Syllable Structure in Old English (Part I)

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0 Introduction
What is most fundamental in constructing descriptions and explanations of phenomena in phonology seems to start by understanding how sequences of sounds in a language can be organized. With a solid basis to count on, one can obtain linguistically significant generalizations in a successful way. It is held, for instance, that the procedure of syllabification, whether it is stated as a rule or as a representational syllabic template, can be composed of properties universal across languages and those that are language-specific by specifying certain general parameters and some idiosyncratic constrains on syllable structure. The present paper reviews a few theories on syllable structure to see how segments in Old English (OE) are organized into structured bodies of prosodic units.

1 The Syllable
This section starts with a discussion on how boundaries are placed in the middle of a given string of segments. This is one area in which languages differ markedly -- a string of identical elements can be variously syllabified according to languages. The literature on phonology has witnessed a number of proposals for explaining the mysterious mechanism each language reveals. For example, let us consider *construction*, *constructor* 'builder', *hamster* 'hamster', which are from English, Spanish, Finnish, respectively. To these lexical items the following syllable boundaries can be supplied (Picard 1987).

(1) English Spanish Finnish

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con$struc$tion cons$truc$stor ham$t$raa ($ = a$ syllable boundary)
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What brings forth such differences among these languages? We can say that there are language particular constraints on syllable structure. For example, it has been pointed out that, in English the onset permits maximally three consonants (Clements and Keyser 1983: 30); in Spanish two consonants (Harris 1983: 13); in Finnish only one consonant (Ito 1986: 41). An appropriate linguistic theory therefore should allow such variations across different languages to be explained in an explicite way. This is the main issue the present study explores in the sections to follow.

2 Two approaches on Syllable Assignment
According to Ito (1986), approaches proposed to assign syllable structure can be divided into two major groups: the rule-approach and the template-approach. In the rule approach, the syllable is constructed by rule; therefore, the admissible syllable structures of a language are derived by a set of syllable structure

(2) Rules 1:

With each [+syllabic] segment of the input string associate one syllable.

Rules 2:

a. \[ C_1 \ldots C_n V \rightarrow C_1 \ldots C_{i+1} \ldots C_n V \]

\[ \sigma \]

where \( C_{i+1} \ldots C_n \) is a permissible initial cluster but \( C_i C_{i+1} \ldots \) is not.

b. \[ VC_1 \ldots C_n \rightarrow VC_1 \ldots C_j C_{j+1} \ldots C_n \]

\[ \sigma \times \ldots \times \sigma \]

where \( C_1 \ldots C_j \) is a permissible final cluster but \( C_1 \ldots C_j C_{j+1} \ldots \) is not.

These rules, together with some conditions on initial syllable consonant clusters, produces the following representations for *construction, constructor, and hamstaraa*:

(3) \[
\begin{array}{cccccc}
\sigma & \sigma & \sigma & \sigma & \sigma & \sigma \\
kanstakjan & konstruktør & & & & hamstaraa
\end{array}
\]

It may be argued that this kind of variation in syllabification is interpreted as a consequence of the rules required language-specifically for expected syllabification to take place or a consequence of the conditions imposed on such rules. Thus, Kahn's rule-approach seems to be on the right track, but it also seems vulnerable to certain problems. For instance, as Picard (1987) argues, it is not possible to attain language universals in a model with the notions of possible initial clusters and possible final clusters. Nor can such a theory seem able to capture consonant clusters impermissible word-initially or word-finally. Suppose that we incorporate Kahn's (1976) syllable theory into lexical phonology. As pointed out in Lowenstamm (1981), there would be no way to account for the following examples:

(4) Sg. \( \text{water} \)

Nom. \( \text{weter} \)

Ace. \( \text{weter} \)
Gen.  wetres  
Dat.  wetre  
Pl.  
Nom.  weter  
Ace.  weter  
Gen.  wetra  
Dat.  wetram

The declension above is of *water* 'water' in the Mercian dialect of OE. To obtain the correct paradigm of this word, Drescher (1978) proposes that the underlying of it be /wetr/. A glance at this underlying representation helps to see that it does not conform to what is defined as the sonority scale, to which we shall return later. We would then expect the final /r/ to remain unsyllabified after all. This result comes by if we adopt Kahn's (1976) attempt to pursue generalizations based on the mere surface values of sequences.

