

## **Old English *i*-umlaut (for the umpteenth time)**

John Anderson

### **Abstract**

This paper offers an account of *i*-umlaut in Old English based on lexical minimality: the elimination of redundancies from, in this case, the phonological sub-entry in the lexicon. And the notation is that of Anderson & Ewen (1987), which is based, crucially for what follows, on simplex features which may combine in varying proportions. These assumptions combine to favour system-dependent underspecification. In accord with lexical minimality, the approach taken here is also polysystemic: thus, for instance, Old English vowels, even Old English accented vowels, do not enter into only one system of contrasts. The phonology is a system of systems sharing some but not all contrasts. The paper attempts to show that on this basis some of the many apparent anomalies that the evidence has been thought to suggest can be resolved in terms of a simple coherent formulation. Concerning this evidence, it is the intention of the paper to minimise appeals to phonetic features and phonetic processes not warranted by textual and comparative testimony. It is suggested that lack of attention to polysystemicity and a pervasive indulgence on the part of historical phonologists in phonetic fantasies undermine the conclusions reached by generations of scholars concerning the development of phonological systems, both in general and in particular.



Accounts of the *i*-umlaut that affects the ancestor of recorded Old English (henceforth OE) bristle with quirky outcrops: vowels that, apparently unaccountably, fail to be susceptible to it; vowels which seem to be twice affected; vowels whose umlaut results in unexpected outputs. Here I look at the light that might be thrown on *i*-umlaut and such exceptional aspects as these by a treatment that seeks to minimise lexical, i.e. contrastive representations; that is, seeks to remove redundant information from lexical entries, in the present case from their phonological content. There are various consequences of such an approach which are relevant to the present endeavour. In particular: underspecification, involving the minimalising of substantive and structural lexical specifications; polysystemicity, the recognition that the minimal system of, say, vowels varies according to the phonological environment.<sup>1</sup> I also assume that ‘derived’ specifications within each synchronic phonology involve the filling in of redundant substantive and structural information. The general framework, and particularly the representational aspects of it, that are invoked here is that of Anderson & Ewen (1987).

I also adopt another sort of minimality, what one might call interpretative minimality, which involves the intention to avoid the positing of phonetic attributes for reconstructed languages that are not warranted by the historical evidence. Many descriptions of earlier stages of languages invoke detailed phonetic descriptions – in some cases, extensive phonetic fantasies – that in their speculations concerning substantive detail go way beyond what is attested by surviving texts or directly inferable from internal and comparative evidence. (Footnotes 7, 8 and 10 discuss some mild (and not so mild) examples of this.) We should be conservative in our reconstructions of substance (cf. here Anderson 1987a). As Hogg (1988: 190) puts it in relation to confronting problems posed by the study of OE dialects: ‘We need only obey two rules. Firstly, have respect for our scribes and the data they present us with; secondly, make sure that the linguistic analyses we reach have some plausibility’. Quite so. However, attempts at satisfaction of the second rule, certainly, and the first, I suggest here, are themselves contentious, as what follows should illustrate (if it does nothing more).

I start here by looking at what I see as the basic character of *i*-umlaut, illustrated by its effects on the system of short monophthongs of pre-OE. §2 looks at the differences in implementation which are introduced by the fact that the system of long monophthongs is different in structure from that associated with the short monophthongs. Similarly, §3 focuses on the situation with vowels, long and short, before nasals, and seeks to expose at more length the importance of recognising polysystemicity, particularly given the severely reduced system to be found in such positions. Finally, in §4 I turn to the *i*-umlaut phonology of the system of short and long diphthongs, as traditionally reconstructed, including the striking apparent anomalies of the non-West-Saxon manifestations of this. Reconstruction of the phonological value of the digraph spellings involved here is contentious; I do not attempt within the confines of this paper to survey, let alone evaluate, the various controversies and proposed solutions (for a critical review see Hogg 1992: §§2.20-37), but adopt a rather traditional position in accepting that many but not all of them represent diphthongs (as argued particularly by Colman 1988).

