morphophonemic stem types of the
 regular verbs.

I. Verbs with one stem-allomorph:

11 V[∅]

12 VCV

13 V^s.A/E

14 V^s.V (never before √L/)

15 Other V^s.V

16 ...V.V.V

II. Verbs with two stem-allomorphs:

21 VC(V)

22 $\check{V}.VH \infty V^s.V$

$\check{V}.el \infty V^s.le$

$V.el(e)$

23 $V^{(s)}.V \infty \check{V}.Ta$

9.2. The inflectional suffixes of the verb are the following.

9.21. The following tense-mood suffixes are added directly to the verb stem-allomorphs or to the fourth person suffix (see §9.22).

{- ϕ -} 'present-indicative' = (-L- ∞ - ϕ -) ∞ (-Lkse ∞ -kse). -Lkse ∞ -kse occur after the fourth person suffix {-tta-}; -L- ∞ - ϕ -, elsewhere. (See Figure 13 [under {-k \check{s} i-} below] for the similarities of allomorph distribution of {-k \check{s} i-}, {- ϕ -}, and {-K-} plus {-t} portmanteau.)

-Lkse occurs following {-tta-} (a) with all subclass 21 verbs except those in -s-; (b) with all subclass 11 verbs in -OO- or - $\check{O}\check{O}$ -; (c) with the following other verbs of subclass 11: müü- 'to sell,' käl- 'to visit,' vii- 'to take'; (d) with {ole-} and {mine-} (subclasses 03 and 04). Examples:
vi \check{i} Ta-Lkse (> vi \check{i} akse) > vi \check{i} jakse 'one takes'
to $\check{O}\check{O}$ Ta-Lkse (> t \check{u} uakse) > t \check{u} uvakse 'one brings'
so $\check{O}\check{O}$ Ta-Lkse (> s \check{u} uakse) > s \check{u} ujakse 'one eats'
n \check{a} hTa-Lkse > n \check{a} hakse 'one sees'
tu \check{l} Ta-Lkse > t \check{u} llakse 'one comes'
su \check{l} Ta-Lkse > s \check{u} rrakse 'one dies'
o \check{l} Ta-Lkse > \check{o} llakse 'one is'
mi \check{n} Ta-Lkse > mi \check{n} nakse 'one goes'

-kse occurs following {-tta-} with all other verbs.

j \check{a} \check{a} Ta-kse > j \check{a} \check{a} takse 'one remains'

pe \check{s} Ta-kse > pe \check{s} takse 'one washes'

\check{o} \check{e} lTa-kse > \check{o} \check{e} ltakse 'one says'

k \check{e} elatTa-kse > k \check{e} elattakse 'one forbids'

k \check{o} nelTa-kse > k \check{o} neltakse 'one talks'

\check{o} stetta-kse > \check{o} stettakse 'one buys'

a \check{h} ta-kse > a \check{h} takse 'one gives'

ehittatta-kse > ehittattakse 'one builds'
 sũitsuttatta-kse > sũitsuttattakse 'one smokes'

-L- occurs with (a) all verbs of subclasses 12, 13, 15, 21, and 23; (b) the anomalous verb {mine-}. Examples:

luKe-L- > loẽ- 'reads'
 palu-L- > palu- 'requests'
 piTa-L- > peã- 'has to'
 saT^ja-L- > saja- 'rains'
 maka-L- > maka- 'sleeps'
 aⁿTA-L- > ẽanna- 'gives'
 la^uLA-L- > laula- 'sings'
 pu^uTA-L- (> pu^ua-) > pu^uja- 'tries to catch'
 teãTa-L- > teã- 'knows'
 tuⁿTE-L- > tũnne- 'feels'
 nãKe-L- > nãẽ- 'sees'
 pane-L- > pane- 'puts'
 aja-L- > aja- 'drives'
 v^ottA-L- > v^ottã- 'takes'
 læⁿTE-L- > læhe- 'goes'

-φ- occurs with all other verbs. Examples:

saã-φ- > saã- 'gets'
 o^ottã-φ- > o^ottã- 'waits'
 oⁿ-φ- > oⁿ- 'is' (before the 3-sg. or 3-pl.)
 ole-φ- > ole 'are' (before any other person-number suffix).

{-ɕi-} 'past-indicative' = -I- ∞ (-s- ∞ -Is- ∞ -Xs-) ∞ (-ɕi- ∞ -Xɕi- ∞ -Lɕi-). The allomorphs -s- ∞ -Is- ∞ -Xs- occur only before the 3-sg. person(-number) suffix, and, in the case of the anomalous {ei-}, when no person(-number) suffix follows. -ɕi- ∞ -Xɕi- ∞ -Lɕi- occur before all other person(-number) suffixes. -I- occurs with all person(-number) suffixes. (See Figure 12 for a summary chart of the allomorph distribution of {-ɕi-}.)

-I- occurs with (a) all verbs of subclass 21; (b) the fourth-person suffix following all verbs; (c) the following verbs of subclass 11: jãã- 'remain', saã- 'get', jQ^o- 'drink', lo^o- 'create', tO^o- 'bring', lO^o- 'strike', sO^o- 'eat'; (d) the anomalous verbs {lase-} and {ole-} (02, 03); (e) the verb piTa- 'to have' of subclass 12. Examples:

subclass anomalous & listed verbs	{mine-} jōŋ ^f TA- lei ^f TA- muŋ ^f TA-	13	23	22	16	15	14	12	11	11(part) {lase-}, {ole
		kait ^f sE- kuŋ ^f lE-	{ei-}, {ütte-}, aja-							
3-sg. & ei#	-Xs-		-Is-							-I-
non-3-sg.	-Xŋi-			-ŋi-			-Lŋi-			
										fourth pe:

Fig. 12. —Summary of the allomorph distribution of {-ŋi-} 'past-indicative.'

teKe-I- > teki- 'did'
 tule-I- > tuji- 'came'
 jOŌTa-I- > joŋti 'one drank'
 peŋtta-I- > peŋtti 'one held'
 jobksta-I- > jobkŋti 'one ran'
 aŋtta-I- > aŋtti 'one gave'
 rāākitta-I- > rāākitti 'one spoke'
 paŋTa-I- > paŋti 'one put'
 kõnelTa-I- > kõnelti 'one talked'
 saā-I- > sai 'got, became'
 tOŌ-I- > tōi 'brought'
 lase-I- > laŋi- 'let'
 ole-I- > oli- 'was'
 piTa-I- > piŋi- 'had to'

- s- occurs with (a) all other verbs of subclasses 11 and 12; (b) all verbs of subclasses 14, 15, 16, and 22; (c) the anomalous verbs (ei-) and (üttele-); (d) the verb aja- of subclass 23; (e) the following verbs of subclass 13 as an alternate form:

kaitsE- 'defend,' kuulE- 'hear.' Examples:

näi-s- > näis- 'appeared'
 pOŌ-s- > poŋs- 'hung'
 ela-s- > elas- 'dwelled'
 luKe-s- > lukes- 'read'
 veTa-s- > vetas- 'pulled'
 süŋTi-s- > süŋtis- 'was born'
 uŋKu-s- > uŋkus- 'believed'
 jäŋkne-s- > jäŋknes- 'followed'
 kirjutta-s- > kirjuttas- 'wrote'
 hiŋne-s- > hiŋnes- 'was late'
 oŋka-s- > oŋkas- 'knew how'
 mõttle-s- > mõttles- 'thought'
 e-s- > es 'past negative auxiliary'
 üttele-s- > ütteles- 'said'
 aja-s- > ajas- 'drove'
 kaitsE-s- > kaitses- 'defended'

- Is- occurs with (a) all other verbs of subclass 23; (b) all verbs

of subclass 13. Examples:
 võttA-Is- > võttis- 'took'
 aŋTA-Is- > aŋtis- 'gave'
 laulA-Is- > laulis- 'sang'

kaĩtsE-Is- > kaĩtšis- 'defended'
taħTA-Is- > taħšis- 'wanted'

-Xs- occurs (a) with the anomalous verb (mine-); (b) as a fast-speech form of the following verbs of subclass 13: jöŭTA- 'arrive,' leiTA- 'to find,' muřTA- 'to break.' Examples:
lāĤTE-Xs- (> lāks-s-) > lāks- 'went'
leiTA-Xs- > leiřs- 'found'
muřTA-Xs- > muřřs- 'broke'

-Xši- occurs with (a) all verbs of subclasses 13 and 23; (b) the anomalous verb (mine-) (i.e., with those verbs which take -Is- and -Xs- before the 3-sg. suffix). Examples:
aħTA-Xši- > aħšši- 'gave'
keētTA-Xši- > keētšši- 'cooked'
leiTA-Xši- > leiřši- 'found'
maksA-Xši- > makšši- 'paid'
seisA-Xši- > seiřši- 'stood'
tařpA-Xši- > tařšši- 'killed'
taħTA-Xši- > taħšši- 'wanted'
aja-Xši- > ajařši- 'drove'
vöřTA-Xši- > vöřšši- 'took'
lāĤTE-Xši- > lāksšši- 'went'

-Lši- occurs with those verbs of subclass 11 which take the past-indicative allomorph in -s- with the 3-sg. suffix. Examples:
müŭ-Lši- > müŭšši- 'sold'
viř-Lši- > viřšši- 'took, carried away'

-ři- occurs with all other verbs which take the allomorph -s- with the 3-sg. suffix. Examples:
ela-ři- > elařši- 'dwelled'
maka-ři- > makařši- 'slept'
öppi-ři- > öppiřši- 'learned'
töotta-ři- > töottařši- 'worked'
imesta-ři- > imestařši- 'amazed'
unusta-ři- > unustařši- 'forgot'
kohta-ři- > kohtařši- 'met'
lehta-ři- > lehtařši- 'slid'
üttele-ři- > ütteleřši- 'said'

{-kři-} 'conditional' = (-ks- ∞ -Lks-) ∞ (-kři- ∞ -Lkři-). The allomorphs -ks- ∞ -Lks- occur with the 3-sg. and fourth-person suffixes; the allomorphs -kři- ∞ -Lkři- occur before

all other person(-number) suffixes. (See Figure 13 for the similarities of allomorph distribution of {-kʃi-}, {-ϕ-}, and {-K-} plus {-t} portmanteau.)

-Lks- ∞ -Lkʃi- occur with (a) all verbs of subclasses 12, 13, 15, 21, and 23; (b) the anomalous verb {mine-}. Examples:
sāra-Lkʃi- > sārakʃi- 'would shine'
ela-Lkʃi- > elakʃi- 'would live'
piTa-Lks- > peāks- 'would have to'
aŋTA-Lkʃi- > ānnakʃi- 'would give'
kuūLE-Lks- > kūuleks- 'would hear'
teāTA-Lks- > teāks- 'would know'
taŋTA-Lks- > tahaks- 'would want'
teKe-Lks- > teēks- 'would make'
vōttA-Lkʃi > vōttakʃi- 'would take'
lāŋTE-Lkʃi- > lāhekʃi- 'would go'

-ks- ∞ -kʃi- occur following (a) the fourth-person suffix {-tta-}; (b) all other verbs. Examples:
palutta-ks- > paluttaks 'one would request'
saā-ks- > saāks- 'would get'
viī-ks- > viīks- 'would take'
ehitta-kʃi- > ehittakʃi- 'would build'
hāājitse-ks- > hāājitseks- 'would pronounce'

{-K-} 'imperative' combines with the first person singular and second person suffixes to form the following portmanteau morphs. (See Figure 13 for the similarities of allomorph distribution of {-ksi-}, {-ϕ-}, and {-K-} plus {-t} portmanteau.)

{-K-} plus {-t} '2-sg.' > -L ∞ -ϕ.

-L occurs with all verbs of subclasses 12, 13, 15, 21, and 23.

Examples:

ʃiTu-L > seō 'tie!'
kūʃi-L > kūʃi 'ask!'
keētTA-L > kēeta 'cook!'
oštA-L > ōsta 'buy!'
laāKE-L > lase 'let!'
kūtsu-L > kūtsu 'invite!'
teKe-L > teē 'do!'
pane-L > pane 'put!'
vōttA-L > vōtta 'take!'

{-φ-}

{-K-}

portr

subclass												restrictions
23	21	15	13	12	04	03	(01)	11	14	16	22	
-Lks-						-ks-						3-sg.
-Lkɣi-						-kɣi-						non-3-sg.
-L-						-ϕ-						except after {-tta-}
-L						-ϕ						

Fig. 13. — Summary of allomorph distributions for:

- (1) {-kɣi-} 'conditional' (except after {-tta-}),
- (2) {-ϕ-} 'present-indicative' (except after {-tta-}), and
- (3) {-K-} 'imperative' plus {-t} '2-sg.' portmanteau.

- ϕ occurs with all other verbs. Examples:

āra- ϕ > āra 'don't!'
 mine- ϕ > mine 'go!'
 üttle- ϕ > üttle 'say!'
 jāā- ϕ > jāā 'remain!'
 kaē- ϕ > kaē 'look!'
 korista- ϕ > korista 'clean up!'
 kummarta- ϕ > kummarta 'bow!'
 puĥka- ϕ > puĥka 'rest!'
 vaätta- ϕ > vaätta 'watch!'

{-K-} plus {-me} '1-pl.' > -Lkem ∞ -kEm.

{-K-} plus {-tte} '2-pl.' > -Lke ∞ -kE.

Elsewhere -K- has the allomorphs -Lku- ∞ -kU-; i.e., before the third person singular and third person plural, and after the fourth person morphemes.

-Lkem, -Lke, -Lku are suffixed to (a) all verbs of subclasses 11 and 21; (b) the anomalous verbs {ole-} 'be' and {mine-} 'go.'
 Examples:

naī-Lku > nāiku 'may he marry'
 kaē-Lku > kāeku 'may he look'
 jOŌ-Lke > jōoke 'drink!'
 sŌŌ-Lke > sōōke 'eat!'
 tOŌ-Lku > tōoku 'may they bring'
 teĥ-Lku > tēhku 'may he make'
 ol-Lku > ōlku 'may he be'
 paĥ-Lke > pāṅke 'put!'
 miĥ-Lke > miṅke 'go!'
 tuī-Lku > tūlku 'may they come'

-kEm, -kE, -kU occur following (a) the fourth person suffix {-tta-}; (b) all other verbs. Examples:

sŌŌTa-kU > sōōtaku 'may one eat'
 miĥTa-kU > miĥtaku 'may one go'
 jobksE-kU > jōbksku 'may he run'
 keētTA-kU > keētku 'may he cook'
 kuūlE-kE > kuūlke 'listen!'
 aĥTA-kE > aĥtke 'give!'
 laūlA-kEm > laūlkem 'let's sing'
 maĥsA-kU > maĥsku 'may they pay'
 vōttA-kU > vōttku 'may they take'

uš^hKu-kE > uš^hkuke 'believe!
 aš^hle-kU > aš^hleku 'may he idle about'
 taš^httle-kU > taš^httleku 'may they strive'
 āntesta-kE > āntestake 'forgive!'
 eš^hittle-kU > eš^hittleku 'may he present'
 tūt^hvusta-kU > tūt^hvustaku 'may he get acquainted'
 ā^har-kU > ā^harku 'may he not'
 ā^har-kEm > ā^harkem 'may we not'
 ā^har-kE > ā^harke 'don't!'
 öš^hl-kE > öš^hlke 'say!'
 pē^hljaH-kU > pē^hljakku 'may he fear'
 vōokaH-kU > vōokakku 'may it flow'
 kūulaH-kE > kūulakke 'listen!'
 pōōrel-kU > pōōrelku 'may it spin'

9.22. Person-(number) Suffixes

9.22.1. The suffix {-tta-} 'fourth person' occurs immediately following the verb and precedes the tense-mood suffixes. {-tta} has the allomorphs -Ta- ∞ -Xta- ∞ -tta- ∞ -Ltta- ∞ -ELtta-.

-Ta- occurs with all verbs of subclasses 11, 21, and 22; and with the anomalous verbs of subclasses 03 and 04. This allomorph retains its morphophonemic shape, forming a fourth-person stem in -Ta-. Examples:

jāā^h-Ta- > jāā^hTa- 'remain'
 vii^h-Ta- > vii^hTa- 'take, carry'
 tōō^h-Ta > tōō^hTa- 'bring'
 sōō^h-Ta- > sōō^hTa- 'eat'
 nāñ^h-Ta- > nāñ^hTa- 'see'
 tuī^h-Ta- > tuī^hTa- 'come'
 su^h-Ta- > su^hTa- 'die'
 hāavaH-Ta- > hāavatTa- 'wound'
 kēelaH-Ta- > kēelatTa- 'forbid'
 kōnel-Ta- > kōnelTa- 'talk'
 miñ^h-Ta- > miñ^hTa- 'go'
 öš^hl-Ta- > öš^hlTa- 'say'
 oī^h-Ta > oī^hTa- 'be'

-ELtta- occurs with (a) all subclass 13 stem-allomorphs in -A- preceded by a cluster of obstruent plus stop; (b) the verb sāā^hTA- 'to place' of subclass 13; (c) all (C)VCV-stem-allomorphs in -a- preceded by √T/ or √K/ (i.e., all of subclass 23 and a part of subclass 12). Examples:

keētTA-ELtta- > kēetetta- 'cook'
 peitA-ELtta- > pēitetta- 'deceive'
 oštA-ELtta- > oštetta- 'buy'
 saātTA-ELtta- > sātetta- 'send'
 sōītTA-ELtta- > sōitetta- 'drive'
 tāitTA-ELtta- > taitetta- 'fill'
 taḥpA-ELtta- > tāpetta- 'kill'
 sääTA-ELtta- > sētetta- 'place'
 aTa-ELtta- > aētta- 'drive'
 kaTa-ELtta- > kaētta- 'cover'
 vōTa-ELtta- > vōētta- 'take'
 piTa-ELtta- > pēētta- 'hold'

-Xta- occurs with all other verbs of subclass 13. Examples:

aḥTA-Xta > aḥtta- 'give'
 maksA-Xta > maksta- 'pay'
 neētTA-Xta > neētta- 'curse'
 laūlA-Xta > laūlta- 'sing'
 teātTA-Xta > teātta- 'know'
 joōksE-Xta > joōksta- 'run'

-Ltta- occurs with all other verbs of subclasses 12 and 15.

Examples:

ḡiTu-Ltta > seōtta- 'tie'
 tasu-Ltta > tasutta- 'pay'
 kuḡsu-Ltta > kūtutta- 'invite'
 rāākKI-Ltta > rāākitta- 'speak'

-tta- occurs with all other verbs. Examples:

jāīkne-tta > jāīknetta- 'follow'
 muḡittseēri-tta > muḡittseēritta- 'make music'
 ehitta-tta > ehittatta- 'build'
 sūitsutta-tta > sūitsuttatta- 'smoke'
 vāimusta-tta > vāimustatta- 'inspire'
 vālkusta-tta > vālkustatta- 'illuminate'
 ūhenta-tta > ūhentatta- 'unite'

9.22.2. All other person-number suffixes are added to the tense-mood suffixes.

{-n} 'first person singular' has the single allomorph -n.

Examples:

joō-φ-n > joōn 'I drink'
 tuūtE-L-n > tūnnen 'I feel'

ǎrmasta-φ-n > ǎrmastan 'I love'
 nāKe-L-n > nāēn 'I see'
 ole-φ-n > olen 'I am'
 jOŌ-I-n > jŏŭn 'I drank'
 tuĥTE-Xŕi-n > tuĥŕŕin 'I felt'
 ǎrmasta-ŕi-n > ǎrmastaŕin 'I loved'
 nāKe-I-n > nākin 'I saw'
 jOŌ-kŕi-n > joŏkŕin 'I would drink'
 tuĥTE-Lkŕi-n > tūnekŕin 'I would feel'

{-me} 'first person plural' has the single allomorph -me.

Examples:

piTa-L-me > peāme 'we have to'
 ŕisa-L-me > ŕisame 'we add'
 hoŕTA-L-me > hŏŕjame 'we preserve'
 vŏttA-L-me > vŏttame 'we take'
 ŭttle-φ-me > ŭttleme 'we say'
 kuŭla-φ-me > kuŭlame 'we listen'
 tǎrvitta-φ-me > tǎrvittame 'we use'
 saā-I-me > saīme 'we became'
 piTa-I-me > piŕime 'we had to'
 ela-ŕi-me > elaŕime 'we lived'
 kŏnele-ŕi-me > kŏneleŕime 'we were talking'
 kuivatta-ŕi-me > kuivattaŕime 'we dried'
 saā-kŕi-me > saākŕime 'we would become'

{-t} 'second person singular' has the single allomorph -t.

Examples:

saā-φ-t > saāt 'you become'
 nāKe-L-t > nāēt 'you see'
 ole-φ-t > olet 'you are'
 lǎĥTE-L-t > lǎhet 'you go'
 ǎrmasta-φ-t > ǎrmastat 'you love'
 lŌŌ-I-t > lŏit 'you struck'
 pane-I-t > paŕit 'you put'
 nāKe-I-t > nākit 'you saw'
 lǎĥTE-Xŕi-t > lǎkŕit 'you went'
 saātTA-Xŕi-t > saātŕit 'you sent'
 ŏppi-Lkŕi-t > ŏppikŕit 'you would learn'

{-tte} 'second person plural' has the single allomorph -tte.

Examples:

ela-L-tte > elatte 'you live'
 piTa-L-tte > peätte 'you have to'
 ta^hTA-L-tte > tahatte 'you want'
 rä^äkKi-L-tte > rä^äkitte 'you speak'
 könele- ϕ -tte > könelette 'you talk'
 tär^vitta- ϕ -tte > tär^vittatte 'you use'
 ole-I-tte > o^litte 'you were'
 üt^lle- ϕ i-tte > üt^lle ϕ itte 'you said'

{-p} 'third person singular' has the allomorphs -p and - ϕ .