(5)  \[
\sigma \quad ? \\
\underline{wet}r
\]

Reviewing Kahn's (1976) syllable theory, Clements and Keyser (1983) develop their own version of syllable theory. The crucial difference between the two theories is that Clements and Keyser dismiss the assumption that syllable-initial consonant clusters have the same spans as word-initial consonant clusters. Here it is interesting to note their comment on the universal theory of the syllable:

A universal theory of the syllable has, in our view, three tasks. First, it must specify the well-formed expressions of the theory. Thus, it provides an alphabet out of which syllable units are constructed together with a characterization of the permissible arrays of alphabetic units. Second, it must specify the parameters along which individual languages vary in their choice of syllable types. Third, it must characterize the class of language-particular rules which modify or extend the underlying syllable representations ("syllabification rules") and state how these rules are integrated into the general organization of the phonological component. (Clements and Keyser 1983: 25)

**The Template-Approach**

As we have examined so far, the rule-based approach like that of Kahn (1976) has drawbacks in accomplishing a universal theory of the syllable noted above. We will, in turn, consider the template-approach, which seeks to gain characteristics of a language by setting the values of parameters varying within the principle for syllable structure. First, let us assume that prosodic structure is organized as in (6):
What is assumed here is that a sequence consisting of CV elements serves as a syllable template that defines the core syllable, which refers to a syllable without an affix/appendix. Itô (1986: 4), for example, presents a definition of the syllable template as follows:

**Syllable Template**: a kind of well-formedness condition defining the possible skeletal sequence of a language, e.g. [CCVC]. There are also other universal as well as language-specific well-formedness conditions on syllable structure beyond the simple skeletal sequencing.

The internal structure of the syllable we are assuming to be the template is figured as illustrated in (7) (Selkirk 1982 : 341). Let us assume that the rime of the core syllable can be occupied maximally by three skeletal slots, the abutting two of which can further be occupied by either the nucleus or the coda under the following condition on syllable structure:

(7) Maximal OE Core Syllable Structure
In addition to the syllable template, some principles of prosodic phonology come into effect. Itô (1986: 2) addresses the following principles:

(8) Basic principles of Prosodic Phonology
   I. Prosodic Licensing: All phonological units must be prosodically licensed, i.e., belong to higher prosodic structure (modulo extraprosodicity).²
   II. Locality: Well-formedness of a prosodic structure is determined locally.
   III. Directionality: Phonological mapping proceeds directionally: left to right, or right to left.

We assume that the parameter-setting of (8-III) is left to right in OE as well as in PE. This leads to the maximization of the onset in syllabification (Clements & Keyser 1983: 37).

We further add the Sonority Principle, according to which the segmental material in the onset and the rhyme must be arranged in a linear order of increasing and decreasing sonority, respectively:

(9) Sonority Hierarchy (Jespersen 1926: 191)

   1) Stimmlose
      a) Verschlusslauten: [p, t, k]
      b) Engelauten: [f, s, ç, ã]
   2) Stimmhafte
      Verschlusslauten: [b, d, g]
   3) "
      Engelauten: [v, z, y]
   4) "
      a) Nasale: [m, n, ě]
      b) Seitenlauten: [l]
   5) "
      r-Lauten
   6) "
      hohe Vokale: [y, u, i]
   7) "
      mittelhohe " [œ, õ, e]
   8) "
      niedrige " [œ, æ, a]

Note that there are arguments for the possibility of deriving the sonority hierarchy from the feature hierarchy (Kiparsky 1982b: 69, Levin 1985: 63).