## **1 The basic story: non-specification and the short monophthongs**

We can illustrate the effects of *i*-umlaut in OE with the differences between the root vowels in the first (unumlauted) and second (umlauted) members of the pairs of (related) words in (1):

- (1) a. burg ‘city’ – byrig ‘city’ *dative sg*  
 b. ofost ‘haste’ – efstan ‘hasten’  
 c. faran ‘go’ – færþ ‘goes’  
 d. cwæl ‘died’ – cwellan ‘to-kill’

I shall be concerned here for the most part with the reconstructed pre-OE phonological ‘process’ of *i*-umlaut; I return later to the indications of ‘grammaticalisations’, or what I shall call denaturalisations, of this ‘process’ that are characteristic of extant OE texts such as those the forms in (1) are drawn from.

The examples in (1), which include only short monophthongal vowels (which I shall focus on for the moment), are a sample of the forms cited in readily accessible accounts of this phenomenon.<sup>2</sup> The (first) vowel in the second form in each pair is usually reconstructed as being ‘closer to’ the ‘high front position’ along some dimension than the corresponding vowel in the first form. All of the former are reconstructed as having had a suffix containing a ‘high front unround’ segment which ‘triggered’ the umlaut reflected in these spellings. I interpret this ‘triggering’ element as extra-segmental. Let me explicate what I intend by this.

An extrasegmental element is one that is not associated lexically, contrastively, with a particular segment and/or not serialised by the normal rules determining linear position (which appeal to sonority hierarchisation and language-particular fine-tuning of this, and to onset or coda status), but are associated with some syntactic or morphological unit as a whole and may be manifested in several places within that unit. This too (cf. fn. 1) should be familiar from Firthian descriptions involving ‘prosodic’ elements. A feature or complex of features is not located contrastively with a particular sequential position within the non-phonological unit that it is a property of. Such a characterisation is appropriate for the representation of harmonising elements (cf. e.g. on Khalkha Mongolian vowel harmony Anderson 1987b: §1, on Finnish harmony Anderson in preparation). Thus, ‘frontness’ and ‘backness’ in Finnish can be regarded as properties of the lexical item in whose forms the property is made manifest, (in ‘linear’ terms) wherever an eligible vowel occurs in that item. The word *pöytä* ‘table’, for instance, contains an extrasegmental element, a simplex feature of ‘frontness’ or ‘acuteness’, that is lacking in *pouta* ‘fine weather’; the two words are segmentally identical, and differ only in presence vs. absence of the extrasegmental.

I suggest this notion also applies to the phonological element that is manifested as *i*-umlaut. Specifically, I suggest that an element consisting of the simplex vowel feature *i*, roughly ‘acuteness’ (Anderson & Ewen 1987: §6.1), is associated lexically with the pertinent suffixes in pre-Old English, to which we can assign the phonological shape in (2):

- (2) {i} ( <{C}> ( {V}... ))

Braces enclose feature specifications; the capitals therein represent (simplex) primary features, which determine the basic syntax of segments, while the lower-case symbols are (simplex) secondary features (largely corresponding to ‘place of articulation’ and vowel dimensions). The round brackets in (2) enclose the phonological units syllable (outer brackets) and rhyme (inner brackets). The angled brackets indicate optionality. Thus, (2) indicates that secondary-feature specification {i} lies outside the syllable whose boundary is marked by the outer brackets and whose internal structure includes an optional onset and a rhyme: the inner brackets enclose the constituents of the rhyme, which I leave largely unspecified here, as not relevant; and the optional consonant, <C>, where {C} is a (primary) categorisation denoting consonant, lies outside this – it is a potential onset. The suffixal {i} is expounded within the suffix in either the vowel position, as in e.g. (1.a), if

the vowel otherwise lacks a secondary feature specification, or an empty onset (as in e.g. the source of (1.d), \*[kwæljən] (cf. Colman 1987: §II). Before proceeding further with the formulation of *i*-umlaut, let me provide an interpretation of the vowel system that serves as input to it.

I reconstruct the pre-*i*-umlaut pre-OE short monophthongal vowel system (rather conservatively in terms of the number of contrasts involved) as in (3), which also indicates the usual spellings of un-umlauted descendants of the vowels in the system – which introduces, alongside **i**, the symbol for the other vowel colour, the ‘grave’ feature, **u** (these together constituting a proper subset of the vowel features):

(3) *pre-umlaut pre-OE lexical system of short monophthongs*

{i} <i>i</i>	{u} <i>u</i>
{i, } <i>e</i>	{u, } <i>o</i>
{ , } <i>æ</i>	
{ } <i>a</i>	

The comma in these representations of secondary (vowel) categories indicates a ‘compound’ vowel, one that involves more than one feature. In {i, } and {u, } one of the features is unspecified, so the representations are underspecified. In { , } both features are unspecified; only ‘compoundness’ is specified. Nothing as to secondary-feature composition is specified in { }.