- ϕ occurs (a) after the past-indicative, imperative, and conditional;
 (b) with the present-indicative of {ole-}. Examples:

o^h- ϕ - ϕ > o^h '(he) is'
 ole-I- ϕ > o^li '(he) was'
 ole-ks- ϕ > oleks '(he) would be'
 jä^ä-I- ϕ > jä^ä '(she) remained'
 näⁱ-s- ϕ > näⁱs '(it) appeared'
 asu-s- ϕ > asus '(he) dwelled'
 saT^ja-s- ϕ > satas 'it rained'
 kaⁿTA-Is- ϕ > kaⁿ ϕ is '(he) carried'
 istu-s- ϕ > istus '(he) sat'
 hä^vitta-s- ϕ > hä^vittas '(he) defeated'
 a^lka-s- ϕ > a^lkas '(he) began'
 piTa-I- ϕ > pi^ti '(he) had to'

-p occurs elsewhere after the present-indicative. Examples:

käⁱ- ϕ -p > käⁱp '(he) strikes'
 piTa-L-p > pe^ap '(he) has to'
 saT^ja-L-p > sa^jap 'it is raining'
 aⁿTA-L-p > äⁿnap '(he) gives'
 istu-L-p > istup '(he) sits'
 a^lka- ϕ -p > a^lkap '(he) begins'
 ehⁱttta- ϕ -p > ehⁱttap '(he) is building'

{-vat} 'third person plural' has the allomorphs -vat ∞ -t ∞ - ϕ .

- ϕ occurs with the imperative and the present-indicative of {ole-}.

Examples:

o^h- ϕ - ϕ > o^h '(they) are'
 tu^l-Lku- ϕ > t^llku 'may they come'

-vat occurs with the present-indicative elsewhere. Examples:

käⁱ- ϕ -vat > käⁱvat '(they) visit'
 sö^ö- ϕ -vat > sö^övat '(they) eat'

veTa-L-vat > veávat '(they) pull'
 luKe-L-vat > loévat '(they) read'
 joóksE-L-vat > jóoksevat '(they) run'
 kašva-L-vat > kásvavat '(they) grow'
 aústa-φ-vat > aústavat '(they) help'
 ehitta-φ-vat > ehittavat '(they) are building'
 leánta-φ-vat > leántavat '(they) fly'

-t occurs with the past-indicative and conditional. Examples:
 tOÓ-I-t > tóít '(they) brought'
 pane-I-t > pañit '(they) put'
 ole-I-t > ojit '(they) were'
 heítTA-Xši-t > heítšit '(they) threw'
 ištu-ši-t > ištušit '(they) marveled'
 imesta-ši-t > imestašit '(they) marveled'
 hačka-ši-t > hačkašit '(they) began'
 sára-Lkši-t > sarakšit '(they) would shine'
 kuúlE-Lkši-t > kúulekšit '(they) would hear'

10. Stem expansion. — The expansion of stems in Estonian is accomplished by means of derivational suffixes and word compounding. Although a full treatment of stem expansion is beyond the scope of this study, I shall here present a brief sketch in order to illustrate some of the more productive types.

10.1. Derivation. — By means of derivational suffixes stems of all word classes (i.e., nouns, verbs, particles as defined above) may become new members of the same word class or members of any other class. Although all possible combinations of original word class and resultant word class are attested, in modern Estonian only the noun and verb classes appear to be productive in providing stems for further expansion.

Some of the more frequent productive derivational suffixes are given in the following paragraphs. The descriptions of most of the suffixes, however, are incomplete in two respects: (1) I have not attempted to list allomorphs which appear to be rare or non-productive, and (2) most of the suffixes occurred too infrequently in my corpus to permit a detailed description of their allomorph distributions. The only suffixes for which a relatively complete description can be claimed are the following:
 {-mi(ne/s(E))-} 'verbal substantive,' {-ja(H)-} 'agent substantive,' {-vA(H)-} 'present participle,' {-ma} 'infinitive I,' {-ta} 'infinitive II,' and {-(n)ut} 'past participle.' In a more detailed

analysis of Estonian derivation it may prove advantageous to segment several of the unit suffixes below into two or more morphemes (i.e., to recognize a class of connective suffixes). The terms "substantive" and "adjective" indicate syntactical subclasses of nouns. These terms provide convenient labels for the description of the various types of suffixes and need not be more explicitly defined here.

10.11. Noun-producing Suffixes

10.11.1. Suffixes which are affixed to nouns:

{-mA(H)-} 'comparative' = -mA(H)- ∞ -LmA(H)- ∞ -ELmA(H)-, which are suffixed only to vowel stem-allomorphs and form nouns of subclass 23. This suffix is affixed only to certain nouns, predominantly adjectives, which it is necessary to list. For a small group of these nouns it is necessary to recognize a special comparative/superlative stem-allomorph, mostly suppletive, which occurs only with this suffix and the superlative suffix {-I-}; i.e., pare- for hääd- 'good,' ena- for pälju(H)- 'much, many,' lähe- for lähe(ne/s(e)- 'close,' lühe- for lühikkE(ne/s(E))- 'short,' õhe- for õhukke(ne/s(E))- 'thin,' pise- for pişikke(ne/s(E))- 'small.'

-LmA(H)- occurs (a) after the superlative {-I-} with disyllabic E-stem-allomorphs of subclasses 23 and 31 and all nouns of subclass 12; (b) with disyllabic E-stem-allomorphs of subclasses 12, 23, and 31; (c) with I-stem-allomorphs of subclass 12; (d) with subclass 12 U-stem-allomorphs of more than two syllables; (e) with lo¹TU- 'loose' (12). Examples:
 küpsE-LmA(H)- > küpsmA(H)- 'riper'
 uu¹TE-LmA(H)- > uu¹vemA(H)- 'newer'
 õ¹ne(+)¹lkkU-LmA(H)- > õ¹nnelikkumA(H)- 'happier'
 ha¹lI-LmA(H)- > ha¹llimA(H)- 'greyer'

-ELmA(H)- occurs with (a) other U-stem-allomorphs of subclass 12; (b) A-stem-allomorphs of subclass 12; (c) the following A-stem-allomorphs of subclass 12: kõva- 'hard,' paha- 'bad,' vana- 'old,' visa- 'persistent'; (d) lähja(H)- 'lean' (22).

Examples:

hu¹U-ELmA(H)- > hü¹llemA(H)- 'crazier'
 paksU-ELmA(H)- > paks¹emA(H)- 'thicker'
 hal¹PA-ELmA(H)- > halv¹emA(H)- 'worse'
 la¹sKA-ELmA(H)- > la¹isemA(H)- 'lazier'

mā¹KA-ELmA(H)- > mā¹rjēmA(H)- 'wetter'
 vana-ELmA(H)- > vanēmA(H)- 'older'

- mA(H)- occurs (a) after the superlative {-I-} with other nouns;
 (b) with other nouns. Examples:
 pare-mA(H)- > parēmA(H)- 'better'
 lāhe-mA(H)- > lūhēmA(H)- 'shorter'
 (12) vāpā-mA(H)- > vāpāmA(H)- 'freer'
 (22) hāppu-mA(H)- > hāppumA(H)- 'more sour'
 (23) kuūlUsA-mA(H)- > kuūlsāmA(H)- 'more famous'
 (23) pimeTA-mA(H)- > pimētāmA(H)- 'darker'
 (31) vāēse-mA(H)- > vāēsemA(H)- 'poorer'
 (32) vī¹jakka-mA(H)- > vī¹jjakkāmA(H)- 'more fruitful'

{-I-} 'superlative' = -I- ∞ -i- ∞ -XeI-, which are suffixed only to vowel stem-allomorphs. This suffix occurs before the comparative suffix {-mA(H)-} and after a relatively small group of adjectives.¹⁷

-XeI-, a non-standard allomorph, was attested with the following A-stem-allomorph of subclass 12: pikKA- 'long'; i.e.,
 pikKA-XeI-LmA(H)- > pikkeimA(H)- 'longest'

-I- was attested with (a) raške(H)- 'difficult' (23); (b) the following disyllabic E-stem-allomorphs of subclasses 12, 23, and 31: (12) kūšsE- 'ripe,' (23) suur(E)- 'large' and uuT(E)- 'new,' (31) pui(ne/s(E))- 'become like wood'; (c) the following other nouns of subclass 12: kena- 'beautiful,' sošJA- 'warm,' vāšsKI- 'false'; (d) those nouns for which it is necessary to set up special comparative/superlative stem-allomorphs (cf. {-mA(H)-} above). Examples:
 kūšsE-I-LmA(H)- > kūššimA(H)- 'ripest'
 uuTE-I-LmA(H)- > ūušimA(H)- 'newest'
 sošJA-I-LmA(H)- > sošjimA(H)- 'warmest'¹⁸
 pare-I-mA(H)- > parimA(H)- 'best'

-i- occurred with the following other nouns of subclasses 23 and 32: (23) ilusA(H)- 'beautiful,' kihtELA(H)- 'firm,' kuūlUsA(H)- 'famous,' lāpšikkU(H)- 'childish,' pimeTA(H)- 'dark,' sūkavA(H)- 'deep,' ūiheTA(H)- 'dense,' tāhtIsA(H)- 'important,' ušinA(H)- 'diligent,' vāhva(H)- 'brave,' viletsA(H)- 'miserable,' šōnnettu(H)- 'unhappy'; (32) jōšukka(s/H)- 'wealthy'; vī¹jakka(s/H)- 'fruitful.' Examples:

tāhtsA-i-mA(H)- > tāhtsaimA(H)- 'most important'
 õnnettu-i-mA(H)- > õnnettuimA(H)- 'most unhappy'

{ⁿ/s(e(H))-} 'adjective-forming' = -ne/s(e)- ∞ -Lne/s(e)- ∞
 (-Xne/s(e)- ∞ -Xne/se(H)-), which are only suffixed to vowel
 stem-allomorphs. This suffix, which is added primarily to
 substantive nouns, forms nouns of subclass 31.

-Xne/s(e) is found with (C)VCI stem-allomorphs. Examples:
 veri-Xne/s(e)- > veri(ne/s(e))- 'bloody'
 tõTI-Xne/s(e)- > tõši(ne/s(e))- 'true'

-Xne/se(H)- is found with certain disyllabic A-stem-allomorphs of
 subclass 12. Examples:
 raúTA-Xne/se(H)- > raút(ne/se(H))- 'iron'
 nuřkKA-Xne/se(H)- > nuřkk(ne/se(H))- 'cornered'

-Lne/s(e) is found with certain other disyllabic stem-allomorphs
 of subclass 12. Examples:
 vařkKU-Lne/s(e)- > vařku(ne/s(e))- 'protein'
 řiivA-Lne/s(e)- > řiiva(ne/s(e))- 'sandy'

-ne/s(e)- is found with other CVCV stem-allomorphs. Examples:
 řina-ne/s(e)- > řina(ne/s(e))- 'linen'
 pori-ne/s(e)- > pori(ne/s(e))- 'dirty'

{-řkkU(H)-} 'substantive-forming' has the sole allomorph
 -(+)...řkkU(H)-, which is only suffixed to vowel stem-allo-
 morphs. √(+)/ is added immediately before the final syl-
 lable of the stem-allomorph to which it is affixed. This
 suffix forms nouns of subclass 12. Examples:
 mataA-(+)...řkkU(H)- > mata(+)...řkkU(H)- 'low place'
 kõlmantA-(+)...řkkU(H)- > kõlman(+)...řkkU(H)- 'a third'

{-ř(ne/s(E))-} 'adjective-forming' = -ř(ne/s(E))- ∞ -Lř(ne/s(E))-,
 which have the same distribution with regard to noun sub-
 classes as the genitive-singular allomorphs -∅ and -L
 respectively. This suffix, which is added primarily to
 substantive nouns, forms nouns of subclass 31. Examples:
 nāKu- 'face and -Lř(ne/s(E))- nāõř(ne/s(E))- 'looking,
 resembling'
 vāřvI- 'color' and -Lř(ne/s(E))- > vāřviř(ne/s(E))- 'colored'
 keērTU- 'a twist' and -Lř(ne/s(E))- > keēruř(ne/s(E))-
 'involved'

'having needles'
aseme- 'place' and -i(ne/s(E))- > asemei(ne/s(E))- 'positioned'

{(+)}ikkU- 'adjective-forming' = -(+)}ikkU- ω -X(+)}ikkU- ω -L(+)}ikkU-, which are only suffixed to vowel stem-allomorphs. This suffix, which is added primarily to substantive nouns, forms nouns of subclass 12. The small number of occurrences of this suffix in my corpus does not justify any general statements of allomorph distribution. Examples:
ime- 'wonder' and -(+)}ikkU- > ime(+)}ikkU- 'marvelous'
söbPrA- 'friend' and -L(+)}ikkU- > söpra(+)}ikkU- 'friendly'
ohTU- 'danger' and -X(+)}ikkU- > oht(+)}ikkU- 'dangerous'
maşınA- 'machine' and -X(+)}ikkU- > maşın(+)}ikkU- 'mechanical'

{IA(ne/s(E))-} 'personal substantive-forming' has the sole allomorph -IA(ne/s(E))-, which is suffixed to vowel stem-allomorphs. This suffix is most frequently added to substantive nouns which are the names of nationalities, countries, and cities. It forms nouns of subclass 31. Examples:
vene- 'Russia' and -XIA(ne/s(E))- > venela(ne/s(E))- 'Russian'
tütKKI- 'Turkey' and -XIA(ne/s(E))- > tütkkila(ne/s(E))- 'Turk'
iitTU- 'union' and -XIA(ne/s(E))- > iitula(ne/s(E))- 'ally'
muştA- 'black' and -XIA(ne/s(E))- > muştula(ne/s(E))- 'gypsy'

{kka(s/H)-} 'diminutive adjective-forming' = -kka(s/H)- ω -Lkka(s/H)-, which have the same distribution with regard to noun subclasses as the genitive-singular allomorphs ϕ and -L respectively. With adjective nouns, this suffix indicates the presence of the adjective quality in a limited degree; with substantive nouns it indicates an abundance of the substantive to which it is affixed. This suffix forms nouns of subclass 32. Examples:
puna- 'red' and -Lkka(s/H)- > punakka(s/H)- 'reddish'
hâppu- 'sour' and -kka(s/H)- > hâppukka(s/H)- 'somewhat sour'
ahte- 'gift' and -kka(s/H)- > ahtekka(s/H)- 'gifted'

{kkE(ne/s(E))-} 'diminutive substantive-forming' = -kkE(ne/s(E))- ω -LkkE(ne/s(E))-, which have the same distribution with

31. Examples:

ema-LkkE(ne/s(E)) -> emakkE(ne/s(E)) - 'mother'
puna+tmüŋŋI-LkkE(ne/s(E)) -> puna+tmüŋŋikkE(ne/s(E)) - 'little
red-capped one (= Little Red Riding Hood)'
tüftre-kke(ne/s(E)) -> tüftrekke(ne/s(E)) - 'little girl'

10.11.2. Suffixes which are affixed to verbs:

{-mi(ne/s(E))} 'verbal substantive' = -mi(ne/s(E)) -ä-Xmi(ne/s(E)),
which are only suffixed to vowel stem-allomorphs. This suf-
fix forms nouns of subclass 31.

-Xmi(ne/s(E))- occur with all A-, E-stem-allomorphs (i.e., with
all verbs of subclasses 13 and 23 with stem-allomorphs in
√A E/). Examples:

kahtA-Xmi(ne/s(E)) -> kahtmi(ne/s(E)) - 'carrying'
jõõksE-Xmi(ne/s(E)) -> jõõksmi(ne/s(E)) - 'running'
võlta-Xmi(ne/s(E)) -> võltmi(ne/s(E)) - 'taking'

-mi(ne/s(E))- occurs with other verbs. This allomorph occurs
with the mine-, ole-, ütle-, aja- stem-allomorphs of {nine-},
{ole-}, {ütle-}, and {aja- = aTa-} respectively. Examples:

toõ-mi(ne/s(E)) -> toõmi(ne/s(E)) - 'bringing'
luke-mi(ne/s(E)) -> lukemi(ne/s(E)) - 'reading'
õppi-mi(ne/s(E)) -> õppimi(ne/s(E)) - 'learning'
ehitta-mi(ne/s(E)) -> ehittami(ne/s(E)) - 'building'
keõla-mi(ne/s(E)) -> keõlami(ne/s(E)) - 'forbidding'
põõrie-mi(ne/s(E)) -> põõriemi(ne/s(E)) - 'spinning'

{-ja(H)-} 'agent substantive' = {-ja(H)- = -lja(H)-} -Xja(H)-,
which are only suffixed to vowel stem-allomorphs. This
suffix forms nouns of subclass 23.

-Xja(H)- occur with all A-, E-stem-allomorphs. Examples:

laõla-Xja(H)- > laõlja(H)- 'singer'
laõke-Xja(H)- > laõkja(H)- 'one who lets'
kõõta-Xja(H)- > kõõtja(H)- 'one who heats'

-lja(H)- occurs with (1) all verbs of subclass 21; (2) the ole-stem
allomorph of {ole-}. Examples:

teke-lja(H)- > tekija(H)- 'door'
pane-lja(H)- > panija(H)- 'one who puts'
ole-lja(H)- > olija(H)- 'one who is, exists'

-ja(H)- occurs with all stem-allomorphs. This allomorph occurs with the mine-, ūtite-, aja- stem-allomorphs of (trine-), (ŭtite-), and (ja- = aTa-) respectively. Examples:
mũ-ja(H)- > müja(H)- 'seller'
pese-ja(H)- > peseja(H)- 'washer'
tõõta-ja(H)- > tõõtaja(H)- 'worker'
ehitta-ja(H)- > ehittaja(H)- 'builder'
aja-ja(H)- > ajaja(H)- 'driver'

{-vA(H)-} 'present participle' = -XEvA(H)- & -vA(H)-, which are only suffixed to vowel stem-allomorphs. This suffix forms nouns of subclass 23.

-XEvA(H)- occurs with all A-, E-stem-allomorphs. The -EvA- of this allomorph retains its morphophonemic shape in the resultant stem-allomorphs, thus forming stem-allomorphs which are susceptible to syncope. Examples:

keštA-XEvA(H)- > keštEvA(H)- 'lasting'
tõõsE-XEvA(H)- > tõõsEvA(H)- 'rising'
seisA-XEvA(H)- > seisEvA(H)- 'standing'

-vA(H)- occurs with all other verbs. This allomorph is added to the mine-, ole-, ūtite-, aja- stem-allomorphs of (trine-), (ole-), (ŭtite-), and (ja- = aTa-) respectively. Examples:

keb-vA(H)- > kebvA(H)- 'boiling'
põõpi-vA(H)- > põõpivA(H)- 'enduring'
kõõva-vA(H)- > kõõvavA(H)- 'growing'
hõõlta-vA(H)- > hõõltavA(H)- 'complaining'
tule-vA(H)- > tulevA(H)- 'coming'
hõõkka-vA(H)- > hõõkavA(H)- 'beginning'
põõrle-vA(H)- > põõrlevA(H)- 'spinning'

10.11.3. Suffixes which are affixed to both nouns and verbs:

{-Us(E)-} 'abstract substantive-forming' = -Us(E)- = -tus(E)-, which are only suffixed to vowel stem-allomorphs. This suffix forms nouns of subclass 24.

-tus(E)- occurs with nouns and verbs with stem-allomorphs of the type (C)VV- or (C)VCV-. Examples:

sal- 'to become' and -tus(E)- > saltus(E)- 'result'
hari- 'to enlighten' and -tus(E)- > haritus(E)- 'education'

-Us(E)- with all other nouns and verbs. Examples:

raħke- 'difficult' and -Us(E)- > raħkus(E)- 'difficulty',
 pobġA- 'bottom' and -Us(E)- > pobġus(E)- 'cause',
 naħpE-i- 'neighbor' and -Us(E)- > naħpurs(E)- 'neighborhood',
 sōpġrA- 'friend' and -Us(E)- > sōpġrus(E)- 'friendship',
 pimeT.A- 'dark' and -Us(E)- > pimeTus(E)- 'darkness',
 vdiġie- 'to fight' and -Us(E)- > vdiġtus(E)- 'battle',
 pukka- 'to rest' and -Us(E)- > pukkus(E)- 'vacation',
 naħT.A- 'to curse' and -Us(E)- > naħTus(E)- 'curse',
 riġġietta- 'to clothe' and -Us(E)- > riġġiettus(E)- 'clothing'.

10.12. Verb-producing Suffixes

10.12.1. Suffixes which are affixed to nouns:

(-ne-) 'verb-forming' is attested with only one clearly productive allomorph, i.e., -Xae-, and in too few instances to justify any general statements about its distribution. This suffix forms verbs of subclasses 14 and 16. Examples:
 jifġi- 'trace' and -Xae- > jifġiae- 'to follow',
 niġġA- 'late' and -Xae- > niġġae- 'to be late',
 vana- 'old' and -Xae- > vanae- 'to get old'.

(-tse-) 'verb-forming' is attested with only one allomorph, i.e., -Lase-, which is suffixized to vowel stem-allomorphs only.

This suffix forms verbs of subclass 16. Examples:
 lava- 'plan' and -Lase- > lavase- 'to plan',
 bodli- 'care' and -Lase- > bodlase- 'to care for',
 oħli- 'fishing rod' and -Lase- > oħlase- 'to fish'.

10.12.2. Suffixes which are affixed to both nouns and verbs:

(-e)(i)(e-)' 'frequentive verb-forming' a -I(e)- a (-Xġe- a -XEI-)' a (-Xġe- a -EIi-). This suffix forms verbs of subclasses 22.

The morphophoneme /Xġ/ causes the immediately preceding morphophoneme (capital or small letter) to be lost.