(10) Universal Sonority Hierarchy (Levin 1985: 63)

   [-high] [+high]
   [ +cons] [ -cons]
   [ +son] [ -son]
[+cont]       [-cont]

[+voice]       [-voice]

[+ant] \rightarrow [-ant]

[+cor] \rightarrow [-cor]

Next, as for the notation of skeletal elements, it can be argued that X should be used instead of C or V to denote a pure timing slot because of the proposals by Levin (1985) and Mohanan (1985, 1986) that a notation expressed by V or C contains redundant information about syllability of a segment. They assert that such a redundancy must be eliminated altogether from the phonological representation, for unlike other segmental properties, syllability appears to be a relative property, often predictable from the position of a segment within a string. (Levin 1985: 60). Thus, an X which is a head, i.e., an X dominated by N is interpreted as V and other X’s as C’s. For example, a noun wudwe ‘widow’ seems to well illustrate the distinction as to syllability — /w/ differs from /w/ only in the feature [syllabic] with all the other features being equal. Thus, wudwe starts with the segmentation of sequence:

(11) X X X X X X

\[
\begin{array}{cccccccc}
 & & & & & & & \\
\text{w} & \text{u} & \text{d} & \text{u} & \text{w} & \text{e}
\end{array}
\]

According to the principles for syllable formation, (11) is assigned the following structure:

(12)

\[
\begin{array}{cccccccc}
\sigma & \sigma & \sigma \\
 & R & R & R \\
 & O & O & O \\
 & N & N & N \\
 & X & X & X \\
 & w & u & d & u & w & e
\end{array}
\]

This representation will ultimately be parsed into the one in (13):
We will examine some issues concerning the numbers of slots allowed as members of the onset, nucleus and coda, respectively.

Lastly, it should be pointed out that the weight tier (mora tier) needs to be incorporated into prosodic structure in addition to the syllable tier (Hyman 1985, Ohta 1989) in that the notion of syllable weight seems to play an important role especially in analyzing OE geminate consonants. We show the well-defined weight of a syllable in terms of its internal structure, which may support the necessity of rime node. Look at the following diagrams:

A heavy syllable is composed of CVV or CVC, and a light syllable, CV; so (14a, b) are the configurations of heavy syllables and (14c) is the structure of a light syllable. It should be borne in mind that heavy syllables are typically characterized by their having complex structures-within the rime node.

**Extrasyllabicety**

Hayes (1981) propounded a treatment of a consonant at the peripheral position of a word in deriving its correct stress contour. In his analysis consonants which do not count for stress assignment are termed extrametrical consonants. This concept has been applied to other levels of phonological description. For example, Pulleyblank (1986) suggests that the same behavior can be observed in application of tone rules. As a manifestation of the extraprosodicity, extrasyllabicety is described as follows:
An extrasyllabic consonant is one which is not a member of any syllable. Typically, such consonants are separated from neighboring consonants by short neutral or voiceless vowels and are historically susceptible to processes which either eliminate them or incorporate them into well-formed syllables by means of processes such as vowel epenthesis, sonorant vocalization and metathesis. English has such examples (Clements & Keyser 1983: 39).

In the next chapter we will explore two of those processes, i.e. vowel epenthesis and sonorant vocalization (syllabification).

3 OE Syllable Structure

This section argues that the nucleus position of the core syllable can be occupied maximally by two skeletal slots, the onset by two, and the coda by two.

Classical OE Sound System

Here we reproduce the following list of vowels and consonants given in Ono & Nakao (1980: 25, 97):

(15) Short and long vowels

<table>
<thead>
<tr>
<th>Front</th>
<th>Round</th>
<th>Mid</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unround</td>
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<tr>
<td>High</td>
<td>i</td>
<td>i:</td>
<td>y</td>
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<tr>
<td>Mid</td>
<td>e</td>
<td>e:</td>
<td>o</td>
</tr>
<tr>
<td>Low</td>
<td>æ</td>
<td>æ:</td>
<td>(æ)</td>
</tr>
</tbody>
</table>

[æ, aw, a] [æ:, a:w, a:]