The representations in (3) are thus underspecified: I return in a moment to the motivations for this. More fully-specified representations, involving the ‘compact’ feature **a** in addition to **i** and **u**, are given in (4), which also contains typical examples:

(4) *more fully specified pre-umlaut pre-OE system of short monophthongs*

{i} <i>fisc</i> ‘fish’	{u} <i>duru</i> ‘door’
{i;a} <i>bed(d)</i> ‘bed’	{u;a} <i>god</i> ‘god’
{a;i} <i>dæg</i> ‘day’	
{a} <i>dagas</i> ‘days’	

(4) introduces the asymmetrical relation indicated by the semi-colon in the representations for the ‘high and low mid front’ vowels: in the first of these vowels the feature to the left of the semi-colon preponderates over that to the right. As we go from {a} to {i} the proportion of **i** increases, the vowel is ‘higher and fronter’, more acute.

The spellings *æ/a* represent a marginal contrast (Colman 1983), based on loss in a number of items of the environment that conditions the relative distribution of the two sounds (basically, factors determining ‘first fronting’ and its ‘exceptions’ or ‘retractions’); and at the earlier period with which we are concerned it must have been even more marginal. But the vowel spelled *æ* when un-umlauted is usually reconstructed as providing the (distinct) input to *i*-umlaut in forms like (1.d) (Hogg 1992: §5.80). However, the presence of {a;i} in the system, whether or not there is also a distinctive /a/ vowel, introduces an asymmetry, in that, in terms of exponency, whereas {i;a} pairs with {u;a}, they are realised ‘at the same height’, so that the latter can be more fully specified, non-contrastively, as {u;a}, {a;i} lacks a grave partner. This motivates the non-specification of {a;i} in (3), if we accept the general assumption embodied in Anderson & Durand

(1988a,b, 1993), that responsibility for such asymmetries can be attributed to a lexically unspecified vowel. Non-specification of that vowel removes the asymmetry, as with the pertinent vowel in (3) vs. (4), the one spelled *æ*. Non-specification is thus system-dependent. I return in §2 to the motivation for the lexical nonspecification of {a}, which, in relation to (4), does not seem to introduce an asymmetry, on the assumption that the unmarked vowel system is ‘pointy-bottomed’, ‘three-cornered’.

The specifications in (3) are filled out by (5):

- (5) a.  $\{V\{i, \}\} \Rightarrow \{V\{i; \}\}$   
 b.  $\{V\{, \}\} \Rightarrow \{V\{;i\}\}$   
 c.  $\{V\{\}\} \Rightarrow \{V\{a\}\}$

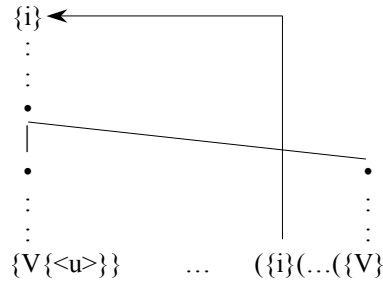
Application of (5) in the intrinsically-determined order given there, which reflects their increasing generality, and where (5.c) finally fills in anything left unspecified, gives us the specifications in (6):

- (6) a.  $\{i, \} \Rightarrow \{i; \} \Rightarrow \{i;a\}$  ‘e’  
 b.  $\{, \} \Rightarrow \{;i\} \Rightarrow \{a;i\}$  ‘æ’  
 c.  $\{u, \} \Rightarrow \{u,a\}$  ‘o’  
 d.  $\{\} \Rightarrow \{a\}$  ‘a’

This fills out all the values for the pre-umlaut system of (3).

By *i*-umlaut, the {i} extrasegmental of (2) is ‘spread’ to the root vowel. This ‘spreading’ I take to involve, as in Finnish harmony, as described in Anderson (in preparation), its being associated with the accented vowel, as in (7):

- (7) *pre-OE i-umlaut*



*condition a: only a vowel that is  $\{V\{<u>\}$  manifests i-umlaut*

*condition b: only a vowel that is  $\{V\{i\}$  fails to manifest i-umlaut*

The extrasegmentality of {i} is again indicated by its placement outside the non-initial (round) brackets in (7). The  $\{V\{<u>\}$  notation of condition a represents a segment with primary category vowel and secondary category, within the inner brackets, substantively **u** or with no specification (with the ‘<>’ brackets indicating optionality). Only such vowels are ‘affected’, according to this condition; thus, {i} and {i, } in (3) are not.