-Xġe- a -XEI- occurs with verbs of subclass 22 and nouns of subclass 24. The allomorph -Xġe- occurs with the vowel stem-allomorph and -XEI- with the consonant stem-allomorph. Examples:

ħabġu- a ħberħi- 'to complain',

ħabġu-Xġe- > ħabġe- and

ħberħi-XEI- > ħberħe- 'to complain repeatedly',

with vdiġ- a vdiġħi- 'degree of comparison'.

võlta-X₂le- > võltle- and
 võrreH-XEL- > võrrel- 'to compare'

-Xle- = -ELI- occur with disyllabic noun stem-allomorphs of subclass 12 with postposed stress and with verbs with stem-allomorphs in √A/. Examples:

with leŋTA- 'to fly'

leŋTA-Xle- > leŋtle- and

leŋTA-ELI- > lēnnel- 'to fly about'

with jūŋKU- 'sliding'

jūŋKU-Xle- > jūŋkle- and

jūŋKU-ELI- > jūvel- 'to slide'

-l(e)- occurs with (C)VCV- stem-allomorphs of verbs and nouns.

Examples:

kōne- 'speech' and -l(e)- > kōnel(e)- 'to speak'

tāKe- 'to do' and -l(e)- > takel(e)- 'to occupy oneself'

{-tta-} 'causative verb-forming' = -tTA- ā- Lta- ā- ta-. This suffix forms verbs of subclasses 13, 15, and 16.

-ta- is found with certain consonant stem-allomorphs of noun subclass 24. Examples:

puhas- 'clean' and -ta- > puhasta- 'to clean'

ārmās- 'beloved' and -ta- > ārmasta- 'to love'

-tTA- is found with monosyllabic verbs with stem-allomorphs in a vowel cluster. Example:

kee- 'to boil (intrans.)' and -tTA- > keetTA- 'to boil (trans.)'

-Lta- is found with disyllabic vowel stem-allomorphs of noun subclass 12 and verb subclass 12. Examples:

hāvi- 'to perish' and -Lta- > hāvitta- 'to destroy'

kaTu- 'to disappear' and -Lta- > kaŋtta- 'to lose'

kuivA- 'dry' and -Lta- > kōivatta 'to dry (trans.)'

10.13. Particle-producing Suffixes

10.13.1. Suffixes which are affixed to nouns:

{-litt} 'adverb-forming' = -litt = -Litt, which have the same distribution with regard to the noun subclasses with which they occur as the genitive-singular allomorphs -ŋ and -L respectively. Examples:

lāŋKA-Litt > lāŋalitt 'heavily'

rāŋKA-Litt > rāŋalitt 'heavily'

suhtejise-itt > suhtejiseitt 'relatively'
 õnne(+))ikkU-Litt > õnneikkult 'happily'
 õllattavA-itt > õllattavalt 'strikingly'

{-ęfi} 'adverb-forming' = -ęfi = -Lęfi, which have the same distribution with regard to the noun subclasses with which they occur as the genitive-singular allomorphs - \emptyset and -L respectively. Examples:

tõTe-Lęfi > tõõęfi 'truly'
 halvPA-Lęfi > halvvaęfi 'badly'
 uõTE-Lęfi > õuveęfi 'newly'
 selke-Lęfi > selkeęfi 'clearly'
 heleTA-ęfi > heletaęfi 'brightly'
 rõõmUsA-ęfi > rõõmsaęfi 'joyfully'

10.13.2. Suffixes which are affixed to verbs:

{-ma} 'infinitive I' = -ma @ -Xma, which have the same distribution as the correspondingly similar allomorphs of the verbal substantive suffix {-mi(na/s(E))-}. Examples:

heitTA-Xma > heittma 'to throw'
 tuõTE-Xma > tuõtma 'to feel'
 võtTA-Xma > võttma 'to take'
 sõõ-ma > sõõma 'to eat'
 saT¹a-ma > satama 'to rain'
 uskU-ma > uskuma 'to believe'
 hiline-ma > hilinema 'to be late'
 hakka-ma > hakkama 'to begin'
 võttle-ma > võttlema 'to compare'

{-ta} 'infinitive II' = (-ta = -Ta=L) @ (-Xta @ -Xa). This suffix occurs with the consonant stem-allomorphs of all verbs which have them.

-Xa occurs with all stem-allomorphs in $\sqrt{A} E/$ which immediately follow $\sqrt{t} T p/$ (i.e., in subclasses 12 and 23). Examples:

hoõTA-Xa > hoõta 'to care for'
 tuõTE-Xa > tuõta 'to feel'
 tappaA-Xa > tappa 'to kill'
 võtTA-Xa > võtta 'to take'

-Xta occurs with all other stem-allomorphs in $\sqrt{A} E/$. Examples:

kuõIE-Xta > kuõita 'to hear'
 naõrA-Xta > naõrita 'to laugh'
 jookkaE-Xta > jookketa 'to run'

-Ta=L occurs with (1) all stem-allomorphs of subclass 11 in $\sqrt{OO} \text{ } \ddot{O} \text{ } \ddot{O} \text{ } i \text{ } \ddot{u} \ddot{u}$; (2) all (C) $\sqrt{R/h}$ stem-allomorphs (i.e., all verbs of subclass 21 which have allomorphs of this type and the mi \ddot{h} - and ol- stem-allomorphs of {mine-} and {ole-}); (3) the verb k $\ddot{a}i$ - 'to visit' of subclass 11.¹⁹ \sqrt{L} indicates that the effect of \sqrt{L} is restricted to the suffix syllable (i.e., to $\sqrt{T/}$) and does not affect the stem-allomorph to which it is affixed. Examples:

j $\ddot{O}O$ -Ta=L > j $\ddot{O}O$ Ta=L > ju \ddot{v} a 'to drink'
 k $\ddot{a}i$ -Ta=L > k $\ddot{a}i$ Ta=L > ka \ddot{i} ja 'to visit'
 n $\ddot{a}h$ -Ta=L > n $\ddot{a}h$ Ta=L > na \ddot{h} a 'to see'
 su \ddot{f} -Ta=L > su \ddot{f} Ta=L > su \ddot{f} ra 'to die'
 tu \ddot{l} -Ta=L > tu \ddot{l} TA=L > tu \ddot{l} ia 'to come'
 mi \ddot{h} -Ta=L > mi \ddot{h} Ta=L > mi \ddot{h} ana 'to go'

-ta occurs with all other verbs, hence with both consonant and vowel stem-allomorphs. This allomorph occurs with the $\ddot{u}t$ el- and aja- stem-allomorphs of {tulle-} and {aja-}aTa-).
 Examples:

j $\ddot{a}i$ -ta > j $\ddot{a}i$ ta 'to stay'
 veTa-ta > ve \ddot{t} ata 'to pull'
 k $\ddot{a}p$ ti-ta > k $\ddot{a}p$ ti \ddot{t} a 'to walk'
 \ddot{a} rma \ddot{s} ta-ta > \ddot{a} rma \ddot{s} ta \ddot{t} a 'to love'
 bo \ddot{t} aH-ta > bo \ddot{t} ata 'to wait'
 h $\ddot{u}p$ pel-ta > h $\ddot{u}p$ pel \ddot{t} a 'to jump around'

{(a)ut} 'past participle' = (-Xnut & -LX \ddot{u} nut & -Laut & -nut) = -Ut.
 This suffix is added directly to verb stem-allomorphs or to the fourth-person suffix (i.e., to the fourth-person stem).
 When affixed directly to a verb stem-allomorph, this suffix has the meaning of an active participle; when affixed to the fourth-person stem, the meaning of a passive participle.

-Xnut occurs with (1) all A-, E- stem-allomorphs; (2) the consonant stem-allomorphs of all verbs of subclass 22 and the $\ddot{u}t$ el-stem-allomorph of {tulle-} (i.e., with disyllabic consonant stem-allomorphs). Examples:

o \ddot{b} TA-Xnut > o \ddot{b} tnut 'bought'
 w \ddot{a} HE-Xnut > w \ddot{a} hnut 'risen'
 p \ddot{a} jaH-Xnut > p \ddot{a} janut 'feared'
 m $\ddot{a}t$ el-Xnut > m $\ddot{a}t$ elnut 'thought'

- LX₂inut occurs with all consonant stem-allomorphs of subclass 21 in /h/. (For /X₂/ see the frequentive verb-forming suffix {-(e)ll(e)-} above.) Examples:
 nāh-LX₂inut > nāinut 'seen'
 teh-LX₂inut > tēinut 'done'
- Laut occurs with (1) the stem-allomorphs of all verbs of subclass 11 and lāī- stem-allomorph of {nine-} (i.e., with stem-allomorphs in a vowel cluster); (2) all consonant stem-allomorphs of subclass 21 in a resonant or /s/ and the ol- stem-allomorph of {ole-}. Examples:
 vil-Laut > vīinut 'carried away'
 lāī-Laut > lāiinut 'gone'
 suf-Laut > sūrnut 'died'
 ol-Laut > ōlnut 'been'
 peš-Laut > pēenut 'washed'
- nut occurs with the vowel stem-allomorphs of all other verbs. This allomorph occurs with the aja- stem-allomorph of {ja- =aTa-}. Examples:
 ʒiTu-nut > ʒitunut 'tied'
 pure-nut > purenut 'bitten'
 ʕppi-nut > ʕppinut 'learned'
 kavatsə-nut > kavatsənut 'planned'
 aja-nut > ajanut 'driven'
- Ut occurs with the fourth-person suffix following all verbs. Examples:
 sōōTa-Ut > sōōtut 'eaten'
 nāhTa-Ut > nāhtut 'seen'
 k̄betetta-Ut > k̄betettut 'boiled'
 maksta-Ut > makstut 'paid'
 seōtta-Ut > seōttut 'tied'
 vālkustatta-Ut > vālkustattut 'illuminated'

10.2. Compounding. — By means of word compounding two separate stems may be combined to form a single new stem which belongs to the same word class and subclass as the second stem of the compound. This resultant stem consists of two or more vocables and is generally marked by a stress pattern in which the stress of the first stem is of a higher degree than that of the second stem (i.e., primary plus secondary or no stress, or,

secondarily plus no stress). A noun stem which occurs as the first member of a compound may or may not contain an inflectional suffix.

Since the generation of compounds in Estonian is dependent upon a thorough syntactic analysis, I shall merely list examples of some of the more productive types of compounds.

10.21. Compounds Consisting of Noun plus Noun

10.21.1. With noun in the nominative-singular: *aita+linna*- 'the center of town' (*aita* 'heart', *linna*- 'city'); *kuju+linna*(H)- 'bad fire' (*kuju* 'fire', *linna*(H)- 'damage'); *robu+kala*- 'canab-jud fish' (*robu* 'robber', *kala*- 'fish'); *kuju+seppA*- 'shoemaker' (*kuju* 'shoe', *seppA*- 'smith'); *õpet+kohtA*- 'consumer cooperative' (*õpetus* 'teacher', *kohtA*- 'group, class, set'); *haridus+õppijA*- 'educational society' (*haridus* 'education', *õppijA*- 'society'); *haridus+ilmus*(E)- 'involved question' (*harid* 'a twist', *ilmus*(E)- 'question'); *kuju+kiiv*- 'jewel' (*kuju* 'expensive', *kiiv*- 'stone'); *must+ingulise*(e)(e)- 'blackish-blue' (*ingulise* 'blackish', *must*+*ingulise*(e)(e)- 'blue'); *aldis+mahtlase*(e)(H)- 'seven-cornered' (*aldis* 'seven', *mahtlase*(e)(H)- 'cornered'); *üks+kuulijase*(e)(E)- 'one-sided' (*üks* 'one', *kuulijase*(e)(E)- 'sided').

10.21.2. With noun in the genitive-singular: *dümmet+puu*- 'oak tree' (*dümmet* 'oak', *puu*- 'tree'); *linna+ma*- 'meadowland' (*linna* 'hay', *ma*- 'land'); *haridus+puu*TR A- 'potato porridge' (*haridus* 'potato', *puu*TR A- 'porridge'); *maht+ab*TR A- 'berry garden' (*maht* 'berry', *ab*TR A- 'garden'); *spord+kuulP*E- 'sport jacket' (*spord*'s sport', *kuulP*E- 'jacket'); *välis+üksU*- 'matchstick' (*välis* 'fire', *üksU*- 'stick'); *kuju+teed*- 'sidewalk' (*kuju* 'roll', *teed*- 'road'); *happene+ajaja*(H)- 'barber' (*happene* 'beard', *ajaja*(H)- 'driver'); *pidaj+lahtja*(H)- 'one who shoots a gun' (*pidaj* 'gun', *lahtja*(H)- 'one who lets'); *kuju+aldis*(e)(E)- 'angel-looking' (*kuju* 'angel', *aldis*(e)(E)- 'resembling'); *kuju+ingulise*(e)(e)- 'yellow'; *kuju+kuulijase*(e)(E)- 'two-roomed' (*kuju* 'two', *kuulijase*(e)(E)- 'roomed').

10.21.3. With noun in a case other than (or in addition to) the genitive-singular or nominative-singular: *kõlles+kuuliku*- 'talk' (*kõlles* 'in the talk' (*gen.*-*eg.* plus inessive), *kuuliku*- 'talk'); *kuju+ajaja*TR A(H)- 'well-founded' (*kuju* 'place' (*part.*-*eg.* plus A(H)- 'building').

10.21.4. With noun as a bare stem: *aldis+maht*(H/m)- 'meadowland of living' (*aldis* 'living', *maht*(H/m)- 'jewel');

makamis+ase(H/me)- 'sleeping quarters' (makamis 'sleeping,' ase(H/me)- 'place'); väjia+maäl(ne/se(H))- 'foreign' (väjia 'external,' maäl(ne/se(H))- 'countried'). Noun₁ of this type is restricted to nouns of subclass 31.

10.22. Compounds consisting of particle plus noun: eŧte+maksU- 'advance payment' (eŧte 'forward,' maksU- 'payment'); eŧte+väjimistus(E)- 'preparation' (väjimistus(E)- 'getting ready'); ŧišse+kälkKU- 'entrance' (ŧišse 'into,' kälkKU- 'going'); väjja+söitTU- 'departure' (väjja 'out,' söitTU- 'trip').

10.23. Compounds consisting of noun plus verb: osa+vöŧTA- 'take part' (osa 'part [part. -sg.],' vöŧTA- 'take'); arusaa- 'understand' (aru- 'reason [part. -sg.],' saa- 'get'); lehtu+pan(e)- 'take flight' (lehtu 'into flight [ill. -sg.],' pan(e)- 'put'); nahka+piŧTA- 'devour' (nahka 'into the skin [ill. -sg.],' piŧTA- 'stick'); mehelet+pan(e)- 'marry off' (mehele 'to a man [gen. -sg. plus allative]'); aŧteks+aŧTA- 'forgive' (aŧteks 'for a gift [gen. -sg. plus translatiue]'), aŧTA- 'give').

10.24. Compounds consisting of particle plus verb: kaäsa+vöŧTA- 'take along' (kaäsa 'with'); kiŧpi+vöŧTA- 'to catch' (kiŧpi 'fast, tight'); väjja+nä(Ke/h)- 'look, glance' (väjja 'out,' nä(Ke/h)- 'to see'); väjja+tul(e)- 'to come out' (tul(e)- 'come'); ära+söÖ- 'eat up' (ära 'away,' söÖ- 'eat'); üles+kirjutta- 'write down' (üles 'up,' kirjutta- 'write'); üles+töösE- 'arise' (töösE- 'rise).

Notes

1. The traditional instructive case (*/paŧja+jalu/* '(to go) bare-foot' < *paŧja-ŧ*, *jalKA-LU*), the special illative-plural (*/ŧilmi/* 'into the eyes' < *ŧilma-I*), and the special stative inessive (*/raäkus/* 'in a leafless state' < *raäKU-s*, inessive suffix added directly to the noun stem) are treated as being outside the case system, since they are non-productive and occur with an extremely small number of noun stems.

2. I consider the illative secondary case suffix to be in contrast with the illative-singular case-number suffix. The illative-singular suffix is found only with certain types of noun stems, and even then with a relatively restricted number of nouns. The illative secondary case suffix occurs freely with all stem types (following one of the three above-mentioned case-number suffixes), including those types which also take the illative-singular. For example, the noun *maja-* 'house' occurs with the illative-singular (*maja-C > maŧja*) and with the illative secondary case suffix with

the genitive-singular or genitive-plural (maja-L-see > majasse; maja-te-see > majatesse). It is difficult to assign any difference in meaning to these two suffixes, although for nouns which may take either suffix there appears to be a distributional difference between the two; i.e., the illative-singular occurs most frequently with the concrete spatial meaning 'into,' whereas the illative with the genitive-singular is used most frequently in more abstract constructions; e.g., with the verb puhttu- 'to concern.'

3. The subclasses of this group are indicated by three-digit numbers with 0 as the first digit. It is necessary to specify the stem-allomorph with which each case suffix occurs. Where no such specification is indicated, it may be assumed that the root in question does not occur with the particular case(s); e.g., the part.-pl. suffix is not found with the root (Nema-).

4. The semantic distinction between (Nema-) and (Nee-) is lost with the gen.-pl. and the part.-pl. The gen.-pl. of (Nema-) functions as the gen.-pl. of (Nee-); the part.-pl. of (Nee-) functions likewise for (Nema-).

5. The subclasses of these two groups are indicated by two-digit numbers, such that subclasses of group I nouns have a first digit of 1; two-stemmed subclasses of group II, a first digit of 2; and three-stemmed subclasses of group II, a first digit of 3. A summary of the morphophonemic stem types of the regular nouns is given in §8.12.1; the occurrence of vowel and consonant stem-allomorphs of the group II subclasses with the case-number suffixes is given in §8.12.2.

6. In the listing of stem-allomorphs, parentheses will be used wherever possible as an abbreviation for the two stem-allomorphs related with the sign \ominus ; i.e., lum(\ominus) = lum- \ominus lum-.

7. The symbol \mathfrak{B} is used to indicate a difference in allomorph distribution which is morphophonemically determined. The use of this symbol was suggested to me by Eric P. Hamp (The University of Chicago, December, 1959): "It seems to me that we lack a category of discrimination. There is obviously phonological conditioning (-), and morphological conditioning where you need to list (e.g., much of IE noun declension, or Russ. \mathfrak{B} in \mathfrak{B}); for the latter, clearly, \ominus is appropriate. But once the morphophonemics has been done carefully there are often alternations that are automatic by virtue of morphophonemic conditioning. These are clearly worth discriminating from the list-type conditionings; a handy symbol might be \mathfrak{B} ."

8. My informant also has a more colloquial nominative form $\sqrt{\text{latev/}}$. This is derived from the stem latTvA- in which $\sqrt{\text{v/}}$ is a resonant parallel to $\sqrt{\text{r/}}$ in $\text{so}\sqrt{\text{PrA-}}$. Cf. the morphophonemic rule $\text{CR}\# > \text{CeR}\#$ in 6.121 (2b) above.

9. The non-productive -E gen. -pl. with šijmA- 'eye' and rišTA- 'breast' which is used in certain fixed post- and prepositional phrases (e.g., $\sqrt{\text{šijme+ešs/}}$ 'before [one's] eyes') is treated here as being outside the case system. The more productive "short" gen. -pl. of the literary language is not actively used by my main informant. The literary "short" gen. -pl. is an allomorph -LE which occurs with subclass 12 stems in ...(+) CikkU- ; e.g., $\text{šanne(+)}\sqrt{\text{ikkU-LE}} > \text{šannešikkas}$ 'of the happy ...-s.'

10. I assign these allomorphs to the partitive-plural on the basis of the vowel changes which characterize them and also because this type of plural formation in literary Estonian is clearly related to that case. By taking the presence and absence of $\sqrt{\text{L/}}$ as the basis of my analysis, however, and considering the lack of general statements which can be made concerning this plural formation in colloquial Estonian, I might equally well have assigned these allomorphs to the nominative-plural.

For literary Estonian the following description of this plural formation could be made. Five allomorphs occur: -i- -LU- -LE- -IL- -LI- . These do not occur with nouns which can only take - šit as a possible part. -pl. and many other nouns which it is necessary to list. They do not occur before the essive, terminative, comitative, and abessive secondary cases. For those nouns which do allow this formation, -i- occurs with those which take the "unfollowed" (i.e., not before a secondary case) part. -pl. allomorph - it ; -LU-, with those which take the "unfollowed" -U. -LE- occurs with those A-stems in which $\text{K} > \text{j}$ ($\text{šä}\sqrt{\text{KA-LE-}} > \text{šärjə-E} > \text{šärjə-}$ 'bulls') and those nouns which otherwise take -E-. -IL- is found with those subclass 23 nouns which take the "unfollowed" -I- part. -pl., where $\sqrt{\text{I/}}$ and resultant stem changes are applied before $\sqrt{\text{L/}}$ ($\text{ušTE-IL-} > \text{uššil-} > \text{uššil-}$ 'new ...-s'). All other nouns take -LI-, and a morphophonemic rule - $\text{ji-} > \text{-t-}$ must be recognized ($\text{jšIKL-LI-} > \text{jššil-} > \text{jššil-}$ 'tracks').

11. The listing presented here is based solely on the forms attested in my own corpus, and, consequently, will not provide an adequate basis for predicting the partitive-plural of all Estonian subclass 23 nouns.

12. In literary Estonian $\text{šä}\sqrt{\text{KA-}}$ takes the -I part. -pl. allomorph.

13. The expected literary form would be *vapu*, not *vapai-* (cf. *undolored' part. -pl. v'apu./*). *vapai-* was attested in the phrase *'vapai-formals/ 'in the Cree country.*

14. The suffixes for forming the two verb infinitives (-*ma*) and (-*ai*), the present participle [-*VA(H)-*], the past participle and (-*ai*), the agent substantive [-*ja(H)-*], and the verbal substantive [-*pu(a)nd/ai(E)-*] are treated as derivational (cf. 10.1). The *re/* marker of the so-called narrative mood is treated as a *-ver/* marker; *-singular* function of the present participle (cf. 11.2.24).

15. The analysis of (-*ma*) as a fourth-person suffix was suggested to me by Eric P. Hamp (The University of Chicago, December, 1959). A similar matter of complicated order relations is treated by Hamp in "Zazsa Berber Personals," *BSOAS XXII*, Pt. 1, (1959), pp. 140-61 and "Tuarog Berber Personals," *SIL XV* (1961), pp. 75-76.