Short and long diphthongs

| Short | æ:æ <ea> | eo | io | i:e |
| Long | æ:æ <ea> | e:o | i:o | ie |

Consonants/semivowels

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<tr>
<td>Stops</td>
<td>+v</td>
<td>p</td>
<td>t</td>
<td>(f)</td>
<td>k</td>
<td>[k, c]</td>
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<tr>
<td></td>
<td>-v</td>
<td>b [b, (β)]</td>
<td>d</td>
<td>(d)s</td>
<td>g</td>
<td>[g, v, ŋ, j]</td>
</tr>
<tr>
<td>Fricative</td>
<td>f[f,v]</td>
<td>0[θ, θ]</td>
<td>s[s, z]</td>
<td>(ʃ)</td>
<td>x</td>
<td>[x, ʒ, h]</td>
</tr>
<tr>
<td>Nasal</td>
<td>m[m, ŋ]</td>
<td>n [n, ŋ, ŋ]</td>
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<tr>
<td>Liquid</td>
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<td>l[1, l] r[r, r]</td>
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<tr>
<td>Semi vowels</td>
<td>w</td>
<td></td>
<td></td>
<td>j [j, ɟ]</td>
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</tbody>
</table>
There is a problem regarding the interpretation of the long vowel and diphthong — a question of how to interpret those vowels in CV phonology. This problem is not new but has been discussed by many researchers. It may be of some use to note several different views on this issue.

**Traditional View**

The oldest and most widely accepted view is that the difference in the volume of vowels is phonemically interpreted in OE, ME, and ModE; i.e., long vowels are in contrast to short vowels. According to this theory, OE is assumed to have two kinds of opposition of vowels: a single vowel versus another single vowel, and a complex vowel versus another complex vowel. In other words, the former lies between a long vowel and short vowel, and the latter between a long diphthong and short diphthong. Lacking the latter opposition, ME and ModE retained only the former.

**Structuralist View**

Long vowels in OE, ME, and ModE are interpreted to consist of 'V+an off-glide'. The off-glides are further distinguished according to the movement an articulator: (i) the fronting /j/, (ii) the backing /w/, and (iii) the centering /h/.

**Moraic View**

The length of a vowel is captured in terms of mora structure, i.e. a single mora vs. two moras. For example, one mora corresponds to a syllable with a single short vowel, and two moras to a syllable with a long vowel. Thus, long vowels and diphthong are regarded as comprising of two moras as they contain a sequence of VV. Their difference lies only in whether or not their constituents are identical.

Following the model concerning the representation of the syllable discussed above, let us hold that a short vowel corresponds to a single timing slot and a diphthong and a long vowel correspond to two timing slots, respectively. This is supported by Abercrombie's (1967: 82) description of the long vowel as "being indicated by the two V's". Let us take swima 'dizziness' as an example to illustrate the difference in the quantitative properties of a long vowel and a short vowel. This word contains two vowels: the first one is long and the second one is short:

(16)  X  X  X  X  X  X  X: a timing slot

We should see how the different views on the interpretation of vowels can be accommodated in our framework. The separation of the X and melody tiers enables us to describe the contrast in quantity independently of that in quality; therefore, it becomes possible to make an amalgam of the traditional and
moraic views in order to set up a better theory on the nature of long vowels. We assert that the nucleus can hold maximally two slots as its members in OE. This authorizes long single vowels and long diphthongs which consist of two slots to safely occupy the nucleus position. By the same token, short diphthongs are also permissible as a member of the coda. They are considered to have the same status as complex segments, i.e. to hold only one slot. See Dresher's (1978) discussion in favor of deriving short diphthongs from short vowels by rule. Thus, we arrive at the four types of vowels: 4

(17) a. long vowel 
\[ \text{N} \quad \begin{array} { c } \text{X} \\ \text{X} \\ /a/ \end{array} \]

b. short vowel 
\[ \text{N} \quad \begin{array} { c } \text{X} \\ /a/ \end{array} \]

c. long diphthong 
\[ \text{N} \quad \begin{array} { c } \text{X} \\ \text{X} \\ /o/ \quad /u/ \end{array} \]

d. short diphthong 
\[ \text{N} \quad \begin{array} { c } \text{X} \\ /o/ \quad /u/ \end{array} \]

These structures are illustrated by the following examples:

(18) a. *dryge 'arid'.* 
\[ \sigma \quad \begin{array} { c } \text{R} \\ \text{O} \quad \text{N} \\ \text{X} \quad \text{X} \quad \text{X} \quad \text{X} \\ d \quad r \quad y \quad g \quad e \end{array} \]

b. *gear 'year'.* 
\[ \sigma \quad \begin{array} { c } \text{R} \\ \text{O} \quad \text{N} \quad \text{C} \\ \text{X} \quad \text{X} \quad \text{X} \quad \text{X} \\ g \quad e \quad a \quad r \end{array} \]
Initial Consonant Clusters