The formulation in condition a thus assumes that *i*-umlaut does not ‘affect’ {i} and {i;a}, and such forms are indeed lacking from (1). But, as Campbell notes, ‘whether *e* > *i* is not demonstrable’ (1959: §191). This is because ‘\*/e/ before \*/i/ had already been

raised to \*/i/ in G[er]m[ani]c' (Hogg 1992: §5.81). Hogg suggests, however, 'analogical extension of \*/e/' may have occurred in some of these cases, at least. Even if not, at the time of *i*-umlaut the 'Germanic raising' in forms like *birst* 'you sg. bear', with pre-OE suffixal {i} (cf. *bere* 'I bear'), may have been reinterpreted as an instance of *i*-umlaut. Either scenario is accommodated if we substitute for '{V{<u>}}' in the condition attached to (7) the requirement that *i*-umlaut 'fails' only if the potential victim contains uniquely **i**. This is the intention of condition b, wherein the verticals around **i** signal '**i** and only **i**'. Other things being equal, this condition allowing more general applicability of *i*-umlaut is to be preferred.

The 'effect' of (7) is to attach the extrasegmental **i** of (2) to the accentual head, on which the vowel in the {i} containing suffix is dependent, as indicated by the partial dependency tree in (7). It is still extrasegmental, not tied to a particular segment, except via the latter's dependence on the head, the accentual node which is a projection of the vowel.

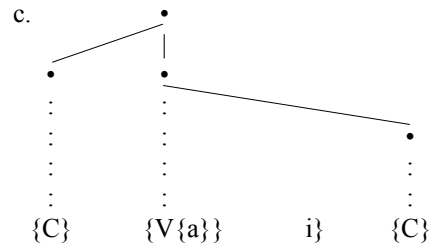
The umlauted forms in (1) contain only one vowel that can be affected, that which projects the accentual head. However, forms like those in (8) are reconstructed as having a back round vowel in the unstressed syllable preceding the *i*-bearing suffix (compare e.g. (8.a) with its Old Saxon cognate *gaduling*):

- (8) a. gædeling 'companion'  
       b. efstan 'hasten'

These are usually interpreted as having undergone 'double umlaut' (see e.g. Campbell 1959: §203, Hogg 1992: §5.76), though the apparently reduced second vowel comes to be spelled *e* in OE, as in (9.a), or it is lacking, as (along with the suffixal vowel) in (9.b). If these forms displayed these intermediate vowels at the time of *i*-umlaut, this double manifestation follows from the formulation in (7): the vowel in question falls within the accentual domain, and thus will 'be affected by' the extrasegmental {i}. As with Finnish vowel harmony the extrasegmental comes to be associated not with any one particular vowel but with the accentual head, and is manifested in any base/stem vowel (any vowel within the accentual domain, subordinate to the accentual vowel) – and, no doubt, any susceptible intervening consonants; combination of the extrasegmental with segmental vowels is expounded either by, in traditional terms, 'fronting' (1.a-c) or 'raising' (1.d) by one step towards {i} – where these traditional terms conceal the unity of the process, however.

{i} which is not extrasegmental is not associated with *i*-umlaut: thus the tautosyllabic [j] that is reconstructed as the value of the *g* in *dæg* is not an umlauter with respect to the preceding vowel (in this case the product of 'first fronting', which we would expect to be spelled *e* in an umlaut environment). However, a stem-final [j] that syllabifies exclusively with the following suffix has extrasegmental status therein, as in the ancestor of *cæg*, with a long, or free vowel rather than a short/checked, where it is associated with umlaut of /ai/ (as we shall look at below). I am assuming, following Colman (1986), that the ancestors of the forms in the paradigms of *dæg* and *cæg* syllabify as in (9.a) and (b) respectively:

- (9) a. (dæ (g) <SUFFIX>)  
       b. (cæ) (g SUFFIX)



If a suffix follows, the [j] in the pre-OE forms of *dæg* is ambisyllabic after the preceding checked vowels (given the requirement to be checked by a consonant in an accented syllable); otherwise, if there is no overt suffix (as allowed by the < > notation, indicating optionality), the [j] belongs entirely to the single syllable of the stem. The vowel in (9.b) is free, so in this case the segment spelled *g* syllabifies with the following suffix, which all the forms of *cæg* probably contained at the period of *i*-umlaut (for references see Colman 1986: 229). *Dæg* is thus not an ‘exception to *i*-umlaut’; it simply does not meet the conditions for it. Indeed, I suggest that the acuteness of the final consonant in *dæg* is shared with the preceding (checked) vowel, its historical source, as represented in the syllable structure of (9.c).