An alternative analysis would be to treat (-*ma-*) as an impersonal voice suffix. In that case the verb inflection would be expressed by the formula *V(-S₁)(-S₂X-S₃)*, in which *S₁* = voice suffix, *S₂* = tense-mood suffix, *S₃* = person-number suffix; and the *S₁* and *S₃* suffixes would be mutually exclusive.

16. A summary of the morphophonemic stem types of the regular verbs is given in §9.12.1.

17. A more common method of forming the superlative is to use the gen. -sg. of *hohkE-* 'all' followed by the comparative form of the adjective e.g., *'vhiber+viamA(H)/* 'the most persistent' (via- 'persistent', which does not occur with the superlative suffix (-*l-*) either in literary or colloquial Estonian). This type of superlative construction is found with practically all adjectives which take the comparative suffix.

The use of (-*l-*) appears to be more general in the literary language, but there too the nouns which take (-*l-*) must be listed. Although (-*l-*) appears to be productive for my informant, it was restricted to a very small number of adjectives; and in several instances, my informant's usage did not conform to that of the literary language.

In literary Estonian (-*l-*) has the following allomorphs: -*l-*, -*l-*, -*l-*. -*l-* occurs with U-stem-allomorphs of more than two syllables and L-stem-allomorphs of subclasses 12 adjectives. -*l-* occurs with (a) other nouns of subclasses 12; (b) *diy*llable E-stem-allomorphs of subclasses 23 and 31; (c) that small group of nouns for which it is necessary to set up special comparative stem-allomorphs (cf. under (-*maA(H)-*)). -*l-* occurs with other adjective stems.

18. In the literary language $\sqrt{ji/} > \sqrt{i/}$ and $\sqrt{jo/} > \sqrt{oi/}$, thus giving *soimA(H)*-.

19. In the literary language this allomorph also occurs with the consonant stem-allomorphs of certain verbs of subclass 22 which end in -i-; e.g., *käqittal-Ta=L* > *käqittalla* 'to handle.'

11. This syntactical sketch is primarily a formulation of the most fundamental rules necessary for the generation of simple Estonian sentences. A transformational model of syntax consisting of a phrase structure and a set of transformational rules has been employed for this purpose.

The phrase structure consists of the initial symbols §§ and a set of rewrite rules by means of which a terminal string of symbols and morphemes may be derived from §§. These rules must be applied in the order in which they are given and are obligatory wherever applicable. The terminal strings thus derived from the phrase structure may be said to underlie the kernel sentences of Estonian (within the limitations of this sketch). It should be noted that the order of phrasal and morphemic elements within these terminal strings is an arbitrary one devised to allow the greatest economy of description and bears no necessary resemblance to the order of these elements in the kernel sentences produced from them.

The transformation rules operate upon the terminal strings provided by the phrase structure. These rules too must be applied in the order in which they are given, but some rules are obligatory (marked OS) and others are optional (marked OP). A terminal string from the phrase structure to which only obligatory rules have been applied is a kernel sentence. In this sketch only the most essential obligatory and optional transformations are presented. In the main, these are rules which are related to the basic uses of the inflectional and most productive derivational suffixes.

The problem of word order and the order of phrasal elements in Estonian is an extremely complicated one, which does not receive full treatment here. While word order is relatively free, certain preferred positions can be observed for specific members of the sentence. The rules of this sketch assign members of the sentence to relative positions of occurrence depending upon (1) the observed frequencies of occurrence of these members in

specific sentence positions, and (2) the exploitation of certain positions in order to achieve overall economy of description. The first, statistical, approach is especially successful in determining the position of the finite verb, which is observed in a very limited and easily predictable set of positions in over ninety percent of its occurrences. Elsewhere this statistical approach is no more than suggestive. While the subject phrase shows a definite preference for initial position in indicative sentences (the only position now permitted), it also frequently occurs following the finite verb. In terms of economy of description, I am led to place the subject at the beginning of the sentence and the verb complex at the end of the sentence, leaving the finite verb at the very end until late in the set of transformational rules. The placing of adverbial phrases suffers greatly at the hands of both approaches and most sentences containing them may at best be said to have a word order which is acceptable but not natural. Adverbial elements have been included mainly in order to illustrate the uses of postpositions, prepositions, and certain of the secondary cases. While many of the major problems of word order thus remain unsolved, I feel that the framework provided by this sketch can, nonetheless, serve as an adequate basis for their ultimate solution.

Stress and intonation, which are intimately bound to the problem of word order, are not treated here.

One other major area not treated in this limited study concerns the basic cooccurrence relationships obtaining between lexical items. Only those distinctions which relate directly to suffixational processes are utilized, while selections based upon other cooccurrence relationships are left to the intelligence of the linguist; e.g., the noun categories of mass and count are distinguished because they are directly related to various uses of case suffixes, whereas the noun categories of animate, inanimate, abstract, etc. are not treated.

Thus, although the syntactical rules presented here are capable of generating grammatical sequences of morphemes which may be referred to other sections of the grammar for conversion into pronounceable phonetic sequences, they will also produce many ungrammatical sequences even if care is taken in the selection of lexical items.

The operational and abbreviational symbols employed in the rules below are essentially the same as those used by Robert B.

∫ : morpheme or morphemic-category boundary

The use of / as a boundary marker, developed by Emmon Bach for German syntax, affords a greater simplicity of description than would otherwise be possible. It is of especial value in developing the verb complex so that the separation of verb and separable verb prefix may be achieved and so that the finite verb may be shifted to the proper sentence position (cf. T18, T19, T25), in shifting the preposition to the front of the noun phrase which it governs (T40), and in preventing transformations from being recursive where this is not desirable (T20).

Morpheme, morphemic category, and general class symbols are composed of upper- and lower-case letters, sometimes underlined (in the case of certain morpheme representations); e.g., P = any person-number suffix, p = partitive-case category, and p̄ = the third-person-singular morpheme.

General cover symbols are: X, Y, Z, etc. — for all material except / ∅ ja 'and'; ... , ...¹, ...², etc. — for all material except ∅. They may also indicate the absence of any other symbols.

11.1. Phrase Structure

Given: #S# (sentence)

F1 S → (NP & n)/VP (NP = noun phrase, VP = verb phrase,
n = nominative)

F2 VP → (Adv//)VC & AUX (Adv = adverbial phrase,
VC = verb complex, AUX = auxiliary)

F3 AUX → (V_n &)aux (V_n = infinitive auxiliary,
aux = primary auxiliary)

F4 aux → (wut/ole &)(ei &)T & P
(wut 'past participle' (10.13.2),¹ ole 'be: perfect auxiliary,' ei 'negative auxiliary,' T = tense, P = person-number)

- F5 $T \rightarrow \begin{cases} \text{pres} \\ \text{past} \end{cases} \quad (= \{\emptyset\} \text{ 'present-indicative' (9.21)}) \\ (= \{s\} \text{ 'past-indicative' (9.21)})$
- F6 $V_a \rightarrow \begin{cases} \text{ma}/V_{\text{ma}} \\ \text{ta}/V_{\text{ta}} \end{cases} \quad \begin{matrix} (\text{ma 'infinitive I' (10.13.2),} \\ \text{ta 'infinitive II' (10.13.2),} \\ V_{\text{ma}} \text{ and } V_{\text{ta}} = \text{verbs which require ma} \\ \text{and ta respectively)} \end{matrix}$
- F7 $\emptyset(\text{Adv})/VC \rightarrow \emptyset(\text{Adv})/V_{\text{ns}}$ (V_{ns} = subjectless verb, used where NP & n has not been selected)
- F8 $\text{Adv}/V_{\text{ns}} \rightarrow \begin{cases} \text{LOC} \\ \text{TM} \end{cases} /V_{\text{ns}}$ (location) (time)
- F9 $VC \rightarrow \begin{cases} \{D \& \text{Nom} \& n/\text{ole}_{\text{ob}}\} \\ V_{\text{s}}$ (D = demonstrative, Nom = noun complex, ole_{ob} = 'be' used in 'have' function, V_{s} = subject verb)
- F10 $V_{\text{s}} \rightarrow \begin{cases} V_{\text{in}} \\ V_{\text{ob}} \end{cases} \quad \begin{matrix} (\text{intransitive verb}) \\ (\text{transitive verb}) \end{matrix}$
- F11 $V_{\text{ob}} \rightarrow \begin{cases} \text{NP}/V_{\text{ob}}^1 \\ \text{NP}/\text{DIR}/V_{\text{ob}}^{\text{D}} \\ \text{NP}/\text{TO}/V_{\text{ob}}^{\text{t}} \\ \text{NP}/\text{NP}/V_{\text{ob}}^2 \\ \text{NP}/V_{\text{c}} \end{cases} \quad \begin{matrix} (\text{DIR} = \text{direction, TO} = \text{motion to,} \\ V_{\text{c}} \text{ and } V_{\text{ob}}^{\dots} = \text{'object' verbs} \\ \text{which require special case} \\ \text{endings with object-complement} \\ \text{NP's}) \end{matrix}$
- F12 $V_{\text{in}} \rightarrow \begin{cases} \text{Pr}/V_{\text{pr}} \\ \text{DIR}/V_{\text{D}} \\ \text{TO}/V_{\text{T}} \\ \text{LOC}/V_{\text{L}} \\ V_{\text{i}} \end{cases} \quad \begin{matrix} (\text{nominal predicate/Pr verb}) \\ (\text{direction verb}) \\ (\text{motion-to verb}) \\ (\text{location verb}) \\ (\text{verb not requiring Pr or adverbial}) \end{matrix}$
- F13 $V_{\text{ns}} \rightarrow \begin{cases} \text{Adj}/\text{ole} \\ V_{\text{n}} \end{cases} \quad \begin{matrix} (\text{adjective/'be'}) \\ (\text{other } V_{\text{ns}}) \end{matrix}$
- F14 $V_{\text{ob}}^1 \rightarrow \begin{cases} V_{\text{ob}}^{\text{O}} \\ V_{\text{ob}}^{\text{p}} \end{cases} \quad \begin{matrix} (\text{'object-case' verbs}) \\ (\text{partitive-object verbs}) \end{matrix}$
- F15 $V_{\text{ob}}^2 \rightarrow V_{\text{ob}} \{ \underline{\text{le-}\emptyset}, \underline{\text{le-p}}, \underline{\text{st-le}}, \underline{\text{itt-p}}, \underline{\text{itt-g\úle}}, \underline{\text{itt-st}}, \underline{\text{p-ka}}, \text{etc.} \}$
 (\emptyset = object-case marker, p = partitive, g = genitive, underlined forms refer to secondary-case suffixes (8.22), le 'across'.

F15 (continued) over' is a postposition. The use of braces with the superscript symbols is a means of abbreviation for
 (V_{ob}^{le-φ}, V_{ob}^{le-p}, etc.).

F16 V_c - V_c (ill, le, st, ka, s, l, gkaest, etc.)
 (ill = illative, eest 'from in front of' is a postposition)

F17 V_{pr} - V_{pr} (pr, ke, na) (pr = predicate marker)

F18 NP & a/(Adv)/(D &)Nom & n - NP & 1/(Adv)/(D &)Nom & n
 (The initial NP in the 'have' construction, indicating the possessor, is in the adessive case; the possessed Nom is in the nominative case. See F19 below.)

F19 Nom & a/ole_{ob} & ([ma/V_{ma} / ta/V_{ta}] &)(nut/ole &)ei -
 Nom & p/ole_{ob} & ([ma/V_{ma} / ta/V_{ta}] &)(nut/ole &)ei
 (The possessed Nom in the negative of the 'have' construction is in the partitive case.)

F20 Pr - { (D &)Nom }
 { Ad }

F21 Adv - { LOC }
 { TM }
 { MAN } (manner)

F22 DER - { TO }
 { SEP } (motion away)

F23 TO - { Adv_{to} } (adverb of motion to)
 { NP & to } (NP & indication of motion to)

F24 SEP - { Adv_s } (adverb of motion away)
 { NP & sep }

F25 LOC - { Adv_L } (adverb of location)
 { NP & loc }

F26 TM - { Adv_{tm} } (adverb of time)
 { NP & tm }

F27 MAN - { Adv_{man} } (adverb of manner)
 { NP & man }

- F28 to $\left\{ \begin{array}{l} \text{ill} \\ \text{le} \\ \text{g \& post}_{to} \\ \text{pre}_{Pto} \end{array} \right\}$ (post = postposition)
(prep = preposition)
- F29 sep $\left\{ \begin{array}{l} \text{st} \\ \text{itt} \\ \text{g \& post}_s \end{array} \right\}$
- F30 loc $\left\{ \begin{array}{l} \text{l} \\ \text{s} \\ \text{g \& post}_L \\ \text{pre}_{PL} \end{array} \right\}$
- F31 tm $\left\{ \begin{array}{l} \text{g \& post}_{tm} \\ \text{pre}_{Ptm} \end{array} \right\}$
- F32 man $\left\{ \begin{array}{l} \text{ka} \\ \text{p \& post}_{mp} \\ \text{g \& post}_{mg} \\ \text{pre}_{Pm} \end{array} \right\}$ (manner post with partitive)
(manner post with genitive)
- F33 NP $\rightarrow \left\{ \begin{array}{l} \text{(D \&)Nom} \\ \text{pers \& sg} \end{array} \right\}$ (personal pronoun \& singular)
- F34 Nom $\rightarrow \left\{ \begin{array}{l} \left\{ \begin{array}{l} \text{Num} \\ \text{[HTE]} \end{array} \right\} \& \text{Noun}_c \& \text{N} \\ \text{Noun}_m \& \text{sg} \end{array} \right\}$ (Num = numeral, [HTE] 'ce,
Noun_c = count noun,
Noun_m = mass noun,
N = number)
- F35 $\left[\begin{array}{l} \text{Num} \\ \text{[HTE]} \end{array} \right] \& \text{Noun}_c \& \text{N} \rightarrow \left[\begin{array}{l} \text{Num} \\ \text{[HTE]} \end{array} \right] \& \text{Noun}_c \& \text{sg}$
(Noun_c is singular after Num or [HTE])
- F36 N $\rightarrow \left\{ \begin{array}{l} \text{sg} \\ \text{pl} \end{array} \right\}$
- F37 pers $\rightarrow \left\{ \begin{array}{l} \text{MA} \\ \text{SA} \\ \text{ME} \\ \text{TE} \end{array} \right\}$ (first-singular)
(second-singular)
(first-plural)
(second-plural)
- F38 pre_{Pto} $\rightarrow \left\{ \begin{array}{l} \text{g/prep}_{to} \\ \text{ni/prp}_{to} \end{array} \right\}$ (genitive preposition)
(terminative preposition)
- F39 pre_{PL} $\rightarrow \text{p/prp}_{Lp}$ (partitive preposition)

F40 prptm → p/prp:tm^p
 F41 prptm → $\left\{ \begin{array}{l} ka/prp:tmka \\ tta/prp:tm^{ta} \end{array} \right\}$ (comitative preposition)
 (abessive preposition)

The rules from F42 on constitute the lexicon of the phrase structure. In these rules braces will be omitted. Forms will be cited in morphophonemic transcription except that stress position will not be indicated where predictable from subclass membership, and post-alveolar consonants will be indicated by the corresponding dental consonants before /i/ (in which position there is no contrast). Following each noun and verb will be given the number of the subclass to which it belongs (cf. 8.1 and 9.1 respectively). Several stems occur in more than one lexical group.

- F42 V_{ma} → hakka 'begin' (22)
 F43 V_{ta} → v_{ti} 'be able' (11), p_iTa 'have to' (12)
 F44 V_{ob} \emptyset → tappA 'kill' (13), ära/v_ötta 'take away' (23),
 ära/v_öÖ 'eat' (11)
 F45 V_{ob}^P → armasta 'love' (16), näKe 'see', tahTA 'want' (13),
 ootta 'wait for' (22)
 F46 V_{ob:d} \emptyset → iOO 'bring' (11), v_ötta 'take' (23), t_östA 'lift' (13),
 vii 'take, lead' (11)
 F47 V_{ob:it} \emptyset → pane 'put' (21), pi_itA 'inject, stick' (13)
 F48 V_{ob}^{le} \emptyset → anTA 'give' (13), o_etA 'buy' (13), ähtesta 'for-
 give' (16)
 F49 V_{ob}^{le}-P → maini 'mention' (15), keela 'forbid' (22)
 F50 V_{ob}^P-ka → t_it_vusta 'acquaint' (16)
 F51 V_{ob}^{itt}-P → k_isi 'ask' (12)
 F52 V_{ob}^{itt}-g_hile → k_isi 'ask' (12)
 F53 V_c^{III} → usKa 'believe' (15)
 F54 V_c^{III} → p_uutta 'touch upon, concern' (14)
 F55 V_c^{III} → v_esta 'answer' (22), me_esti 'please' (14), so_pi 'cut'
 (12), h_unia 'belong' (14)

- F56 V_{cst} → rääkKi 'speak' (15), mõttle 'think' (22), olene 'depend upon' (16), aru/saa 'understand' (11), osa/võtta 'take part in' (23), hooli 'take care of' (15)
- F57 V_{cka} → apitellu 'marry' (14), tutvune 'get acquainted with' (16), alka 'begin with' (22), võrtu 'be equal to' (14)
- F58 V_{cs} → veentu 'be convinced' (14)
- F59 V_{c1} → põhine 'be based on' (16), rajane 'be based on' (16)
- F60 V_{cgs} → hoitu 'beware of' (14)
- F61 V_{prPR} → ole 'be' (03)
- F62 V_{prka} → saa 'become' (11), jää 'remain' (11), kasva 'grow' (15), tule 'become' (21), ole 'be' (03)
- F63 V_{prna} → püei 'remain' (12)
- F64 V_D → mine 'go' (04), ulatta 'reach' (16), kaTu 'disappear' (12)
- F65 V_T → jää 'remain' (11), vaatta 'look' (22)
- F66 V_L → istu 'sit' (15), asu 'be situated' (12), käi 'visit' (11)
- F67 V_i → sure 'die' (21), lõppe 'end' (15), vanane 'get old' (16)
- F68 V_n → pimene 'get dark' (16), koiTA 'dawn' (13), saTja 'rain' (12), sulA 'melt, thaw' (12)
- F69 ole_{ob} → ole 'be' (03)
- F70 Adj → punase 'red' (31), arKA 'cowardly' (12), suure 'large' (23), pikkA 'long' (12), noore 'young' (23), vana 'old' (12), keerulisE 'complicated' (31), külma 'cold' (12)
- F71 D → Nee 'this' (011), Noo 'that' (011)
- F72 Num → kahte '2' (12), kolme '3' (12), kümmeH '10' (33), mitteh 'several' (33), poolE 'half' (23), paari 'pair' (12)
- F73 Noun_c → mees 'man' (24), naisE 'woman' (31), maja 'house' (12), huppti 'wolf' (12), raamatUH 'book' (23), käti 'hand' (23), asJA 'matter, affair, thing' (12), lauTA 'table' (12), päevA 'day' (12), õnnas 'dinner' (24), metsA 'forest' (12), jalKA 'leg' (12)

F74 Noun_m - ilha 'meat' (12), aeKA 'time' (12), veTi 'water' (23),
valu 'pain' (12), vihmA 'rain' (12), su 'honour' (11),
valkusE 'light' (24)

F75 MA - mina (021), ma (022): 'I'

F76 SA - sina (021), sa (022): 'you (sg. -familiar)'

F77 ME - mei (023), meije (024): 'we'

F78 TE - toi (023), taije (024): 'you (sg. -polite & plural)'

F79 Adv_{to} - siina 'there', takasi 'back', üles 'up', siija 'here'

F80 Adv_s - siälti 'from there', kañkelti 'from afar'

F81 Adv_L - sin 'here', siäl 'there', kotus 'at home', väljas
'outside'

F82 Adv_{tm} - tänna 'today', vara 'early', pes 'soon', õösel 'at
night'

F83 Adv_m - hästi 'well', ruttu 'quickly', taas 'quietly'

F84 post_{to} - sisse 'into', alla 'under', läpt 'through', ette
'before'

F85 post_s - allt 'from under', eest 'from before', järealt 'from
at'

F86 post_L - al 'under', sees 'inside', järeas 'at', ees 'before'

F87 post_{tm} - pärast 'after'

F88 post_{ing} - asemel 'instead of', pärast 'on account of', kätte
'by the ...'