As shown above, the number of phonemes in OE is greater than that of PE, and naturally this results in the large number of initial consonant clusters. But it does not seem that all the possible combinations of phonemes manifest themselves. Clusters such as /tl-/ /tn-/ /tl- /tm- do not appear because their representations obviously violate the sonority scale. ME retained most of the OE initial clusters /xl-, xr-, xn-, xw-, which somehow disappeared in the transition from LOE to EME. The possible OE initial consonant clusters are summarized as follows:

(19) Initial CC clusters

<table>
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<tr>
<th>1-2</th>
<th>1-3a</th>
<th>1-3b</th>
<th>2-3a</th>
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3a-3b
wr-  wl-

Examples are as follows:
(20) CC-

sp.: spātīl 'saliva', spearwa 'sparrow', speed 'success', spēdlum 'quickly', spelād 'splinter', spildan 'to destroy', spora 'spur', spurnan 'beside', spyrían 'investigate, inquire'

st.: stān 'stone', staca 'stake', stemn 'voice', stice 'stab', stōd 'stood', storm 'storm', stefn 'voice', stelan 'steal' stycce 'piece'

sk.: scand 'disgrace', scafa 'enemy, crime', sclu 'troop, host', scōl 'school', scōp 'created, formed'

sw.: swās 'own, familiar', sweeg 'noise', swelec 'such', swipe 'whippe', sword 'sword', swurd 'sword', swyle 'swelling', swearn 'swarm', swaref 'sleep', swolop 'heat, burning', swoogan '(re)sound', swutol 'distinct', swustor 'distinct'

θw.: ḷwāng 'thong', ḷwēal 'washing', ḷwian 'wash', ḷwēores 'across', ḷweroð 'adverse, angry', ḷwēran 'stir, churn', ḷwītan 'cut, shave off'

xw.: xwar 'what, who', hwæthewug 'something, a little', hwæper 'which of two', hwelc 'each', hwelp 'help', hwèrfa 'turn, return', hwettan 'sharpen', hwile 'spare of time', hwonne 'when', hwyrft 'turning'

tw.: twelf'twelve', twelfwintre 'twelve years old', twibill 'two-edged axe', twig 'once', twinihte 'two days old', twiveg 'meeting of two roads', twywva 'twice'

dw.: dweulan 'lead astray', dweorg 'dwarf', dwinan 'become smaller', dwohtian 'stray', dwohma 'chaos'

kw.: cweccan 'shake', cwel 'die', ewell 'kill', cwēman 'please', cwēn 'queen', cweorn '(hand)mill', cwepan 'say, speak', cwicāht 'live stock, cattle', cwide 'what is said', cwucian 'revive'

fr.: fram 'motion', frēa 'lord, king' frec 'gluttonow', fremsum 'beneficial', frīgan 'ask, inquire', frum 'beginning, origin', frumbearn 'first-born child'

θr.: hrēa 'pressure, force', hrēu 'thread', hrēa 'threat', hridda 'third', hrims 'weight', hrīngan 'press on, crowd', hrop 'farm', hrosn 'vapour', hrāh 'rancid', hryccan 'press, trample'

xr.: hrēa 'indigestion', hrēod 'reed', hrēow 'storm', hrēm 'rime', hrīndan 'thrust', hring 'ring, gold', hrōc 'rook', hrōf 'roof', hruitan 'snore', hryc 'back, ridge'

fr.: scrēad 'shred, pairing', scrēawa 'shrew mouse', scrēnca 'put stumbling-block in the way of', scrēp 'scrape', scrinca 'wither, fade'

pr.: prica 'point', prician 'prick, stab', prūt 'proud', prūtscape 'pride'

br.: brand 'point, dot', brastlian 'crackle, rattle', breca 'break, burst', bregdan 'move, quickly', brego 'chief', brēost 'breast', bridd 'young bird', brim 'sea, ocean', brū 'eyebrow', bruce 'useful', brycg 'bridge'