Whereas (5) alone provides for the fuller specification of the (first) vowels in the first words in (1), application of both (7) (*i*-umlaut) and (5) gives (10) as representations for the (first) vowels in the second words in (1), where the {i} on the left is the extrasegmental {i} attached by *i*-umlaut to the accented vowel:

- |      |    |                                                     |  |                            |
|------|----|-----------------------------------------------------|--|----------------------------|
| (10) | a. | {i}...{u} –                                         |  | i.e. {i}...{u}, ‘y’        |
|      | b. | {i}...{u, } ⇒ {u,a} (by (5.c)) –                    |  | i.e. {i}...{u,a}, ‘oe’/‘e’ |
|      | c. | {i}...{ } ⇒ {a} (by (5.c)) –                        |  | i.e. {i}...{a}, ‘æ’        |
|      | d. | {i}...{ , } ⇒ { ,i} (by (5.b)) ⇒ {a;i} (by (5.c)) – |  | i.e. {i}...{a;i}, ‘e’      |

We can represent the umlauted vowel in (10.a), for example, more completely as in (11):

- (11)
- $$\begin{array}{c}
 \{i\} \\
 \vdots \\
 \vdots \\
 \{V\} \\
 | \\
 \{V\{u\}\}
 \end{array}$$

Interpretation and exponence of these representations involves a combination of the extrasegmental specification with the segmental. (10.a-b) are straightforward, conventionally representable as [y] and [ø] respectively, the former involving overall a combination of the acute and grave vowels, and the latter all three features. Overall, (10.d) has more *i* than (c) has; so that, in terms of proportions of *i* and *a*, we can say: (10.d) : (10.c) :: (6.b) : (6.a). {i}... {a;i} is equivalent to {i;a}, and {i}...{a} is equivalent to {a;i}. Thus, both (10.d) and (6.b) are spelled *e*, and (10.c) and (6.a) are spelled *æ*:

- (12)
- |    |                                                 |
|----|-------------------------------------------------|
| a. | cwellan ‘to-kill’ (10.d); cweþan ‘to-say’ (6.b) |
| b. | færþ ‘goes’ (10.c); sæt ‘sat’ (6.a)             |



Such would be an interpretation of the usual assumptions about the inputs and outputs to *i*-umlaut. The general shape of this is not unfamiliar in phonology. There arise questions about the interpretation of the data that I have not gone into here,<sup>3</sup> but we shall encounter some more serious problems, particularly as concerns the vowels here analysed as unspecified, in looking at the operation of *i*-umlaut with respect to vowels other than the short monophthongs considered in this section. Let us conclude this section with a look at the subsequent development of the pre-OE umlauted forms.

The front round vowels that result in the history of the forms on the right in (1.a-b), i.e. (10.a-b), unrounded subsequently, rather early in the case of (1.b), as reflected in the (typical) spelling in (1/10.b), rather later in the case of (1/10.a), where *y* spellings persist through much of OE, though not in Kentish (e.g. Anderson 1988a). As noted in fn. 2 there also occur early spellings for the umlaut of the vowel of (1/10.a-b) with (respectively) *ui* and *oe/oi*, as (once more) exemplified in (13):

- (13) a. buiris ‘chisel’  
 b. dochter ‘daughter’ *dative singular*, oefest ‘haste’, *Oidilualdo*

As also observed there, these *-i*-spellings are usually interpreted as evidence for the generally postulated original outputs of *i*-umlaut in these cases, i.e. front rounded vowels.