F89 post_{up} - mööda 'along'

F90 post_s - läpt 'through', üle 'over'

F91 post_{ed} - kuni 'as far as'

F92 post_{ly} - keset 'in the middle of', allpool 'below'

F93 post_{ly} - enne 'before', pärast 'after'

F94 post_{to} - koos 'together with'

F95 post_{tm} - ilma 'without'

11.11. The basic terminal-string types which the phrase
structure provides may be represented as follows:

- (1) #NP & n/(Adv/)NP/V_{ob}¹ & AUX# (one object complement)
- (2) #NP & n/(Adv/)NP/NP/V_{ob}² & AUX# (two object complements)
- (3) #NP & n/(Adv/)Pr/V_{pr} & AUX# (predicate nominal)
- (4) #NP & n/(Adv/)V₁ & AUX# (simple intransitive sentence)
- (5) #NP & n/(Adv/)DIR/V_D & AUX# (intransitive sentence with directional adverbial)
- (6) # (Adv/)V_n & AUX# (simple subjectless sentence)
- (7) # (Adv/)Adj/ole & AUX# (adjectival subjectless sentence)
- (8) #NP & 1/(Adv/)(D &) Nom/ole_{ob} & AUX# ('have' construction)

Examples of kernel sentences and their analyses obtained from the above strings are the following:³

- (1) mina nâkin tâna seta maja. 'I saw this house today.'
 #MA & sg & n/V_{ob}^P & past & n/Adv_{tm}/D & sg & p & Noun_c
 & sg & p#
- (2) mees oji nâisele râamattu aâmtut. 'The man had given the woman the book.'
 #Noun_c & sg & n/ole & past & p/Noun_c & sg & g & le/Noun_c
 & sg & g/V_{ob}^{le-#} & nut#
- (3) nâine saap ilusaks. 'The woman will become beautiful.'
 #Noun_c & sg & n/V_{pr}^{ks} & pres & p/Adj & sg & g & ks#
- (4) hâpfit surit. 'The wolves died.'
 #Noun_c & pl & n/V₁ & past & vat#
- (5) mees ei vâi qâna miâna. 'The man is unable to go there.'
 #Noun_c & sg & n/ei & V_{ta} & pres/Adv_{to}/V_D & ta#
- (6) tasa sajav. 'It is raining quietly.'
 #Adv_m/V_n & pres & p#
- (7) sâael ei ole hâpm ôlmut. 'It has not been cold at night.'
 #Adv_{tm}/ei & ole & pres/Adj & sg & n/ole & nut#

- (8) *õllel mehel õft lüuvat. 'This man had the tables.'*
 #D & sg & g & 1 & Noun_C & sg & g & 1/ole & past & vat/Noun_C
 & pl & nf

11.2. Transformational rules

11.2.1. Verbal Government

Let $Vrb = \{V_{ob}^{(1,2)}, V_{ob:d}^{\phi}, V_{obit}^{\phi}, V_c, V_{pr}, V_D,$
 $V_T, V_L, V_i, V_a\}$

$x, y = \{\phi, p, ill, le, st, itt, ka, ks, s, l, na, gkõle, gkeest\}$

T1 OB: $\left[\begin{array}{c} Pr \\ NP \end{array} \right] // \left[\begin{array}{c} TO \\ DIR \end{array} \right] // Vrb^x \rightarrow \left[\begin{array}{c} Pr \\ NP \end{array} \right] \& x // \left[\begin{array}{c} TO \\ DIR \end{array} \right] // Vrb^x$

T2 OB: $NP / NP' / Vrb^{x-y} \rightarrow NP \& x / NP' \& y / Vrb^{x-y}$

T1 and T2 insert the proper case endings on verb-complex complements. For example, a verb which takes a direct object (in an object case) and an indirect object (in alliative case) such as *anna* 'give' here undergoes the following transformation (cf. F11, F15, and example 2 in 11.11):

$NP / NP' / V_{ob}^{le-\phi} \rightarrow NP \& le / NP' \& \phi / V_{ob}^{le-\phi}$

Other examples:

(1) $NP / TO / V_{obit}^{\phi} \rightarrow NP \& \phi / TO / V_{obit}^{\phi}$ (cf. F11)

mees pani räämatu lüuvale. 'The man put the book on the table.'

$V_{obit}^{\phi} = pane, NP \& \phi = räämatu, TO = lüuvale$

(2) $NP / V_c^{ill} \rightarrow NP \& ill / V_c^{ill}$ (cf. F11, F16)

mees ütvas räämatuuse. 'The man believed in the book.'

$V_c^{ill} = uska, NP \& ill = räämatuuse$

(3) $Pr / V_{pr}^{ks} \rightarrow Pr \& ks / V_{pr}^{ks}$ (cf. F12, F17)

mees jää vanaks. 'The man remains old.'

$V_{pr}^{ks} = jää, Pr \& ks = vanaks$

11.2.2. Partitive Subject

T3 OP: (D &) $\left[\begin{array}{l} \text{Noun}_c \text{ \& pl} \\ \text{Noun}_m \text{ \& sg} \end{array} \right] \& \text{n...} \left[\begin{array}{l} \text{ole}_{ob} \\ \text{Vb}_{in} \end{array} \right] \rightarrow$

(D &) $\left[\begin{array}{l} \text{Noun}_c \text{ \& pl} \\ \text{Noun}_m \text{ \& sg} \end{array} \right] \& \text{p...} \left[\begin{array}{l} \text{ole}_{ob} \\ \text{Vb}_{in} \end{array} \right]$

Condition: $\text{Vb}_{in} \neq \text{Pr/V}_{pr}$

T3 provides that the subject of an intransitive verb or the possessed Nom of the 'have' construction may occur in the partitive case (within the bounds specified by T3). In this case the partitive expresses an indefinite quantity of the noun.

Examples:

- (1) $\text{h\u00f4p\u00f4te j\u00f4ksep metsa}$. 'There are wolves running into the forest.'
- (2) $\text{le\u00efpa o\u00efi l\u00e4uval}$. 'There was bread on the table.'
- (3) $\text{minul o\u00efi r\u00e4amattuit}$. 'I had some books.'

Compare the following sentences in which the nominative has been retained: (1) $\text{h\u00f4p\u00f4it j\u00f4ksevat metsa}$. 'The wolves are running into the forest.' (2) $\text{le\u00efp o\u00efi l\u00e4uval}$. 'The bread was on the table.' (3) $\text{minul o\u00efit r\u00e4amattut}$. 'I had the books.'

11.2.3. Subject Conjunction

T4 OP: Let $s = \{n, p\}$

$S_1: \{ \text{\&NP} \& s \dots \}$ } $\rightarrow \text{\&NP} \& s \& \text{ja} \& \text{NP}' \& s \dots$
 $S_2: \{ \text{\&NP}' \& s \dots \}$

(It should be noted that ... in S_1 equals ... in S_2 .)

T4 is introduced in this sketch in order to enable a more complete treatment of person agreement in T5. Other conjunction rules will not be presented here. Example:

S_1 : $\text{mees i\u00eftus majas}$. 'The man sat in the house.'

S_2 : $\text{n\u00e4ine i\u00eftus majas}$. 'The woman sat in the house.'

resultant sentence: $\text{mees ja n\u00e4ine i\u00eftu\u00eft majas}$.

'The man and (the) woman sat in the house.'

11.2.4. Verb Person Agreement

- T5 OB:
- (a) $\text{ME} \& \text{sg} \& \text{n...P} \rightarrow \text{ME} \& \text{sg} \& \text{n...me}$
 - (b) $\text{MA} \& \text{sg} \& \text{n} \& \text{ja...P} \rightarrow \text{MA} \& \text{sg} \& \text{n} \& \text{ja...me}$
 - (c) $\text{ja} \& \text{MA} \& \text{sg} \& \text{n...P} \rightarrow \text{ja} \& \text{MA} \& \text{sg} \& \text{n...me}$
 - (d) $\text{TE} \& \text{sg} \& \text{n...P} \rightarrow \text{TE} \& \text{sg} \& \text{n...te}$
 - (e) $\text{SA} \& \text{sg} \& \text{n} \& \text{ja...P} \rightarrow \text{SA} \& \text{sg} \& \text{n} \& \text{ja...te}$

- (f) $ja \ \& \ SA \ \& \ sg \ \& \ n...P \rightarrow ja \ \& \ SA \ \& \ sg \ \& \ n...tte$
 (g) $MA \ \& \ sg \ \& \ n...P \rightarrow MA \ \& \ sg \ \& \ n...n$
 (h) $SA \ \& \ sg \ \& \ n...P \rightarrow SA \ \& \ sg \ \& \ n...t$
 (i) $NP \ \& \ n \ \& \ ja...P \rightarrow NP \ \& \ n \ \& \ ja...vat$
 (j) $ja \ \& \ NP \ \& \ n...P \rightarrow ja \ \& \ NP \ \& \ n...vat$
 (k) $X \ \& \ pl \ \& \ n...P \rightarrow X \ \& \ pl \ \& \ n...vat$
 (l) $D \ \& \ Num \ \& \ Noun_c \ \& \ sg \ \& \ n...P \rightarrow$
 $D \ \& \ Num \ \& \ Noun_c \ \& \ sg \ \& \ n...vat$
 (m) $P \rightarrow P$

Condition: $n \neq 1$ or p (See F18, F19)

Rules (a) through (m) must be applied in the order in which they are listed, only one rule thus being applicable for any given P . They may be summarized as follows:

- (a)-(e): First person plural or first person plus any other subject requires a first-plural verb suffix.
 (d)-(f): Second person plural or second person plus any third-person subject requires a second-plural suffix.
 (g)-(h): First- and second-singular suffixes.
 (i)-(k): Third person plural or more than one third-person subject requires the third-plural suffix; e.g.,
 mees ja naine istuvat majas. 'The man and woman are sitting in the house.'
 (l): A numeral plus a noun requires a third-plural suffix if it is preceded by a demonstrative (otherwise the third-singular suffix is used); e.g.,
 neet kolm meest istuvat majas. 'These three men are sitting in the house.' (Compare: kolm meest istup majas.)
 (m): Elsewhere a third-singular suffix is used. This rule accounts for (1) all other NP & n, (2) all NP & p (cf. T3), and (3) subjectless verb constructions; e.g., pimenep. 'It is getting dark.'

Rules (l)-(m) also determine the correct verb suffix for the 'have' construction, in which the possessed Noun determines the verb person marker.

In further rules, let $P = (\underline{n}, \underline{t}, \underline{p}, \underline{me}, \underline{tte}, \underline{vat})$.

11.2.5. Predicate—Subject Number Agreement

To O8:

$$(a) \ Pr \ \& \ \begin{bmatrix} pr \\ ka \\ na \end{bmatrix} \dots \begin{bmatrix} n \\ t \\ p \end{bmatrix} \rightarrow Pr \ \& \ sg \ \& \ \begin{bmatrix} n \\ ka \\ na \end{bmatrix} \dots \begin{bmatrix} n \\ t \\ p \end{bmatrix}$$

(b) Pr & $\begin{bmatrix} \text{pr} \\ \text{ks} \\ \text{na} \end{bmatrix}$... $\begin{bmatrix} \text{me} \\ \text{tte} \\ \text{vat} \end{bmatrix}$ → Pr & pl & $\begin{bmatrix} \text{n} \\ \text{ks} \\ \text{na} \end{bmatrix}$... $\begin{bmatrix} \text{me} \\ \text{tte} \\ \text{vat} \end{bmatrix}$

T7 OP: Pr & pl & ks → Pr & sg & ks

Once T5 has been applied, the proper number for predicate nouns and adjectives may be determined easily from the verb person-number suffix. Since noun categories have not been developed in the phrase structure, T6 and T7 as they now stand will produce only sentences in which subject and predicate have the same number (e.g., "Those boys are delinquents;" but not "Those boys are a nuisance."

There is apparently a stylistic fluctuation with regard to the number agreement of the translative ks in the predicate. It is found to occur in singular and plural in agreement with the person-number suffix as well as in singular only, not in agreement with the subject number. Accordingly, the optional T7 accounts for the use of ks with no agreement. Examples:

(T6) mehet jãvat vapateks. (< Pr & pl & ks) 'The men remain free.'

(T7) mehet jãvat vapaks. (< Pr & sg & ks) 'The men remain free.'

In T6 the pr case marker becomes nominative (n). In certain circumstances it may also become partitive, but this is not treated here.

Further examples with T6:

ma olen õppetaja. (< Pr & sg & n) 'I am a teacher.'

mees kasvab suureks. (< Pr & sg & ks) 'The man grew large.'

me saime sõprateks. (< Pr & pl & ks) 'We became friends.'

mehet õlit sõprat. (< Pr & pl & n) 'The men were friends.'

mehet õlit arat. (< Pr & pl & n) 'The men were cowardly.'

11.2.6. Impersonal Adjective Case

T8 OB: $\$(Adv//)Adj \rightarrow \$(Adv//)Adj \& \text{sg} \& \text{n}$

The adjective of impersonal constructions is nominative singular. Example: on+kõlm. (< Adj & sg & n) 'It is cold.'

11.2.7. Negative Object

T9 OB: NP & \emptyset ... ei → NP & p ... ei

The direct object of a negative verb is in the partitive case. The noun: *moox* of *diipya naist*. 'The man will not kill the woman.' (NP & p = *naist*). (Compare: *moox diipya naist*. 'The man will kill the woman.')

11.2.8. Imperative

11.2.8. Vb_s & (ma/naika &)(et &)T & p -

Condition: p ≠ n

Vb_s & (ma/naika &)(et &)K & p

The imperative is formed from subject verbs for all persons except first singular by replacing T with the imperative morpheme K.

11.2.9. Yes-No Question

11.2.9. Yes-No Question

11.2.9. T & p_q → θna & ...T & p_q

Examples: *has ma diipya naist*. 'Will I kill the woman?'
has p_{na}naeap. 'Is it getting dark?'

has maist epi θ_{na}waet. 'Did I have the babies?'

11.2.10. "Real" Condition

11.2.10. θ₁ θ₂...T & p_q } → θ_{na}l & ...T & p_qle₁ & ...T' & p'_q

Conditions: ... and ... do not contain *ha*.

Example: *θ₁ naist diipya naist*. 'I will kill the woman.'

θ₂ naist eap_{ep}. 'The woman will die.'

result: *naist naist diipya naist*, *θ₁ naist eap_{ep}*.

'If I kill the woman, the woman will die.'

11.2.11. "Unreal" Condition

11.2.11. θ₁ θ₂...T & p_q } → θ_{na}l & ...θ₁ & p'_qle₁ & ...θ₂' & p'_q

θ_{na}l & ...θ₁ & p'_qle₁ & ...θ₂' & p'_q

Conditions: ... and ... do not contain *ha*.

In the "unreal"-condition construction, T is replaced by the conditional morpheme *θ₁*. Examples: *θ₁* and *θ₂* are the same as in the example for 11.2; result: *naist naist diipya naist*, *θ₁ naist eap_{ep}*. 'If I were to kill the woman, the woman would die.'

11.2.12. Fourth Person

T14 OP: #X NP & n/... Vb_s & (V_a &)(nut/ole &)(ei &)

T
ka/
K

 & P_g

→ #X ... Vb_s & (V_a &)tta' & (nut/ole &)(ei &)

T
ka/
K

 &

The fourth-person construction is formed by replacing the subject and its corresponding person-number suffix by the fourth-person morpheme tta', which indicates an action performed by an unspecified agent. Certain references to the original subject such as number may remain, however, in predicate nominal constructions; compare: õllakse röömus. 'One is gay.' (< mees on röömus. 'The man is gay.') and õllakse röömsat. 'People (in general) are gay.' (< mehet on röömsat. 'The men are gay.')

The number of the predicate has already been determined by T6 and T7. Examples:

- (1) mi¹ti şina. 'One went there.' (< ma läkşin şina. 'I went there.')
- (2) kui mi¹taks şina, ... 'If one were to go there. ...' (< kui naine läheks şina. 'If the woman were to go there.')
- (3) mi¹taku şina. 'May one go there.' (< mi¹ku see mees şina. 'May this man go there.')
- (4) on şina mi¹tut. 'One has gone there.' (< ma olen şina läinut. 'I have gone there.')
- (5) oli şina mi¹tut. 'One had gone there.' (< ma olin şina läinut. 'I had gone there.')
- (6) ei şina şina. 'One doesn't go there.' (< ma ei lähe şina. 'I don't go there.')
- (7) ei mi¹tut şina. 'One didn't go there.' (< ma ei läinut şina. 'I didn't go there.')
- (8) ei ole şina mi¹tut. 'One hasn't gone there.' (< ma ei ole şina läinut. 'I haven't gone there.')
- (9) ei õinut şina mi¹tut. 'One hadn't gone there.' (< ma ei õinut şina läinut. 'I hadn't gone there.')
- (10) ärku mi¹taku şina. 'May one not go there.' (< ära mine şina. 'Don't go there!')

11.2.13. Imperative and Fourth-Person Object

T15 OB: $\phi \dots \left[\begin{array}{c} K \\ tta' \end{array} \right] \rightarrow \neq \dots \left[\begin{array}{c} K \\ tta' \end{array} \right]$

The direct (non-negative) object of imperative and fourth-person verb constructions has a special "nominative-object" pattern (pph). Later this will be represented by either the pattern (T34 and T35) or the nominative case (T36), as in 11.2.14. "Aspectual" Partitive Object

Let: Noun = {Noun, Noun_{pl}}

T16 OP: / (D &) Noun & No & $\left[\begin{smallmatrix} \text{np} \\ \phi \end{smallmatrix} \right]$ → / (D &) Noun & No & p

T17 OB: / (D &) Noun & No & $\left[\begin{smallmatrix} \text{np} \\ \phi \end{smallmatrix} \right]$... halha -

/ (D &) Noun & No & p ... halha

The object case markers ϕ and np may be replaced by the partitive case by means of optional T16 or are obligatorily replaced in T17. In those instances the use of the partitive may reflect upon (1) the nature of the object or (2) the nature of the verbal action. In the first instance, the partitive indicates that only a part of the object or some of the object class is questioned (compare T3 above); e.g., ma v ϕ lin rhamattat' fra. 'I took away some books.' (compare: ma v ϕ lin rhamattat' fra. 'I took the books away.'; from Noun & No & ϕ).

In the second instance the partitive may indicate the non-completion of the verbal action, and in the case of the present tense may indicate an action going on in the present (as opposed to ϕ , which would indicate a future completion of the action); e.g., ma v ϕ lin rhamattat' fra. 'I was taking the book away.' ma v ϕ lin rhamattat' fra. 'I am taking the book away.' (compare: ma v ϕ lin rhamattat' fra. 'I took the book away!'; ma v ϕ lin rhamattat' fra. 'I shall take the book away!'; in which Noun & No & ϕ is used).

It should be noted that in the first instance mass nouns and plural count nouns are used, whereas in the second the contrast is most clearly perceived with the use of singular count nouns.

T17 indicates that the verbal auxiliary halha "v ϕ lin" calls for the aspectual partitive. (Other verbs in auxiliary function not treated here behave like halha in this respect; e.g., aa "get in," havalat "plan.")

Since the various functions of the aspectual partitive are always only in broad outline, my treatment of it at this time went

11.2.15. Imperative Shift (Subject Optional)T18 OB: (a) $\# \dots / X \underline{K} \# \rightarrow \# X \underline{K} / \dots \#$ (b) $\# \left[\begin{array}{l} NP \ \& \ \left[\begin{array}{c} P \\ n \end{array} \right] / \\ NP \ \& \ \underline{1} / \end{array} \right] \dots / X \underline{K} \ \& \ P \# \rightarrow$
 $\# X \underline{K} \ \& \ P / \left[\begin{array}{l} (NP \ \& \ \left[\begin{array}{c} P \\ n \end{array} \right] /) \\ NP \ \& \ \underline{1} / \end{array} \right] / \dots \#$

T18 shifts the last phrasal element of the verb complex to the first phrasal position in imperative sentences. In (b) the subject of the sentence is optionally deleted. With the third person this subject deletion results in ambiguity, since K plus p and K plus vat produce identical forms. Examples:

- (1) miñtaku ãina. 'May one go there.'
- (2) iñtuke (tãije) sãil. 'Sit there!'
- (3) ßotakkem (mãije) meest. 'Let's (us) wait for the man.'
- (4) vananeu. 'May he/they grow old.'
- vananeu see mees. 'May this man grow old.'
- vananeu neet nãiset. 'May these women grow old.'
- (5) õiku maja suur. 'May the house be large.'
- (6) võtta rãamattut ãra. 'Take the books away!'
- (< ãina/rãamattut/ãra/võttA & K & t#)
- (7) ãra võtta rãamattuit ãra. 'Don't take the books away!'
- (< ãina/rãamattuit/ãra/võttA & ei & K & t#)
- (8) olku mehel maja. 'May the man have a house.'

11.2.16. Fourth-Person Verb ShiftT19 OP: $\# \left[\begin{array}{c} kui \\ seis \\ kas \end{array} \right] \ \& \ \dots / X \left[\begin{array}{c} T \\ \\ kui \end{array} \right] \# \rightarrow \# \left(\left[\begin{array}{c} kui \\ seis \\ kas \end{array} \right] \ \& \right) X \left[\begin{array}{c} T \\ \\ kui \end{array} \right] / \dots \#$

T19 shifts the last phrasal element of the verb complex to the sentence-initial position in non-imperative fourth-person sentences. If T19 is not applied, then T25 below is obligatory. Examples:

- (1) ãkas sãilest ãjjaet/aru/sãitakse# \rightarrow ãkas sãitakse/sãilest ãjjaet/aru# 'Does one understand this matter?'
- (2) ãkui sãilest ãjjaet/aru/sãitut/oleks#... \rightarrow ãkui oleks/sãilest ãjjaet/aru/sãitut#... 'If one would have understood this matter, ...'

11.2.17. Comparative

$$\begin{aligned} \text{T0 OP: } S_1: & \#X \text{ NP} \& n/\dots / \text{Adj} \& \text{No} \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} / V_{pr} \\ S_2: & \# \left(\begin{bmatrix} kui \\ sise \\ kas \end{bmatrix} \& \right) Y \text{ NP}' \& n/\dots / \text{Adj} \& \text{No}' \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} / V_{pr} \\ & - \#X \text{ NP} \& n/\dots / \text{Adj} \& \underline{\text{mAH}} \& \text{No} \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} \& \text{kui} \& \\ & Y \text{ NP}' \& n/V_{pr} \end{aligned}$$

$$\begin{aligned} \text{T1 OP: } & \text{Adj} \& \underline{\text{mAH}} \& \text{No} \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} \& \text{kui} \& \text{NP} \& n/ \rightarrow \\ & \text{Adj} \& \underline{\text{mAH}} \& \text{No} \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} \& \text{NP} \& \underline{\text{st/}} \end{aligned}$$

T20 forms comparative constructions from two sentences having identical predicate adjectives. In T20 the comparison is expressed by *kui* 'than' plus the nominative case of the compared NP. In T21 the comparison is expressed by the elative case of the compared NP. Examples:

- 5: *mees on vana.* 'The man is old.'
 6: *naine on vana.* 'The woman is old.'
 result: (T20) *mees on vanem kui naine.* 'The man is older
 (T21) *mees on vanem naiseest.* 'than the woman.'