tr.: tref 'tent', tredan 'tread', trega 'grief', trifo 'tribute', trīmes 'a weight', trog 'tough', trum 'fist', trymman 'make strong', trymp 'firmness'

dr.: drēfan 'drive', drenc 'what is drunk', drencan 'give to drink', drēogan 'do', drēopan 'drop, drip', drēosan 'fall', drepan 'strike, hit' drepe 'stroke'

kr.: crabbia 'crab', cræft 'skill', crīgan 'fall in battle', crīmman 'crum, insert', crohha 'saffron', cropp
'sprout'

gref 'style', gremman 'irritate', grimm 'cruel', gripe 'grasp', gröwan 'grow', grund 'bottom' gryre 'terror'

wrenna 'wren', wrað 'band, bondage', wrecend 'avenger', wrenc 'modulation', wrigels 'covering'

sleænes 'sloth', sleapan 'sleep', sléan 'strike', slecg 'sledge-hammer', slide 'slip', sliȝt 'killing', slōh 'slough, mere', shyppe 'paste, slime'

fli 'arrow, dart', flæor 'flying', fliȝa 'flea', flett 'floor', flicce 'flitch', floocc 'body of men', floor 'floor', flyge 'flying, flight'

hlaedel 'ladle', hlaest 'burden', hlæapan 'leap over', hlǣd 'over', hliehhan 'laugh', himman 'resound or noise', hlōwan 'low', hlūd 'loud', hlūdan 'make loud sound or noise', hlūst 'sense of hearing'

plega 'quick movement', plegen 'play', plegol 'sportive', pleoh 'danger, peril'

blæd 'blowing', blanca 'steed', blandan 'mix', blind 'blind', bliss 'joy', blōd 'blood', blōstm 'blosom', blōyscan 'blush'

clēne 'clear', clām 'mud', clawn 'claw', clōa 'claw, hoof', clíwen 'ball of thread', clifian 'adhere', clūd 'rock', clynian '(re)sound'

glas 'glass', glengan 'adorn', glida 'kite', glōf 'glove'

wlanc 'proud, elated', wleccan 'make teped', wlenco 'pride', wlipps 'lisping', wloitt 'beautiful'

snaca 'snake', snād 'handle', snægl 'snail', snell 'quick', snide 'incision, killing', snorū 'daughter-in-law', snypian 'go with nose to the ground', snytru 'prudence'

smād 'narrow', smeorū 'fat, grease', smiercels 'ointment', smierwan 'anoint', smitān 'daub, smear', smip 'smith', smocc 'smock-frock', smylte 'serene'

fnaed 'fringe, hem', fnes 'fringe'

hnapp 'cup, bowl', hnasce 'soft', hneappian 'doze', hnecca 'nape of neck', hniitol 'given to butting', hnot 'bald-headed', hunne 'nuts'

knæfa 'boy, youth', knedan 'knead', knẽoht 'boy, attendant, server', cnocian 'knock', cnoll 'hill-top', cnōoist 'stock, progeny', cnotta 'knot', cnyll 'sound of bell', cnyssan 'beat'

gnætt 'gnat', gnagan 'gnaw', gnēap 'niggardly', gnīdan 'rub, pulverize'

(21) Initial CCC clusters.

1-2-3b only

spr- spl- str- skr-

Examples are as follows:

(22) CCC-

spr- sprðadan 'spread', sprengan 'scatter', springan 'leap, spring back', spryttan 'sprout', sprecan 'speak',
sprecol 'talkative'

spl-: splott 'spot, plot of land'

str-: strange 'violently, severely', strēam 'flowing', strēaw 'straw', strenge 'string', streccan 'hold out,
extend', stridān 'strew, spread', strengepu 'strength, violence', streowanc 'bed, resting-place', streðan 'plunder'

skr-: screawa 'shrew-mouse', serencan 'cause to tumble', scrīpan 'move smoothly', scrīfan 'decree'