11.2.18. Superlative

$$\begin{aligned} \text{T2 OP: } & \text{Adj} \& \text{No} \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} \rightarrow \text{Adj} \& \underline{\text{I}} \& \underline{\text{mAH}} \& \text{No} \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} \\ \text{T3 OP: } & \text{Adj} \& \text{No} \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} \rightarrow \text{kõike} \& \text{Adj} \& \underline{\text{mAH}} \& \text{No} \& \begin{bmatrix} n \\ ks \\ na \end{bmatrix} \end{aligned}$$

The superlative may be formed in two ways. T22, the more literary construction, suffices a superlative morpheme, I, between the adjective and the comparative morpheme mAH. T23 forms a superlative construction by means of the genitive-stagular of kõike 'all' plus the comparative degree of the adjective.

Examples:

(T22) mees on vapim. (< vana & I & mAH & n) 'The man
oldest.'

(T23) mees on kõike vanem. (< kõike & vana & mAH & n)

In further rules let Adj & mAH (from T20), Adj & I & mAH (T23) = Adj.
and kõike & Adj & mAH (T23) = Adj.

11.2.19. Attributive Adjective

T24 OP: $S_1: \#X \text{ Noun} \& \text{ No} \& n / \dots \text{ Adj Y/V}_{pr} \} \rightarrow \dots \text{ Adj} \& \text{ Noun}$
 $S_2: \dots \text{ Noun} \dots$

T24 allows the insertion of a predicate adjective into an attributive position. Examples:

S_1 : (1) mees on vana.

(2) mees on vanem näisest.

(3) mees on kõike vanem.

S_2 : nēntel kõlmel mehel on maja. 'These three men have a house.'

results: nēntel kõlmel

(1) vanal
(2) vanemal
(3) kõike vanemal

 mehel on maja.

'These three old/older/oldest men have a house.'

In further rules let

Num
ūHTE

 & Adj X Noun & No = Nom.

11.2.20. Verb Second Shift

T25 OB: $\#X / \dots / Y P \# \rightarrow \#X / Y P / \dots \#$

T25 shifts the final phrasal element of the verb complex to the second phrasal position of the sentence in sentences to which neither T18 nor T19 have been applied. The one most striking feature of word order in Estonian is the fact that the finite—i.e., tense-mood bearing—verb is nearly always predictably in the first or second phrasal position of the sentence. For this reason T18 and T25 have been set up as obligatory rules. Further shifts of the finite verb are not treated here. Examples:

(1) rāamattut võttakse ära. 'One takes the books away.'

(2) ma olen rāamattut ära võtnut. 'I have taken the books away.'

(3) ma olen rāamattut ära võtta võinut. 'I have been able to take the books away.'

(See also the sentence examples cited for the preceding rules except for T18 and T19.)

11.2.21. Non-Finite-Verb Shifts
 Further shifts of the verbal elements in the verb complex to positions immediately following the finite verb are also common phenomena. Rules T26 and T27 permit such additional shifting, if the limitations upon these shifts are poorly understood.
 Let $Af_v = \{nut, ma, ta\}$

T26 OP: $\begin{bmatrix} T \\ ksi \\ K \end{bmatrix} (& P) / \dots / Vrb \ \& \ Af_v \# \rightarrow \begin{bmatrix} T \\ ksi \\ K \end{bmatrix} (& P) / Vrb \ \& \ Af_v / \dots \#$

T27 OP: $nut / \dots / Vrb \ \& \ Af_v \# \rightarrow nut / Vrb \ \& \ Af_v / \dots \#$

Examples:

- (1) before T25: #ma/setsa ʃiha/sōōma/hākkanut/olen#
 'I have begun to eat this meat.'
 T25: #ma/olen/setsa ʃiha/sōōma/hākkanut#
 T26: #ma/olen/hākkanut/setsa ʃiha/sōōma#
 T27: #ma/olen/hākkanut/sōōma/setsa ʃiha#
- (2) before T25: #ma/sēlle rāamattu/āra/viʃja/vōin#
 'I am able to take away this book.'
 T25: #ma/vōin/sēlle rāamattu/āra/viʃja#
 T26: #ma/vōin/āra/viʃja/sēlle rāamattu#
 (Note: āra/vii = Vrb)

11.2.22. Negative Imperative

T28 OB: $X \ \& \ ei \ \& \ \begin{bmatrix} K \\ K \ \& \ P \end{bmatrix} \rightarrow ei \ \& \ \begin{bmatrix} K \\ K \ \& \ P \end{bmatrix} \ \& \ X \ \& \ \begin{bmatrix} K \\ K \ \& \ P \end{bmatrix}$

T28 accounts for the reduplicated occurrence of the imperative person-number portmanteau morph with the negative auxiliary and the finite verb and puts the verbal elements in proper sequence; e.g., #mine & ei & K & tte → #ei & K & tte & mine & K & tte > ārke miŋke. 'Don't go!'

11.2.23. Negative Shift

T29 OB: $X \ \& \ ei \ \& \ \begin{bmatrix} ksi \\ T \end{bmatrix} (& P) \rightarrow ei \ \& \ X \ \& \ \begin{bmatrix} ksi \\ T \end{bmatrix}$

T29 puts the verbal elements of other negative constructions into proper sequence and removes the person-number marker from non-fourth-person constructions. With the conditional and non-fourth-person present tense no further changes are necessary.
 Examples:

- (1) anTA & ei & pres & n → ei & anTA & pres >
ei áanna '(I) don't give.'
- (2) anTA & ei & ksi & n → ei & anTA & ksi >
ei ánnaks '(I) wouldn't give.'
- (3) anTA & tta' & ei & ksi → ei & anTA & tta' & ksi >
ei áttaks 'one wouldn't give.'

11.2.24. Indirect Report

T30 OP: pres (& P) → vAH & sg & p

Any given sentence with the present tense morpheme may be presented as indirectly reported speech without assuming responsibility for the accuracy of the sentence. This is achieved by replacing the tense and, with non-fourth-person sentences, the person-number suffix by the present participle vAH in the participative-singular case. Examples:

- (1) #maja/asu & pres & p/métsas# 'The house is located in the forest.' → #maja/asu & vAH & sg & p/métsas# >
maja asuvatt métsas. 'The house is said to be in the forest.'
- (2) #mehet/ole & pres & vat/šínna/láinut# 'The men have gone there.' → #mehet/ole & vAH & sg & p/šínna/láinut# >
mehet olevatt šínna láinut. 'The men are said to have gone there.'

11.2.25. Negative Past

T31 OP: ei & X & past → ei & past & X & pres

Condition: X does not contain tta'.

T31 provides an optional colloquial negative past-tense formation which puts the negative auxiliary in the past tense and affixes the present tense to the negated verb; e.g., ei & anTA & past → ei & past & anTA & pres > es áanna 'didn't give.'

T32 OB: ei & X & past → ei & X & nut

The more standard negative past tense is formed by replacing the tense marker with the past participle morpheme. Examples:

- (1) ei & anTA & past → ei & anTA & nut > ei áhntut
- (2) ei & anTA & tta' & past → ei & anTA & tta' & nut > ei áhntut
'one didn't give.'

11.2.26. Negative Fourth-Person Present

T33 OB: ei & X & tta' & pres → ei & X & tta'

In the negative fourth-person present no tense marker at all occurs; e.g., ei & ole & tta' & pres → ei & ole & tta' > ei oita 'one is not' (compare the positive form in which the present-tense suffix occurs: ole & tta' & pres > illakse 'one is').

11.2.27. Object Case

The following rules determine the proper case value for the object and nominative-object markers (ϕ and $n\phi$ respectively). These are realized as the partitive-singular, genitive-singular, nominative-singular, and nominative-plural case-number suffixes depending upon the environments in which they occur. T37 also determines the proper cases for numeral constructions in the nominative case.

T34 OB (ME/TE Object): $\begin{bmatrix} \text{ME} \\ \text{TE} \end{bmatrix}$ & sg & $\begin{bmatrix} n\phi \\ \phi \end{bmatrix}$ → $\begin{bmatrix} \text{mei} \\ \text{tei} \end{bmatrix}$ & sg & p

T35 OB (MA/SA Object): $\begin{bmatrix} \text{MA} \\ \text{SA} \end{bmatrix}$ & sg & $n\phi$ → $\begin{bmatrix} \text{mina} \\ \text{sina} \end{bmatrix}$ & sg & p

T36 OB (Nominative Object): $n\phi$ → n

T37 OB (Numeral Object and Nominative):

Num X Noun_c & sg & $\begin{bmatrix} n \\ \phi \end{bmatrix}$ → Num & sg & n X Noun_c & sg & p

T38 OB (Genitive-singular Object): sg & ϕ → sg & g

T39 OB (Nominative-plural Object): pl & ϕ → pl & n

11.2.28. Preposition Shift

Let Prp = prp: {to_g, to_{ni}, L_p, tmp, mka, mta}

T40 OB: /X/Prp/ → /Prp & X/

T40 shifts the preposition into its proper place before the noun phrase. Examples:

- (1) /metsa & sg & g/lāpi/ → /lāpi & metsa & sg & g/ >
lāpi mētsa 'through the forest'
- (2) /liha & sg & tta/ijma/ → /ijma & liha & sg & tta/ >
ijma lihatta 'without meat'

11.2.29. Case Concord

Thus far only the final element—i.e., head—of the noun phrase has been assigned a case ending. The following rules assign the proper case endings to the other members of the noun

phrase. These rules must be applied repeatedly to the noun phrase until they are no longer applicable.

Let: Px = {ka, ni, tta, na}

Cx = {n, p, g, ill, ks, s, st, sse, l, ltt, le}

T41 OB: $\left[\begin{array}{c} D \\ \text{Num} \\ \text{Adj} \\ \text{üHTE} \end{array} \right]$ & Noun & No & Px →

$\left[\begin{array}{c} D \\ \text{Num} \\ \text{Adj} \\ \text{üHTE} \end{array} \right]$ & No & g & Noun & No & Px

T42 OB: $\left[\begin{array}{c} D \\ \text{Num} \\ \text{Adj} \\ \text{üHTE} \end{array} \right]$ & $\left[\begin{array}{c} \text{Noun} \\ \text{Adj} \end{array} \right]$ & No & Cx →

$\left[\begin{array}{c} D \\ \text{Num} \\ \text{Adj} \\ \text{üHTE} \end{array} \right]$ & No & Cx & $\left[\begin{array}{c} \text{Noun} \\ \text{Adj} \end{array} \right]$ & No & Cx

T43 OB: D & üHTE & No & Cx → D & No & Cx & üHTE & No & Cx

T44 OB: D & Num & No & Cx → D & pl & Cx & Num & No & Cx

It should be noted that agreement is complete only in T42 and T43. In T41 the class of case suffixes Px occurs only with the head of the noun phrase, the other members being in the genitive. These suffixes thus clearly resemble postpositions. In T44 the demonstrative before a numeral is plural, whereas the numeral (and subsequent members of the noun phrase) are singular.

Examples:

- (1) Given: Noo & kolmE & suurE & punase & maja & sg & ni
'as far as those three large, red houses'

T41: Noo & kolmE & suurE & punase & sg & g & maja & sg & ni

T42: Noo & kolmE & suurE & sg & g & punase & sg & g

T43: Noo & kolmE & sg & g & suurE & sg & g

T44: Noo & pl & g & kolmE & sg & g

result: nõnte kõlme suure punase majani

- (2) Given: Nee & üHTE & arKA & mees & sg & l
'this one cowardly man (has)'

T42: Nee & üHTE & arKA & sg & 1 & mees & sg & 1
 T42: Nee & üHTE & sg & 1 & arKA & sg & 1
 T43: Nee & sg & 1 & üHTE & sg & 1
 result: söllel ühel aral mehel

In further rules let $\begin{bmatrix} D \\ \text{Num} \\ \text{Adj} \\ \text{üHTE} \end{bmatrix}$ & No & Cx = $\begin{bmatrix} D' \\ \text{Num}' \\ \text{Adj}' \\ \text{üHTE}' \end{bmatrix}$; and let any

NP now consist of the elements D', Num', Adj', üHTE' corresponding to the original elements without number and case.

11.2.30. Third-Person Pronoun

Let Case = {Cx, Px}

- T45 OP: (a) D & pl & n & Num & sg & n X Noun & sg & p →
 Nema & pl & n
 (b) D & No & Cx X Noun & No' & Case → Nema & No
 & Case

Conditions: No may equal No'.

If Case = p, then Cx must also = p.

The third-person pronouns occur in the same positions as D & Nom (thus differing from the other personal pronouns) and show a number agreement with their antecedents which matches the number of the demonstratives in corresponding antecedent D & Nom constructions. Accordingly, T45 forms these pronouns by substituting them for the demonstratives, retaining the number of the demonstrative, but taking the case ending from the head of the noun phrase. Examples:

- (1) Given: Nee & pl & n & kolmE & sg & n & mees & sg & p
 'these three men'
 T45(a): Nema & pl & n (> nemat) 'they'
 (2) Given: Nee & pl & g & kolmE & sg & g & mees & sg & ka
 'with these three men'
 T45(b): Nema & pl & ka (> nēnteka) 'with them'
 (3) Given: Nee & sg & g & liha & sg & tta 'without this meat'
 T45(b): Nema & sg & tta (> tematta) 'without it'

11.2.31. Pronominalization (Noun Ellipsis)

T46 OP: (a) Num & sg & n & Noun & sg & p → Num & sg & n

(b) $\begin{bmatrix} D \\ \text{Num} \\ \text{Adj} \\ \text{üHTE} \end{bmatrix}$ & No & Cx & Noun & No & Case -

$\begin{bmatrix} D \\ \text{Num} \\ \text{Adj} \\ \text{üHTE} \end{bmatrix}$ & No & Case

Condition: If Case = p, then Cx must also = p.

Examples:

- (1) Given: Nee & pl & n & kolmE & sg & n & mees & sg & p
'these three men'
T46(a): Nee & pl & n & kolmE & sg & n (> neet kolm)
'these three'
- (2) Given: Noo & sg & g & suurE & sg & g & maja & sg & ni
'as far as that large house'
T46(b): Noo & sg & g & suurE & sg & ni (> tõlle suurel)
'as far as that large one'

11.2.32. Illative Case

T47 OB/OP: No & ill → No & sse

Note: This rule is obligatory where No = pl or where No is immediately preceded by a noun which does not take the illative-singular suffix. Elsewhere it is optional.

T47 permits the choice between the illative-singular morpheme and the illative secondary-case formation. It should be noted that this option is possible only where ill (but not sse) occurs; e.g., with verbs of the type V_c^{ill} (uskü 'believe') the option is possible, but not with verbs of the type V_c^{sse} (punitu 'concern'). Examples:

OB: maja & pl & ill → maja & pl & sse (> majassee)
OB: mees & sg & ill → mees & sg & sse (> mehessee)
OP: maja & sg & ill → maja & sg & sse (> majassee)
(but also: maja & sg & ill > majja)

11.2.33. Secondary-Case Formations

Let $S_x = \{ks, s, st, sse, l, itt, le\}$

T48 OB: No & $\begin{bmatrix} Px \\ Sx \end{bmatrix}$ → No & g & $\begin{bmatrix} Px \\ Sx \end{bmatrix}$

The secondary-case suffixes follow the genitive-singular and genitive-plural morphemes to form singular and plural respectively; e.g., *maja* & pl & *sse* → *maja* & pl & g & *sse* (> *majatesse*).

11.2.34. Literary Alternate Plural

T49 OP: X & pl & g $\begin{bmatrix} Px \\ Sx \end{bmatrix}$ → X & pl & p & $\begin{bmatrix} Px \\ Sx \end{bmatrix}$

Condition: The last element in X must be a noun which takes the partitive-plural followed by a secondary-case suffix.

Example: *ja*KA & pl & g & *s* → *ja*KA & pl & p & *s*
(> *ja*KA-LU-*s* > *jalus*) 'in the legs'

11.2.35. Optional Negative Auxiliary plus 'be'

T50 OP: *ei* & *ole* & $\begin{bmatrix} pres \\ nut \end{bmatrix}$ → *pole* & $\begin{bmatrix} pres \\ nut \end{bmatrix}$

Example: #*ma/ei* & *ole* & *pres/vana*# 'I am not old.' → #*ma/pole* & *pres/vana*# (> *ma pole vana*.)

11.2.36. Suffixation

- T51 OB:
- (a) & sg & n → - {X}
 - (b) & sg & g → - {ϕ}
 - (c) & sg & p → - {tt}
 - (d) & sg & ill → - {G}
 - (e) & pl & n → - {t}
 - (f) & pl & g → - {te}
 - (g) & pl & p → - {sit}

T51 converts the above sequences to the corresponding case-number suffixes (cf. 8, 8.21).

Let Af = {Sx, Px (8.22); P (9.22.2); tta' (9.22.1); T, ksi, K (9.21); Af_v (10.13.2); I, mAH (10.11.1); vAH (10.11.2).}

T52 OB: & Af → -Af

11.2.37. Juncture

- T53 OB:
- (a) / → +
 - (b) #¹...#²...# → ...¹, ...²...
 - (c) #...# →

T54 OP: $\begin{bmatrix} \cdot \\ , \end{bmatrix}$ → $\begin{bmatrix} ; \\ ; \end{bmatrix}$

It is now possible to refer the final transformed strings to morphemic, morphophonemic, and phonemic sections of the grammar.

Notes

1. Numbers in parentheses following suffix morphemes refer to the sections in the grammar in which they are described.

2. Glosses of the individual lexical items may be found under the corresponding class symbols in the lexicon of the phrase structure. In these examples and in the examples of the transformational rules below, the morphophonemic position of stress will not be marked (1) with first syllables ending in a single vowel, and (2) with monosyllabic vocables with a nucleus of VV or VC (in which case postposed stress occurs). The prevocalic $\sqrt{+}$ juncture will be indicated by a space in the transcription of sentences.

QUANTITY IN ESTONIAN

12. The Estonian language is best known by non-Finnicists for the fact that it is reputed to have at least three distinctive degrees of vowel and consonant length. A great amount of investigative effort has been spent in attempts to shed light on this problem; but there has been little agreement among scholars as to the number of phonologically significant degrees of length which it is necessary to recognize. I shall here present a critical survey of the earlier scholarly literature on this subject and discuss the most important factors which account for the wide divergence of opinion among existing solutions.

12.1. First I shall touch upon the problem of length as reflected in the Estonian orthography. The first scholars to deal with the question of quantity in Estonian were Estonian linguists of the nineteenth century. They were primarily concerned with the practical problem of providing Estonian with a writing system which had some consistent relationship to the phonetic facts as they observed them. The modern Estonian orthography, which has been strongly influenced by Eduard Ahrens' grammar of 1843,¹ did not assume its present shape until late in the nineteenth century. In the orthography three degrees of length are reflected only with respect to the stop phonemes /p t t̥ k/. Intervocally the letters b d g indicate single short stops (d = /t/ or /t̥/, since palatalization is not indicated by the orthography); the letters p t k indicate geminate stops following a short vowel with plain stress (long consonants) or following a vowel cluster with plain or postposed stress (long or overlong consonants respectively); pp tt kk indicate geminate stops following a short vowel with postposed stress (overlong consonants); e.g., sada = /+sãta/ '100,' pika = /+pikka/ 'long (gen. -sg),' auto = /+ãutto/ 'car,' saata = /+sãhta/

'to send,' pikka = /+pikka/ 'long (part. -sg.)' To a more limited extent, clusters of stops and resonants also reflect differences in length in a similar manner; e.g., adra = /+àtra/ 'plow (part. -sg.)'. Beyond this, however, the orthography does not distinguish the long and overlong degrees of length (i.e., the difference between plain and postposed stress with syllabic nuclei of VV and VC); e.g., taevas = /+tàevas/ 'sky' or /+taèvas/ 'in the sky,' linna = /+|linna/ 'of the city' or /+|inna/ 'to the city,' osta = /+òsta/ 'buy (2nd sg. imperative)' or /+òsta/ 'to buy.'

Of the more recent descriptions of length in Estonian, only that of Andrus Saareste² bases its conclusions partially upon orthographic considerations. He claims four degrees of length for consonants and vowels, the fourth degree being based upon the addition of a particle -ki 'also' to words which already end in an overlong vowel or consonant; e.g., pukk 'goat' plus -ki provide, he suggests, pukki 'also a goat.' This "superlong" degree of length has no phonetic basis, however. The suffixation of /ki/ to /pukk/ merely provides /pukki/, by virtue of regular morpho-phonemic contraction in such instances.

12.2. Of the scholars of the nineteenth century who dealt specifically with the problem of quantity, the most significant are F. J. Wiedemann and Oskar Kallas. Both of these men suggest four major degrees of length for Estonian.

Kallas indicates four degrees of consonant length for the dialect of Lutsi:³ (1) short (tugi 'support'), (2) intermediate (soke 'blind'), (3) long (mitu 'some'), and (4) overlong (kätte 'into the hand'). In standard Estonian, and also in the dialect of Lutsi as checked by Posti in 1936, the intermediate and long degrees of Kallas are identical.

Wiedemann recognizes the following four-degree system:⁴ (1) short, (2) long, (3) extra-long, (4) maximally-long. For Wiedemann the distinction of the extra-long and the maximally-long degrees apparently has the sole function of differentiating the partitive-singular (extra-long) from the illative-singular (maximally-long) in certain noun types; e.g., wakka (part. -sg.) with extra length ("schwer betont") as opposed to wakka (ill. -sg.) with maximum length ("noch schwerer"). "Der Illativ ist theils dem Infinitiv [partitive] gleich oder dem Genitiv... Wo er dem Infinitiv oder Genitiv gleich ist da wird er zum Theil durch eine noch schwerere Betonung und demgemäss stärkere Form unterschieden."⁵

There is little doubt that Wiedemann's "noch schwerer" degree, with its extreme morphologically-determined limitations, is a mistake. Posti concludes that this distinction is the result of false analogy with an actual distinction made in southern Estonian in forms such as partitive küllä and illative küllä.⁶

Judging from the exactitude of Wiedemann's transcriptions elsewhere, I hesitate to assume that analogy alone led to this error. In my own corpus I find that a noticeably high percentage of illative-singular forms of the above type occur with primary phonemic stress, whereas this is not true with the otherwise homophonic partitive-singular forms. If this same situation existed at the time of Wiedemann's investigation, it may have been a significant factor in his mistake.