As the data above show, we do not find clusters violating the sonority profile except the s+C(=/p, t,
k/ clusters, to which we will turn later. As for the CCC clusters, we recognize the four types provided in (23), though there are some moot issues as to their membership. Let us start with the CC clusters first. What we see from the data set is that OE allowed sequences that are not permissible in PE. For example, we find /fn-, aw-, xw-, wr-, xl-, gn-/ of which the phoneme /x/ represented by the letter h dropped from the inventory during the time of late OE through early Middle English, whereas ME latched onto the remaining clusters. Here it should be remembered that those clusters permissible in OE but not in PE never violate the universal conditions on syllable structure; then it may be reasonable to assume that diachronic changes in a language can be ascribed to that of a condition on rules or representations, as usually taken to be the case in analyzing language particular variations in the synchronic grammars of different languages. Next, basing ourselves on the hypothesis that the syllable conditions should be placed on the representations but not on the rules (Itō 1986: 7ff). We suspect that the grammar of OE contained the same sort of phonotactic conditions that we find operative in PE as well (cf. Clements & Keyser 1983: 44, 46; Borowsky 1986: 174). Negative conditions have a prohibitive effect, and positive conditions allow a given configuration or its representation to take effect despite there being a general principle that would exclude such a configuration.

(23) Negative Syllable Structure Conditions

a. *[+lab] [+lab] 
    bw-, pw-, fw-

b. *[+cor] [+cor] 
    dl-, tl-, th-

c. * 
    [+son] [+cont] [+voice] 
    vw-, zw-, vl-, vw-

(d. *  
    [+strid] [+cor] [+low] 
    sr-
Positive Syllable Structure Condition

e. \( \begin{array}{c} + \text{strid} \\ + \text{cor} \\ + \text{ant} \end{array} \) [-cont] \begin{array}{c} \text{sp-} \\ \text{st-} \\ \text{sk-} \\ \text{sm-} \\ \text{sn-} \end{array} \\

Thus, we propose that OE had the same mechanism as PE does for the configuration of the initial consonant clusters. This is supported by the fact that the OE maximum initial consonant clusters, though manifesting a contrast to PE regarding the permissible types of clusters, always begin with /s/.

(24) OE PE

spr- spr-

spl- spl-

str- skr-

skr- skl-

*skw- unattested slw-

*spj- unattested spj-

*stj- unattested stj-

*skj- unattested skj-

In PE we find CCC clusters in PE whose third positions are occupied by a semivowel, while in neither OE nor ME can such clusters be found despite the fact that at these stages the semivowels are permitted to the second position of CC clusters. This seems to suggest the existing of a certain filter which acted to prevent a semivowel from occurring as the third member of a triconsonantal cluster:

(25) Negative Syllable Structure Condition

*CCC

[+high]

By this condition will the clusters with asterisks in (24) be ruled out.

Lastly, let us look into the status of the syllable initial /s/, which reveals a property different from that of other segments. Recall that the configuration of CCVCC has been posited as the template of the OE core syllable, and in fact we find such clusters consisting of three consonants, as shown in (24); they always begin with /s/, a point that actually goes against the effect of the template introduced earlier. Now we are required to provide an explanation of the status of /s/ in question. Since there seems to be parallelism in the discussion of how the same segment in PE can be analyzed, it seems reasonable to assume an explanation applicable to OE and PE as well. We find two views on this matter. One theory assumes that the extra segment, i.e., /s/, is added to the word-initial position by rule, a process illustrated
by the following diagram:

(26) \[ \begin{array}{c}
  W \\
  | \\
  o \\
  | \\
  O \\
  | \\
 X \\
  | \\
 (s) \\
\end{array} \]

\[ (\text{[+cor]} \) \]

The alternative treatment claims that the sequence sC forms a complex segment, which will be interpreted by means of the following representations:

(27) \[ \begin{array}{ccc}
  C & C & C \\
  s & p & s \\
\end{array} \]

Thus, there appears no violation of the syllabic template. As the matters stand now, however, we are left with no way of telling which theory to choose. Now we find a remark by Borowsky (1986). Borowsky (1986: 177, n. 10) says, "Bill Poser (pc) reports that in Old English these clusters [=sp, st, sk] can rhyme with the second of the two consonants: i.e. sp may alliterate with p, sk with k etc. This suggests rather the s may be considered to be extrasyllabic"; therefore, the former approach favorable over the latter one at least in the case of OE. As a consequence it follows that the /s/ remains extrasyllabic; after syllabification has taken place, and then will be incorporated into a higher prosodic unit in one way or another, a way that we suppose to have to do with the treatment of the extrasyllabic consonants in the coda position. We will return to this topic in Part II, in which we will focus on issues concerning word-final consonant clusters.