12.3. During the first three decades of this century most scholars who dealt with Estonian treated it primarily from a phonetic point of view and did not overtly concern themselves with distinctive differences.

The most important of these scholars is Lauri Kettunen, who published a detailed description of the dialect of Kodafers⁷ and a phonological history of Estonian.⁸ In his study of Kodafers Kettunen distinguishes four phonetic degrees of consonant length and five degrees of vowel length. A close examination of his data reveals a system of three basically contrastive degrees of length. More significant, however, are: (1) his distinction of weak consonant clusters and strong consonant clusters, which parallels exactly his treatment of long consonants and extra-long consonants; (2) his distinction of extra-short and short diphthongs as opposed to long diphthongs, which again parallels the distinctions of long and extra-long vowels; and (3) his distinction of extra-short, short, and half-long vowels in the second syllables of words, all of which are allophonic lengths of short vowels. For Kettunen the half-long vowels are found in the second syllable of two-syllable words following a non-strong (non-extra-long) first syllable; the extra-short and short vowels occur elsewhere, often in free variation. With words of more than two syllables, however, it is difficult to find any norm, and Kettunen states: "Die Angabe der überkurzen und halblangen Vokalstufe ist daher nur auf die zweisilbigen Wörter beschränkt worden."⁹ Kettunen documents his study with kymographic measurements, which show an even greater amount of free

variation in the lengths of the vowels of the second syllable than his distributional statements would indicate.

Kettunen's work also provides the basis for Björn Collinder's diachronic description of Estonian quantity in his Über den finnischnisch-lappischen Quantitätswechsel.¹⁰

Eliel Lagercrantz presents a number of Estonian kymnographic measurements in his Strukturtypen und Gestaltwechsel im Lappischen.¹¹ Lagercrantz is here solely concerned with im length features, and at no point do phonological or contrastive features enter into his study. In addition to the array of "normal" length types presented by Lagercrantz, we find the following two somewhat disturbing measurements: (1) a contrastive pair ark`k`i (super-long) 'fork (ill. -sg.)' and ark`ki (extra-long) 'fork (part. -sg.)' (p. 33); and (2) a type hõGu 'gust of wind (ill. -sg.)' with an extra-long vowel in the first syllable and a half-long vowel in the second syllable (pp. 36, 33).

The first example would appear either to support the fourth degree of consonant length posited by Wiedemann in just that position or to be an error. Considering that Lagercrantz did not attempt to account for accompanying stress phenomena, I am led to suspect that the mechanically recorded difference in length is correlated with a difference in stress, and is, therefore, non-phonemic. The second example is striking because it violates the general formula of Kettunen concerning the occurrence of the half-long vowel in the second syllable of two-syllable words; i.e., the half-long vowel should never occur following an extra-long vowel (or diphthong) in the first syllable. My own corpus contains several such examples (e.g., /+laèva;/ 'boat (part. -sg.)', /+aùkku:/ 'into the hole'); and, considering the terminal-contour nature of this "half-length," I find nothing disturbing in Lagercrantz' data.

12.4. The works, during the thirties, of two scholars of the "Prague-School," E. D. Polivanov and N. S. Trubetzkoy, are significant.

Polivanov was the last to claim four phonologically distinctive degrees of vowel and consonant quantity for Estonian.¹² Polivanov's four degrees correspond quite closely to those of Wiedemann and Lagercrantz, the two longest degrees of length serving primarily to distinguish the partitive and illative. Of greater importance is the fact that Polivanov attempted to cope with the concomitant intonation phenomena, and found that each length type was accompanied by a characteristic intonation curve.

He gives the following length-intonation types (contours are indicated by the symbols \uparrow \downarrow): (short) \uparrow pi_{me} 'dark'; (long) \uparrow pi_{ma} 'milk (gen. -sg.)'; (extra-long) \uparrow p:_{ma} 'milk (part. -sg.)'; (maximally long) \uparrow pi:_{ma} or \uparrow pi:_{ma} 'milk (ill. -sg.)'. With various lengths of stop consonants after a short vowel, however, the differences in intonation are not as distinct and "the quantity of the consonant appears, then, as the marker of the form (illative)".¹³ On the other hand, he reports that "there are also opposite instances: in diphthongs the melody alone becomes the marker of the morphological difference: e.g., gen. \uparrow ka_{levu} 'well,' part. \uparrow ka_{levu}, ill. ka_{levu} . . ."¹⁴

Since Polivanov's findings do not agree with those of most scholars who have dealt with more "standard" dialects of Estonian (nor do they agree with my own findings), it is difficult to evaluate his work. Nonetheless, a certain amount of this lack of agreement may be due to non-standard dialect features in the speech of his informant (his wife, a native of Tallinn). For example, the above-mentioned claim by Polivanov that diphthongs do not exhibit length differences is called "the most striking of these errors" by Posti¹⁵; but in light of Paul Ariste's report

In some Estonian dialects the intonation is developing independence. In these dialects the difference between the long and extra-long is not so much real quantity as just a different pitch.¹⁶

I am hesitant to agree with Posti.

Trubetzkoy, using Polivanov's description as his source, reduces the number of significant quantities to two.¹⁷

Im Estnischen bestehen vier Quantitäten der Vokale der ersten Silbe, wobei die Stammsilbe vieler Substantiva . . . im Genitiv die zweite, im Partitiv die dritte und im Illativ die vierte Quantitätsstufe aufweist. Bei näherer Betrachtung erweist sich aber, dass parallel mit der Quantitätsstufe auch der Tonverlauf des Silbenträgers sich verändert: die zweite Quantitätsstufe weist einen deutlich fallenden Tonverlauf auf, die dritte einen ebenen, . . . die vierte einen fallend-steigenden . . . Und da die diphthongischen Stammsilben . . . in den betreffend Formen keine Quantitätsunterschiede, sondern nur die ihnen entsprechenden . . . Tonverlaufunterschiede . . . so darf wohl angenommen werden, dass diese Tonverlaufunterschiede das phonologisch Wesentliche, die Quantitätsunterschiede dagegen nur phonetische Begleiterscheinungen sind.

Because Trubetzkoy used Polivanov as a source, any objections which one might have concerning Polivanov's data would also apply to the work of Trubetzkoy. Even if one accepts Polivanov's effort as an accurate description of one particular dialect of Estonian, Trubetzkoy's must nonetheless be considered in light of the following two alternative: (1) length is a function of some kind of tone-contour phonemes (in addition to whatever pitch levels one might wish to recognize); (2) the pitch contours are a function of some kind of phonemic length, which, then, may be considered allophones of the pitch phonemes. Unfortunately Trubetzkoy seems content to eliminate the extra lengths from Estonian and does not discuss the supposed merits which his analysis would provide.

12.5. The following three articles by Estonian phoneticians which appeared in Eesti keel, the Estonian linguistic journal, deal with problems closely connected to the general problem of quantity:

- (1) "The Estonian Stops k, p, t and b, d, g" by Paul Ariste (1933)¹⁸;
- (2) "On the Relationships of Intonation, Quantity, and Intensity in Estonian" by Elin Põldre (1937)¹⁹; and
- (3) "The Half-long Vowel of the Second Syllable in Standard Estonian" by Õie Sõster (1938).²⁰

Ariste's article provides an impressive list of mechanical measurements of the stop phones indicated by the graphemes of his title. His main thesis is that the degree of voicing is dependent upon the environment and the length of the phone in question; and, thus, that the distinction of voiced-voiceless is not phonemic in Estonian. He also points out the fact that recent foreign loans do not disturb this system, even though they are written with b, d, or g in accordance with the sound of their ultimate source.

Ariste also provides detailed measurements of consonant lengths, which are accompanied by standardized, "phonetic" transcriptions. A close examination of his measurements reveals the following points of interest:

- (1) A certain amount of overlapping exists in some of his examples of long and overlong consonants between the longer long consonants and the shorter overlong consonants (transcribed ČC and ĆĆ respectively); e.g., on page 76 we find koftl, toptl, and kokka with lengths of 0.265-0.285, 0.20-0.265, and 0.27-0.29

seconds respectively, and on page 77, toppi, kokku, and toppi with lengths of 0.27-0.365, 0.25-0.36, and 0.29-0.385 seconds respectively; on page 79, osafta with lengths of 0.23-0.33 seconds for ft, and on the same page, rāmattütte, in which the first tt-cluster was only 0.11-0.13 seconds in length.

(2) Ariste points out that the overlong consonants following a long vowel in words of two syllables have an average length of 0.20-0.27 seconds (p. 79) and that the long consonants following a short vowel in disyllabic words have an average length of 0.20-0.29 seconds (p. 77). Nonetheless he consistently transcribes the first type as though it actually were longer than the second type; i.e., CC as opposed to ČC. If Ariste's transcription is actually a phonetic one, we should not expect to find segments of identical length indicated as though this were not the case.

There are two apparent reasons for the above inconsistencies in Ariste's transcriptions. First, his transcription is partially "morphophonetic"; i.e., he transcribes words as having extra length depending upon where the morphology calls for it. Second, even though the quantity of long and overlong consonants is identical, one important difference remains to be considered: the way in which the vowel of the first syllable is connected to the following cluster or "contact," which is markedly different in the two cases.²¹ This fact probably kept Ariste from indicating the two types as identical, even though the kymographic measurements showed the lengths to be identical. One must keep in mind the fact that the problem of quantity is not purely a question of length, but of syllabic phenomena as well. Inasmuch as Ariste was not directly concerned with the problem of length, I find his measurements all the more credible.

In her investigation of the relationships of intonation, quantity, and intensity Pöldre arrives at the following conclusions:²²

Des expériences il ressort que les différences de hauteur correspondent dans les mots plus ou moins régulièrement aux degrés de longueur. En général le ton monte, lors de l'allongement du phonème, d'un à trois demi-tons pour chaque degré de longueur.... D'une manière générale on peut constater qu'en estonien les accents de hauteur, de quantité et d'intensité sont régis par les rapports suivants:

1) L'accent de hauteur et l'accent de quantité sont liés entre eux, quoique ce ne soit pas absolu....

- 2) L'accent de hauteur et l'accent d'intensité sont des phénomènes toujours concomitants en estonien
- 3) Il n'y a pas de liaison absolue entre l'accent de quantité et l'accent d'intensité, la coincidence en est partielle, quoique non occasionnelle

In evaluating Põldre's conclusions it is necessary to bear in mind the fact that her corpus consisted of 22 words (citation forms) plus one connected phrase of 11 words. Her informants were nine speakers of standard Estonian representing all major dialect areas; and the same list of words plus the one phrase were used with all informants. I do not hesitate to accept her conclusions (1) and (3) above, since only one example of non-dependence is required to demonstrate phonological contrast. Conclusion (2), however, in which a positive correlation is found, must be considered to be a function of the size of her corpus, which I consider inadequate to justify her conclusion in this case.

Sõster's article represents an attempt to determine the conditioning factors governing the occurrence of the half-long vowel of the second syllable. He concludes that his vowel length seems to be conditioned by the following four factors: "(1) an open second syllable, (2) a first syllable in the weak stage, (3) the final position of the vowel, and (4) the position of the last syllable of a word."²³

Sõster's corpus consisted entirely of one-word citation forms, and, consequently, each could occur with the terminal contour '/. Because of the lack of longer utterances in his corpus Sõster was unable to determine whether non-final syllables might occur with half-long vowels. His conclusions would lead us to suspect that he did assume that they could. Sõster himself realized the limitations of this approach. "In absolute final position vowel length increases. Vowels occurring in a phrase, not in absolute final position, may have a different quantity."²⁴

A comparison of Sõster's measurements with the phonetic transcriptions reveals a strong tendency toward "morphophonetics." In the examples on page 216 we find the ä of säBäz is both longer and shorter than ä of säppa and päÿ. On page 219 we find the example kamppa, which has a second syllable which is as long as the other half-long vowels and also has a length relative to the first-syllable vowel which clearly marks it as a half-long vowel. Since the first syllable has a strong degree of length, this example refutes Sõster's condition number (2) above.

Söster comments: "[In this instance] it will be seen that even though the first syllable has a strong degree of length, the word-final vowel of the second syllable is half-long. . . . In the transcription here employed this type of half-length is not indicated since the half-length of the vowel of the second syllable in the examples under consideration is the result of the absolute final position of that vowel."²⁵

In other words, in a corpus of citation forms, each of which occurs as an absolute phrase, Söster wants to attribute the observed terminal length in some cases to the final position of the word (in which case he does not indicate it in his transcription) and in others to the degree of length in the first syllable. Unfortunately, this unconvincing procedure with its resultant overlapping of allophones is not warranted by the data.

12.6. The period beginning with the Third Congress of Phonetic Sciences (1938) until the early fifties is one in which the treatments of the Estonian length system presented at that congress, the work of Paul Ariste²⁶ and Marguerite Durand,²⁷ predominate.

The common conclusions of these two phoneticians include: (1) the recognition of three phonological degrees of consonant and vowel length, and (2) the decision that the intonation contours which accompany the various length types are determined by those types, and are, consequently, non-significant from a phonological point of view.

In addition to the above points Ariste's paper treats briefly the half-long vowel of the second syllable, which he considers to be a conditioned phenomenon (in the same manner as Söster). He also mentions the fact that consonant clusters and diphthongs have two contrastive degrees of length.

Ariste's subsequent Eesti keele foneetika²⁸ [The Phonetics of Estonian] presents these same views without change. One interesting point introduced for the first time in this later work concerns the fact that when a form which one should expect (on morphophonemic grounds) to have the third degree of length occurs in a non-stressed position in a phrase, the quantity of that form is reduced to the second (plain long) degree. I should like to note here the significance of this observation with regard to my own treatment of the extra degree of length as a stress phenomenon.

Other works of this period which present the theory of three phonological degrees of length do little more than substantiate

the conclusions of Ariste and Durand. In her Voyelles longues et voyelles brèves, Durand adds more data in support of her earlier conclusions.²⁹

Scholars who include brief mention of the three-quantity system of Estonian in larger works or articles are: Daniel Jones, Bertil Malmberg, Aurélian Sauvageot, Alo Raun, and Leida Kraas.³⁰

12.7. Lauri Posti's "On Quantity in Estonian,"³¹ which appeared in 1950, presents a new approach to the problem of quantity. The introduction of this article constitutes a critical summary of earlier claims of two, three, and four phonological degrees of length. Those who presented evidence for four degrees (i.e., Wiedemann, Kallas, Polivanov, and perhaps also Lagercrantz) are mainly criticized for having used poor informants or for false analogy. Trubetzkoy, who recognized only two degrees, is criticized for basing his analysis on Polivanov's data. Those who claim three distinctive degrees (Ariste, Durand, Jones, and others) erred, we are told, in focusing their attention too narrowly upon the phenomena of the first syllable.

While Posti also recognizes three contrastive degrees of length in the first syllable, he calls attention to the length of the vowel of the second syllable. This is short, he claims, when the first syllable contains an extra-long degree of length and half-long otherwise. He concludes:³²

It follows that the long and over-long degrees of quantity belong to the same chroneme, i.e., they are allochrones, since they never occur in identical environments. . . . The glottic interpretation is therefore:

<u>phonetic value</u>	<u>glottic value</u>
short	short
long } overlong }	long

The phonetically long allochrone is entirely dependent on the half-long vowel of the second syllable. That it cannot be an independent degree of quantity is further shown by the fact that only the short and over-long degrees of phonetic length can occur in monosyllables.

The most significant contribution of Posti's article, however, is his realization that the "minimum unit of Estonian glottic quantity is the syllable as a whole. . . ."³³ This idea has long been recognized and implicitly utilized by Estonian grammarians,³⁴ but Posti is the first to make an explicit application of this principle in an

attempt to present a phonological solution of the problem of length. Posti acknowledges the usage of the earlier grammarians, but concludes:⁵

Another way of denoting the difference between the two quantitative structures would be to indicate the half-length of the second syllable, e.g., linnà vs. linna. From the chronemic point of view this method is to be preferred.

Unfortunately, Posti does not explain the reasons for his preference.

Posti also points out that non-initial syllables (in the "word") with secondary stress and the syllables immediately following them often behave in the same manner with respect to length as the first and second syllables. Since Posti does not deal with phonemic stress or juncture and does not define "word," it is difficult to evaluate his statement. Although in my own corpus such phenomena occur only in vocable-initial syllables, many morphophonemic words of the very type Posti deals with consist of two or more vocables.

That Posti's interpretation depends entirely upon the so-called half-long vowel of the second syllable is obvious. Since the appearance of Söster's article (cf. §12.5 above) the tradition governing the transcription of this half-length has become so entrenched, that one might be tempted to say that we are no longer confronted with "morphophonetics" or overlapping allophones, but rather with a phonetic orthography; and that the transcription of standard Estonian has become more an exercise of dictation than of phonetics. A close examination of the body of measurements of vowel length in Estonian (those of Lagercrantz, Kettunen, and Söster) which existed at the time of Posti's article reveal that the half-length of the vowel of the second syllable is fictitious.

Even though Posti attempts to base his solution upon the half-long vowel of the second syllable, the exact phonemic status of that vowel as a part of a phonemic system is never clear. On the one hand it contrasts with the short vowel (rikkàs vs. rikkas), and on the other hand it contrasts with vowel clusters (or diphthongs) (rikkàs vs. rikkais, the latter containing an over-long /kk/, a type which Posti does not consider). Thus, this vowel cannot be treated either as a short vowel or as a vowel cluster (unless one wishes to consider a basic opposition between clusters of like and unlike vowels).

The validity of Posti's claim that only the short and over-long degrees of length occur in monosyllables may be questioned. This statement may be true with regard to citation forms (and it is apparent that Posti's corpus consists solely of one-word items), but in connected speech this is certainly not the case. In my own corpus all three degrees of length are found with monosyllables. Paul Ariste also indicates three degrees of length with monosyllables; e.g., nāD, nāD, and naD 'they,' depending upon their position in the phrase.³⁶

12.8. From the time of the appearance of Posti's article until the present a great wealth of material dealing with the problem of length in Estonian has been published. The early part of this period may be characterized as one of reaction to Posti's analysis. His analysis is attacked for numerous reasons, and rarely are the reasons cited by two different scholars the same. Nonetheless, the underlying principle of Posti's solution, and perhaps his most significant contribution, i.e., that the problem of quantity in Estonian is not a function of segmental length but rather of syllable length, is ignored by those who attack him.

One of the first to comment upon Posti's analysis was Björn Collinder.³⁷ Collinder adopts a skeptical position based upon the following objections: (1) from a diachronic point of view Posti has turned things around, since the differing vowel lengths of the second syllable are a secondary development. "A description which turns all this upside down, starting from the assumption that the length of the first syllable (historically primordial) is an epiphenomenon of the length of the second vowel (historically secondary), must offer some quite pronounced systematic or didactic advantage to outweigh this inconvenience."³⁸ (2) The overlapping in the absolute length values of the vowels of the second syllable as measured by Kettunen leads him to suspect that they are not distinctive. (3) The fact that only two degrees of length occur in monosyllabic words does not prove anything as to the number of quantitative degrees which are distinctive. Of these objections only the last two may be considered relevant.

Collinder concludes:³⁹

Even if Posti has been able to prove that there are only two degrees of quantity in Estonian, we must admit that he has cleared the way of the only-two-degrees theory of Trubetzkoy by showing that it is not necessary to assume three distinctive degrees in this language.

Julius Mägiste, in his short but significant article, "Nägra ord om den estniska kvantiteten,"⁴⁰ also expressed skepticism as to the validity of Posti's conclusions. Mägiste bases his criticism primarily upon the fact that Posti deals only with the standard language.

First of all, Mägiste criticizes Posti's historical explanations of the development of the Estonian length system on the grounds that Posti's synchronic data are too restricted in scope. Secondly, Mägiste presents evidence from colloquial speech and Estonian dialects which refutes Posti's analysis in two major respects: (1) The half length of the second syllable is seen to be independent of the length of the first syllable. This produces a contrast in the lengths of the second syllable, but Mägiste apparently does not attach any significance to this contrast, probably because it does not distinguish "meaning."

Thus one sees that at least in modern colloquial Estonian the quantity of the second syllable cannot determine the quantity of the first syllable, that is to say, a short or even reduced vowel in the second syllable does not imply that the overlong quantity must occur in the first syllable. . . . As far as modern Estonian is concerned, the quantity of the first syllable is the primary factor and the half-long quantity of the second syllable is only a "Begleiterscheinung." In the case of vilu, for example, even in northern and literary Estonian, with a fast tempo of speech the v can be shortened to a minimum or almost "swallowed up"; but this neither hinders comprehension nor changes the meaning of the word.⁴¹

(2) Posti's observations concerning the length of monosyllabic words is seen to be limited to citation forms. In connected speech all three degrees of length are found.

But monosyllabic Estonian words have scarcely any conclusiveness. It is my own opinion that monosyllabic words in Estonian have one single degree of length—the overlong—which occurs when it is pronounced in isolation, in a stressed position. Posti's observation is based upon standard Estonian and its orthographic rules.⁴²

Mägiste concludes that "since the justification for this [Posti's analysis] has not been stated in more detail, it seems that the old theory of three degrees still stands unaltered."⁴³

Alo Raun's "On Quantity in Estonian"⁴⁴ attempts to refute Posti's analysis on morphophonemic grounds. Raun suggests that

the question of length can only be investigated fruitfully by "trying a thorough analysis of the morphophonemic alternation in Estonian." Raun limits himself to the same word types as Posti—including the half-long vowel of the second syllable—and sets up three degrees of phonemic length for both consonants and vowels (without any discussion of his grounds for doing so). He then lists the various possible morphophonemic degrees of length for individual stems. In conclusion Raun states:

Thus the morphophonemic quantity alternation of Estonian displays

short ~ overlong
long ~ overlong

as the typical pattern in the first syllable, while the quantity of the second syllable is so-to-say in inverse proportion to that of the first. Since both the short and long degree appear as opposed to the overlong, it is impossible to consider the two latter ones as allochrones of the one long degree, as Posti does. The morphophonemic analysis shows that Estonian essentially is a language of binary oppositions, and that more important than the number is the arrangement of degrees.