Notes

1. Levin (1985) suggests a set of rules that builds up syllable structure by employing X’ type schema. In her theory, the syllable is considered to be the projection of the Nucleus; hence, "the distinctions in syllabicity are wholly determined by head (N) placement" (Levin 1985: 79). This was followed by Borowsky’s (1986: 186) attempt to accounts for the syllabicity of word-final sonorants. The nucleus rule (Levin's N-placement rule) applies at Level 1, yielding the following structure:
At the next level, i.e., level 2, the nucleus rule becomes applicable to the final /t/ because Structure Preservation no longer holds at this level, and the following representation results.

Now we find at this point a problem arising in regard to how the syllabic consonant can be represented. It should be recalled that, as often pointed out in the literature on phonetics, syllabic consonants become much longer in duration than their non-syllabic counterparts. For example, Jones (1956: 56) remarks as follows:

When a consonant is immediately followed by a vowel, it is usually not syllabic, since the vowel has the greater inherent sonority. However, a consonant in this position is sometimes given extra prominence by increasing its length, and it may thus become syllabic. Examples are found in such English words as *glutony* 'glatni, muttony *mutni, lightening *laarnig, bubbling *bablign, flannelly *flaeli*. The *n* and *l* in these words are quite distinct from those in *Putney* *patni, lightning* *laarnig, publish* *pablign, manly *maeni*. In the latter case the *n* and *l* are very short; in the former they are lengthened so that their prominence is sufficient to make them syllabic in spite of the greater sonority of the adjacent vowel.

See also Masuya (1976: 170), from which we obtain another piece of phonetic evidence that the syllabic /t/ is about 1.6 times as long as the non-syllabic /t/ in duration. Therefore, as the matters stand, Levin's theory does not seem capable of capturing the facts Jones (1956) and Masuya (1976) address. Rather, it appears reasonable to consider, in the same vein as Clements and Keyser (1983), that a syllabic sonorant is dominated by two elements, V and C.

Levin's (1985) approach may lead to another problem when we turn to vowel epenthesis in OE as her N-placement rule would wrongly applied to the extrasyllabic /t/ in /wet/; the assumed underlying representation of *weter* 'water' unless such a segment has been specified in the lexicon so as to prevent the N-placement rule from taking effect.

2. Insofar as we do not go into specific realms of phonological representation, we will use the term *extraprosodic* as the general term, under which *extrametrical, extratonal, extrasyllabic, and extraharmonic* are subsumed.
3. For example, the interpretation of an X slot is undertaken by Mohanan's (1986: 30) *Principles of Headship in English*:

A segment is syllabic if the following conditions are met:

a. it is [+sonorant]
b. it is stem final if it is [+cons]
c. it constitutes a sonority peak within its syllable.

In all other cases, it is nonsyllabic.

4. Hyman (1985: 7) presents an analysis in which a short diphthong consists of a complex nucleus:

```
          σ
         / \   
        O   R
       / \   |
      N   i
     /   |
    V   a
```

5. Analyzing the Japanese syllable structure in relation to word games and speech errors, Ota (1989: 8) argues that phonological representations should contain the mora tier as well. This is illustrated by the following diagram:

```
          σ
         / \   
        O   R
       / |   |
      P   V
     /   |   |
    C   M
```

\[G=\text{glide}\]

6. Following Ono and Nakao (1980: 168), the numerals indicate that 1=fricatives /f, 0, s, x/, 2=stops /p, b, t, d, k, g/, 3a=semivowels /j, w/, and 3b=nasals and liquids /m, n, 1, r/.

7. The examples presented in (20) and (22) are from Hall (1960), Sweet (1896), and Wright and Wright (1925).

References


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