The circularity of Raun's argument is obvious. A morphophonemic analysis or description can only be based upon a given phonemic system. The oppositions which that phonemic structure provides will be significant in the subsequent morphophonemic system. Since Raun assumes from the outset a phonemic system based upon three degrees of length, his resultant morphophonemic solution is in unquestionable accord with his assumed phonemics.

Equally crucial for the establishment of a morphophonemic system is the necessity of showing the relevance of that system to the morphological structure of the language. Raun does not indicate the relevance of his supposed morphophonemic contrasts to any kind of proposed morphology. Consequently, we cannot judge even the validity of his morphophonemic contrasts.

In his recent article "Word Stress in Estonian"⁴⁷ Raun only indirectly deals with the problem of quantity. Nonetheless he makes several important observations with regard to the problem. In one respect we find a basic agreement with Posti in Raun's statement that "length in Estonian is basically a syllabic phenomenon."⁴⁸ Raun introduces for the first time the feature of contact, which is directly related to the syllabic treatment of quantity in Estonian. "When studying length in Estonian one comes across the phenomenon

of contact, i.e., the way a vowel is tied to the following consonant or consonant cluster."⁴⁹ I consider this statement as additional support for my own attempts to treat quantity in terms of sub-laryngeal activity.

In another respect we find in Raun's treatment of the relationship of stress and quantity evidence which refutes one of Posti's supporting arguments. Raun makes the following observations concerning this relationship:⁵⁰

The primary stress may fall on an overlong, long or short syllable, while the stronger variant of the weaker stress occurs only with the overlong syllable and the weaker one with either the long or short. . . . Monosyllabics are overlong if pronounced separately.

In other words, monosyllables which occur in connected speech may occur without a phonemic degree of stress, and are only phonetically long in that case. Raun, however, attempts to analyze stress primarily on the basis of one-word utterances and, in so doing, ignores the necessary relevance of internal open transition to any description of Estonian stress. I find that Raun's so-called "stronger variant of the weaker stress" always involves an instance in which a word consists of two or more vocables, the last of which occurs with a postposed stress; e.g., /+kɪrja+ɲikku/ 'writer (part.-sg.)' (kirjanikku).

Valter Tauli, in his primarily diachronic "The Origin of the Quantitative System in Estonian,"⁵¹ presents a valuable discussion of the synchronic status of Estonian quantity. Tauli, like Posti, puts forth the thesis that "the opposition of the so-called second and third degrees of length in Estonian relates to (long) syllables and not to phonemes."⁵² One support he gives for this thesis is "the fact that the difference in quantity is accompanied by the difference in intonation;"⁵³ and further admits that "the difference between the quantities of the second and third degrees is sometimes quite negligible, but a difference in intonation is, on the other hand, always present."⁵⁴ Upon closer inspection, these arguments would seem to support the intonation-based solution of Trubetzkoy, Tauli's second and third degree syllables thus being in complementary distribution.

Further insight into the mechanism of this syllabic quantity is provided by the following impressionistic statements of Tauli:⁵⁵

The difference between medium long and extra long syllables can be characterized as follows: in the extra

long syllables one can prolong the longest sound beyond its normal length ad libitum. In the medium long syllables this can not be done.

When the long vowel or diphthong is followed by a geminate or a consonant cluster... it is difficult to say whether the difference between the second and third degrees depends upon the length of the vowel or on the following consonant. In fact in the extra long syllables of that type we can prolong either the long vowel... or the following consonant—the impression is the same in both cases.

Tauli also attacks Posti on much the same grounds as Mägiste with regard to the question of the half-long vowel and monosyllabic length. He also claims Posti's solution to be counter-intuitive—though without presenting any evidence.

Among the more recent articles are Hildegard Must's "Distinctive Duration of Speech Sounds in Estonian"⁵⁶ and "Duration of Speech Sounds in Estonian."⁵⁷

In the first of these two articles Must presents an impressive body of sound-spectrograph measurements, but, unfortunately, her corpus seems to have consisted solely of one-word citation forms. These measurements agree with those of her predecessors and actually shed little new light on the problem. Most significant, however, is the fact that Must is more keenly aware of the implications of her measurements and more cautious in their interpretation.

In this article Must arrives at the following conclusions:⁵⁸

Thus there are three distinctive degrees of durations [sic] in Estonian; however, phonetic experiments show an additional number of durations which are determined by the duration of their environment.

All speech sounds occur with all three distinctive durations (h, v, and j appear only with short durations except for some dialects and in loanwords or descriptive words). Diphthongs, however, are only long or overlong, i.e., the second component is either as long as the first or longer.

Must attacks the fiction of the half-long vowel of the second syllable. Her most cogent evidence is the fact that "in trisyllabic or longer words it was again the final vowel, not the second vowel that was considerably longer than the average short stressed

vowel. . . .⁵⁹ Must nonetheless continues to support the idea that in disyllabic words there is a necessary connection between the half-length of the vowel of the second syllable and the quantity of the first syllable.

The duration of the vowel of the second syllable is determined by the duration of the following consonant (or cluster) and by the duration of the preceding syllable. It is longer than the short vowel of the first (stressed) syllable under two coexistent conditions: if it is preceded by no overlong consonants or vowels in the first syllable and if it is final or followed by one short consonant.⁶⁰

Although her examples are all found in phrase-final position, she fails to recognize this phenomenon as a function of that position in all instances. She does not indicate examples of the kind given by Lagercrantz and Söster in which an extra-long first syllable is followed by a half-long vowel.

Insofar as Must treats this half-length as a terminal feature she points to a "well-known phonetic fact that an unstressed final vowel whose duration is not distinctive generally tends to be longer."⁶¹ Must, then, assumes that this length is not distinctive. Her data do not indicate any evidence to support this assumption. Although she establishes the fact that the half-length is connected with phrase-final position, she says nothing of the contrast of half-long vowels and short vowels in that position. My own corpus indicates contrasts of this nature.

Must does not present any further justification of her claim for three distinctive degrees of length nor does she indicate what the resultant phonemic system would look like. She does not even give any examples in phonemic transcription, a striking omission for a treatment which is purportedly concerned with the phonemic analysis of quantity. One important alternative solution, the recognition of plain syllable length as opposed to extra-long syllable length (as suggested by Posti) as the basic opposition of analysis, is not considered. Even within the limited framework of Must's data (i.e., without consideration of stress and juncture) I would consider this second solution to be the one which is the most economical and which best accounts for the data.⁶²

The second of Must's two articles is essentially a somewhat shortened but more refined restatement of the first article; and her conclusions remain the same. A minor addition are four examples

accompanied by spectrographic plates. Although she offers examples in a transcription between slanting bars, this is admittedly a phonetic transcription in the symbols of the International Phonetic Association,⁶³ and no attempt is made to give a phonemic transcription.

A significant addition to this article is found in her treatment of the half-long vowel. Concerning this vowel she comments that "in continuous speech it is usually not lengthened"⁶⁴ and "in continuous speech... the 'half-long vowel' is actually short."⁶⁵ A significant deletion is the abandonment of certain earlier restrictions upon the occurrence of the half-long vowel based upon the quantity of the preceding syllable. In this regard she concludes: "Thus any vowel becomes longer in absolute final position."⁶⁶ I find this conclusion to be only partially true. The data of my own corpus require that this statement be altered to read: any vowel before a terminal contour (i.e., /./ or /,) may become longer (i.e., add /') or remain short.

One of the most comprehensive studies of Estonian phonology published thus far is Ilse Lehiste's recent article "Segmental and Syllabic Quantity in Estonian."⁶⁷ Her analysis of the Estonian phonemic system is based upon a most impressive body of carefully controlled spectrographic recordings (approximately 3000) of the speech of seven informants representing the Tallinn dialect of standard Estonian.

In order to account for distinctive length phenomena, Lehiste sets up a phonemic mora (symbolized as /:/). Each segmental phoneme, then, occurs with one, two, or three morae; and of itself, presumably, manifests only qualitative differences. She further sets up three syllabic quantities (short, long, overlong), which may be defined in terms of their segmental-phoneme and mora constituents.⁶⁸

To support her solution, Lehiste presents spectrographic evidence that "three-mora vowels have three clearly discernible peaks of energy, vowels of two morae have two such peaks, and one-mora vowels have, as a rule, only one energy peak."⁶⁹ That these sub-laryngeal peaks of energy, rather than absolute length, are the distinguishing features of the Estonian quantitative system may be inferred from the measurements of the vowel lengths presented by Lehiste. One informant (UM) showed no difference in absolute length in the pairs /i:/—/i:/: and /a:/—/a:/:, only two

centiseconds difference for /e:/—/e:./ and /o:/—/o:./, and for the pair /ɔ:/—/ɔ:./ the two-mora vowel is shown to be one centisecond longer than the three-mora vowel.

Lehiste also presents a great deal of valuable data concerning the relation of intonation and quantity. She concludes:⁷⁰

It may be safely said that characteristic pitch ordinarily accompanies words of a certain structure, but that the distinctive factor lies somewhere else.

In this instance her conclusion is derived from a pair test designed to test the acoustic clues used by native speakers (twenty listeners times two hundred judgments) in assigning a given syllable to one length or another. The words used in this test were pronounced normally and also in a manner especially devised to maintain pitch, first-syllable length, and second-syllable length as constants (i.e., words and 'non-words' were employed). Unfortunately the summary of results presented is too limited to permit a proper evaluation of her statistics; e.g., the results of the responses to normal words as opposed to the 'non-words' are not given; only average quantities for the various types of agreement are presented. Nonetheless her finding that "35 words with identical pitch patterns—rising and level—were classified with over 75% agreement in either quantity II or III" remains a powerful support for the above conclusion.⁷¹ It should also be noted that in order to evaluate Lehiste's statement that "pitch is considered nonphonemic,"⁷² it is necessary to bear in mind that "pitch" is used in the sense of non-terminal intonation contour and not the number of distinctive pitch levels, a problem not discussed in her paper.

A second reason for the subordination of other prosodic features to quantity is:⁷³

Quantity is considered primary, because quantity functions actively within the morphophonemic system of Estonian; stress has no such function.

This type of argument is subject to the same objections raised above in the discussion of Raun's "On Quantity in Estonian." Further, the establishment of some sort of phonemic primacy dependent upon morphophonemic function has little value for either the phonemic or morphophonemic systems as such.⁷⁴

The validity of the above statement concerning stress is also subject to doubt, since stress appears to be treated only in passing.

The traditional three degrees of stress—loud (or main), secondary, and weak—are indicated as comprising "all possible conditions of stress."⁷⁵ Whether these are meant to include the "sentence stresses" mentioned on page 54 or are considered solely as word stresses is not clear. My own studies indicate that a minimum of five stresses is stresses must be accounted for.

In a survey of the relative lengths of the first and second syllables in disyllabic words, Lehiste finds:⁷⁶

The determining factor in the assignment of a word to one of the three quantities depends ultimately on the ratio between the quantities of the first and second syllable. The word is assigned to quantity I, if the ratio is 2/3; to quantity II, if the ratio is 3/2; and to quantity III, if the ratio is 2/1.

This conclusion is based upon the citation-form words and 'non-words' used in the above mentioned pair tests and, apparently, upon average durations. The use of this material by Lehiste for claims concerning the phonemic oppositions which obtain in the language does not seem justified.

Two junctures are recognized by Lehiste: word boundary and syllable boundary (/./). The former is set up to eliminate the need for a velar nasal phoneme and with no other apparent phonetic basis (p. 39). The latter is faithfully indicated in all phonemic transcriptions; but the need for this boundary is not at all clear, since its occurrence can always be predicted from the segmental and mora phonemes.

The above-mentioned criticisms, together with other minor objections concerning the phonemic treatment of phonetic data which do not merit attention here, nonetheless, do not seriously detract from the significance of Lehiste's valuable contribution.

Notes

1. Eduard Ahrens, Grammatik der ehstnischen Sprache revalschen Dialektes (Reval, 1843).

2. Andrus Saareste, Kaunis emakeel [Beautiful Mother Language] (Lund, 1952), pp. 22-23. Saareste contrasts pukki 'also a goat' with pugi 'force (2-sg. imperative)', puki 'of the goat,' and pukki 'goat (part. -sg.)'.

- Oskar Kallas, Lutsi Maarahvas [The Peasants of Lutsi] ("Suomi," Vol. III, No. 12; Helsinki, 1895); cited by Lauri Posti, "Quantity in Estonian," JSFOu, LIV (1948-1950), p. 4.
4. F. J. Wiedemann, Grammatik der estnischen Sprache (St. Petersburg, 1875), pp. 136-37; cited by Posti, p. 2.
 5. Wiedemann, pp. 349-50 [not cited by Posti].
 6. Lauri Posti, "Quantity in Estonian," JSFOu, LIV (1948-1950), p. 3.
 7. Lauri Kettunen, Lautgeschichtliche Untersuchung über den kodaferschen Dialekt (MSFOu, XXXIII; Helsinki, 1913).
 8. Lauri Kettunen, Viron kielen äännehistoria [Phonological History of Estonian] (Helsinki, 1917); and a second edition by the title Eestin kielen äännehistoria ("Suomalaisen Kirjallisuuden Seuran toimituksia," CLVI; Helsinki, 1929).
 9. Kettunen, Lautgeschichtliche Untersuchung . . ., p. 39.
 10. Björn Collinder, Über den finnisch-lappischen Quantitätswechsel, Uppsala Universitets årskrift (Uppsala, 1929), especially pp. 21-51 and 72-80.
 11. Eiel Lagercrantz, Strukturtypen und Gestaltwechsel im Lappischen (MSFOu, LVII, Helsinki, 1927), especially pp. 27-44.
 12. E. D. Polivanov, Vvedeniie v jazykoznanie dlja vostokovednykh vuzov (Leningrad, 1928), pp. 197-202.
E. D. Polivanov, Review of "Remarques sur l'évolution phonologique du russe comparée à celle des autres langues slaves," by Roman Jakobson, Slavia, XI (1932), pp. 145-46.
 13. Polivanov, Vvedeniie . . ., p. 201.
 14. Ibid., pp. 201-202.
 15. Posti, p. 4. Posti's highly critical survey of Polivanov's work (ibid., pp. 2-4) claims that it contains "numerous errors," that Polivanov's informant was not reliable, and suggests that Polivanov "had too much confidence in the statements of F. J. Wiedemann."
 16. Paul Ariste, "A Quantitative Language," Proceedings of the Third International Congress of Phonetic Sciences [1938] (Ghent, 1939), p. 280.

17. N. S. Trubetzkoy, Grundzüge der Phonologie, TCLP, (Prague, 1939), p. 178.
18. Paul Ariste, "Eesti sulghäälikud k, p, t ja b, d, g," EK, XII (Tartu, 1933), pp. 73-82 and 170-81.
19. Elin Põldre, "Intonatsiooni, kvantiteedi ja dünaamilise rõhu suhteist eesti keeles," XVI (Tartu, 1937), pp. 164-81.
20. Õie Sõster, "Teise silbi poolpikk vokaal eesti ühiskeeles," EK, XVII (Tartu, 1938), pp. 213-23.
21. The significance of contact has been pointed out by Alo Raun in his recent article "Word Stress in Estonian," Lingua, VII (1958), p. 354. I include this material (although not by the term "contact") in the section on open transition (3.11.2); and have attempted to describe it in terms of sub-laryngeal phenomena.
22. Põldre, pp. 182-183. The quotation is from the French summary at the end of her article.
23. Sõster, p. 223. The quotation is from the English summary at the end of his article.
24. Sõster, p. 217 (translation is my own).
25. Sõster, p. 219 (translation is my own). It should be noted that Lagercrantz' measurements indicate this same phenomenon, in apparent contradiction to the traditional rules for the occurrence of the half-long vowel (cf., §12.3 above).
26. Ariste, "A Quantitative Language," pp. 276-280.
27. Marguerite Durand, "Durée phonétique et durée phonologique," Proceedings of the Third International Congress of Phonetic Sciences [1938] (Ghent, 1939), pp. 263-64.
28. Paul Ariste, Eesti keele foneetika (Tallinn, 1953).
29. Marguerite Durand, Voyelles longues et voyelles brèves (Paris, 1946), especially pp. 31-32, 70-90, 140, 164.
30. Daniel Jones, "Chronemes and Tonemes," Acta Linguistica IV (1944), p. 5. Jones here adopts the system of using a third vowel or consonant to indicate the third degree of length; e.g., jama 'nonsense,' jaama 'of the station,' jaaama 'to the station,' lina 'lines,' linna 'of the city,' linna 'to the city.'

- Daniel Jones, The Phoneme (Cambridge, 1950), especially pp. 52, 119, 127, 132-33, 143, 172-73.
- Bertil Malmberg, Die Quantität als phonetisch-phonologischer Begriff, Lunds Universitets Årskrift, Ny Följd, Avd. 1, Vol. 41, No. 2 (Lund, 1944), especially pp. 25, 36, 42, 52. Malmberg apparently bases his statements upon an unpublished manuscript by Valter Nilius, "Essai sur l'alternance quantitative et la valeur phonologique des consonnes en Esthonien," Institute de Phonétique, Paris, 1938 (in the library of the Institut). I know of the comments of Sauvageot only as cited by Posti, pp. 6-7.
- Alo Raun, "Sur la théorie des alternances consonantiques et vocaliques surtout en finno-ougrien," Acta Linguistica, V (1945-1949), pp. 38-41.
- Leida Krass, "estounjən," Le maître phonétique, Sér. III, No. 81 (1944), p. 6.
- Leida Krass, "The Phonetics of Estonian" (unpublished Master's thesis, University of London, 1944), cited by Jones, "Chronemes and Tonemes," p. 5.

31. Posti, pp. 1-14. This article was first presented as a paper before the Twenty-third Annual Meeting of the Linguistic Society of America, New York, December 30, 1948.

32. Ibid., p. 8.

33. Ibid., p. 9.

34. Cf., Elmar Muuk, Välke õigekeelsus-sõnaraamat [Small Orthographic Dictionary] (Tartu, 1933). Muuk indicates syllables which contain extra-long vowels, consonants, vowel clusters, and consonant clusters by writing a grave accent before the syllable in which that extra length occurs; e.g., `liina, `linna, `taevas, `osta. He does not mark the length of individual segments.

35. Posti, p. 12.

36. Ariste, Eesti keele foneetika, p. 92.

37. Björn Collinder, "Three Degrees of Quantity," Studia Linguistica, V (1951), especially pp. 28-32.

38. Ibid., p. 31.

39. Ibid., p. 32.

40. Julius Mägiste, "Några ord om den estniska kvantiteten," Meddelanden från Seminarierna för slaviska språk, jämförande

språkforskning och finsk-ugriska språk vid Lunds Universitet. I
(Lund, 1951), pp. 5-12.

41. Ibid., pp. 8-9.
42. Ibid., pp. 9-10.
43. Ibid., p. 12.
44. Alo Raun, "On Quantity in Estonian," Studia Linguistica, VIII (1954), pp. 62-76.
45. Ibid., p. 66.
46. Ibid., p. 76.
47. Alo Raun, "Word Stress in Estonian," Lingua, VII (1958), pp. 349-55.
48. Ibid., p. 351.
49. Ibid., p. 354.
50. Ibid., p. 351.
51. Valter Tauli, "The Origin of the Quantitative System in Estonian," JSFOu, LVII (1954), 19 pp.
52. Ibid., p. 4.
53. Ibid., p. 3.
54. Ibid.
55. Ibid., p. 2 and pp. 2-3 respectively.
56. Hildegard Must, "Distinctive Duration of Speech Sounds in Estonian," FUF, XXXIII (1958), pp. 146-63.
57. Hildegard Must, "Duration of Speech Sounds in Estonian," Orbis, Vol. VIII, No. 1 (1959), pp. 213-23.
58. Must, "Distinctive Duration of Speech Sounds in Estonian," p. 152.
59. Ibid., p. 160.
60. Ibid., p. 159.

Ibid., p. 160.

62. This is essentially the tentative solution for Estonian quantity which I proposed in my review of Die Herkunft des Terminativs, Genitivs, Instruktivs, und Komitativs, by Lauri Kettunen, Language, XXXIV (1958), p. 157.

63. Must, "Duration of Speech Sounds in Estonian," p. 222. That her transcription is phonetic is further evident from the fact that we find the following types of t-segments indicated: /d t t': t::/ (slant bars as used by Must).

64. Ibid., p. 219.

65. Ibid., p. 221.

66. Ibid., p. 219.

67. Ilse Lehiste, "Segmental and Syllabic Quantity in Estonian," Uralic and Altaic Series, I (1960), pp. 21-82.

68. Lehiste's statement (p. 55) that "syllabic quantity thus is not the result of simple addition of the segmental quantity of the sounds that make up the syllable" is true in the sense that the number of morae alone will not distinguish between the long and overlong syllables; e.g., syllable type (C)V:: with three or four morae is overlong, whereas syllable type (C)V:CC with four or five morae is only long. Once we consider both morae and segmental phonemes, however, the syllable length is automatically predictable.

69. Ibid., p. 51.

70. Ibid., pp. 61-62.

71. Ibid., p. 61.

72. Ibid., p. 24.

73. Ibid., p. 76.

74. One might wish to argue, for example, that Estonian high and mid vowels are primary and that the lower vowels are subordinate to them, since the former participate in morphophonemic alternations in quality, whereas the latter do not.

75. Ibid., p. 23.

76. Ibid., p. 63.

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