The unrounding of the vowels of (1/10.a), spelled *y*, and (1/10.b), spelled *oe*, results in some denaturalisation; the ‘results’ of *i*-umlaut are no longer a transparent outcome of ‘spreading’ of {*i*}: in their case **u** is also suppressed relative to the vowels which are the historical sources of these umlaut vowels, and they collapse with other vowels spelled respectively *i* and *e*. The other main source of denaturalisation – indeed, the major one – is the loss of the extrasegmental {*i*} in many cases, as manifested by the prevalence of spellings with *e* in forms like those in (1) or the lack in many suffixes of any reflex whatsoever of a segmental manifestation of {*i*}. And this also results in displacement of the regularity from the phonology, in that synchronically in the historical OE period *i*-umlaut is best interpreted as morphophonological: it is no longer a general phonological regularity, but is a set of alternations triggered by various morphological factors, including only in some cases the presence of an originally non-tautosyllabic {*i*}.<sup>4</sup> I list the alternations in (14):

- (14) a. {**u**} ~ {**i**}  
 b. {**u,a**} ~ {**i;a**}  
 c. {**a**} ~ {**a;i**}  
 d. {**a;i**} ~ {**i;a**}  
 e. {**a**} ~ {**i;a**}

(14.a-d) are illustrated by the respective forms in (1); (14.e) occurs in a nasal environment, as in *mann/menn*, involving complications I shall return to in §3. Each of these alternations does still show an increase in acuteness in the second member compared with the first. So we can still perhaps characterise the expression of the morphological relationships as involving attachment of an {*i*} to the accented vowel of the derived forms (cf. on German Lodge 1989: §3).

Before pursuing the effects of the nasal environment, I turn to the situation with the long monophthongs, which are usually reconstructed as being in simple contrast with the corresponding short vowels, with which they constitute correlative pairs. In terms of the notation deployed here, a short monophthong such as /o/ can be represented as {**V{u,a}**}, with the corresponding long being {**V,V{u,a}**}.

## 2 *i*-umlaut of the long monophthongs

Umlaut of the long vowels differs in that the long vowel which when unumlauted is spelled *æ* in West Saxon does not undergo it: West Saxon *dæd* 'deed', *mære* 'famous'. One might interpret this as reflecting a pre-*i*-umlaut lexical long-vowel system such as that in (15), with the *æ*-vowel specified:

- (15)
- |                           |                          |
|---------------------------|--------------------------|
| {i} <i>fif</i> 'five'     | {u} <i>hus</i> 'house'   |
| {i, } <i>med</i> 'reward' | {u, } <i>gos</i> 'goose' |
| {i,a} <i>dæd</i> 'deed'   |                          |
| { } <i>stan</i> 'stone'   |                          |

This differs from the short-vowel system of (3) in the characterisation of the vowel spelled *æ* (in West Saxon), long {i,a} vs. short{ , }. As a consequence, the long vowel, whose representation contains **i**, fails to undergo *i*-umlaut (7). This vowel seems to be absent from the inventory of the Anglian dialects, where West Saxon *dæd*, for instance, is spelled *ded* (e.g. Campbell 1959: §128); the Anglian vowel contains {i, } contrastively, and also, of course, as a consequence of this specification, would fail to undergo *i*-umlaut, as originally formulated in (7), under condition a.<sup>5</sup>

Somewhat ironically, given what has just been suggested, Anderson (1992: §3) attributes the failure of this long vowel to undergo *i*-umlaut to its underspecification, since, on his account, *i*-umlaut applies only to vowels containing **u** or **a**; on the account just entertained which is associated with (15), the failure results from the vowel being, in a sense, overspecified, in so far as, as well as its being the most fully specified vowel, its representation contains specifically **i**. However, against this new account, it is not clear why the long system should differ in this respect, and specifically how one could justify the 'overspecification' of the long system, given that the long as well as the short vowel spelled *æ* lacks a grave congener, as is apparent from filling out (15) in accordance with (5), modified as in (5)' to allow for the specification of the newly interpreted *æ*-vowel:

- (5)'
- |    |          |   |          |
|----|----------|---|----------|
| a. | {V{i,a}} | ⇒ | {V{a;i}} |
| b. | {V{i, }} | ⇒ | {V{i;a}} |
| c. | {V{ }}   | ⇒ | {V{a}}   |

The fuller specifications are as in (16)

- (16)
- |    |       |   |           |             |
|----|-------|---|-----------|-------------|
| a. | {i,a} | ⇒ | {a;i} 'æ' |             |
| b. | {i, } | ⇒ | {i; }     | ⇒ {i;a} 'e' |
| c. | {u, } | ⇒ | {u,a} 'o' |             |
| d. | { }   | ⇒ | {a} 'a'   |             |

We have the same system for both long and short vowels, as can be seen by comparing (17) with (4) above:

- (17) *more fully specified pre-umlaut pre-OE system of long monophthongs*
- |                           |                          |
|---------------------------|--------------------------|
| {i} <i>fif</i> 'five'     | {u} <i>hus</i> 'house'   |
| {i,a} <i>med</i> 'reward' | {u,a} <i>gos</i> 'goose' |
| {a,i} <i>dæd</i> 'deed'   |                          |

{a} *stan* ‘stone’

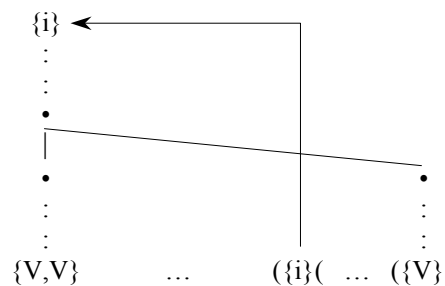
The pattern of contrast does not motivate the differentiation between the long and short systems suggested by (15).

A resolution of the discrepancy between the accounts for the short and long systems presents itself if we adopt Colman’s (2003) analysis of the pre-umlaut vowel system of OE. She argues that the ‘long’ low vowel of (17) has not developed as such at this point, but remains diphthongal (its ancestor is Germanic /ai/). In this case, the long monophthong system is different from the short, in lacking the long low vowel, as shown in (18.a), underspecified, and (b), more fully specified.

- (18) a.      {i} ‘i’                      {u} ‘u’  
                  {i, } ‘e’                      {u, } ‘o’  
                                  { , } ‘æ’
- b.      {i} ‘i’                      {u} ‘u’  
                          {i;a} ‘e’                      {u;a} ‘o’  
                          {a;i} ‘æ’

The consequence of this is that the system in (18.a) lacks any vowel which both does not have **u** but which undergoes *i*-umlaut. We can therefore, in the case of the long system, tighten the requirements for manifestation of *i*-umlaut, as formulated in (7), as reformulated in (7)’:

(7)’      *pre-OE i-umlaut (long monophthongs)*



*condition: only a vowel that is {V,V{u}} manifests i-umlaut*

That is, instead of it affecting any vowel which has **u** or is unspecified, as required by condition a of (7), or to any vowel except that which contains only **i** (condition b), we can restrict *i*-umlaut in this case to affecting just vowels with **u**; the original (7) applies only if the (underspecified) system shows a non-acute vowel lacking **u**. In this way the vowel in West Saxon *dæd* etc. will not be affected, but only {u} and {u, } will. *I*-umlaut (7)’ applies less generally than the umlaut of the short/checked vowels, and much less generally than under condition b. Otherwise, *i*-umlaut and the redundancies in (5) apply as with the short system.

The positing of a long-vowel system such as (18.b) also provides us with a motivation for the non-specification of {a} in the short system of (4), as incorporated in the

### 3 Polysystemicity, and *i*-umlaut before nasals

In the pre-*i*-umlaut short vowel system, whatever variation there may have been in the realisation of these vowels, there are contrasts before nasals only among three vowels, {i}, {u} and {a}, as illustrated by the paradigm for the strong verb *bindan* 'bind': 1st and 3rd singular preterite indicative *band*, second participle *bunden*. These exhaust the possibilities for stem vowels. We have the basic triangular system (Lass & Anderson 1975: ch.II, §5) of (19.a):

- However, whereas umlaut of {u} seems to be straightforward, and early spellings of the other vowel show *æ*, as we might expect, in forms with historical /a/ + nasal associated with an *i*-umlaut environment such as those in (20b) and these persist in some texts, overwhelmingly the umlauted form of this etymological class is spelled *e*, as in (20.c):

- (20) a. cyme ‘coming’, trymman ‘strengthen’  
 b. aenid ‘duck’, cændæ ‘he begot’  
 c. ened ‘duck’, fremman ‘do/perform’

$\mathcal{A}$  represents the normal umlaut of /a/; *e*, however, if it reflects simply the effects of umlaut, suggests a reinterpretation of /a/ as /o/, i.e. {u,a}, underspecified as {u, } in the major system.

This would not be an unnatural reinterpretation of this vowel, given the emphasis on the lower end of the spectrum (gravity) projected by nasals; in this context the vowel may indeed have been nasalised. Moreover, the exponence of this {u,a}, formerly {a}, vowel, may have been distinct in quality from both the {u,a} (realised as {u;a}) and the {a} of the main system (cf. e.g. Hogg 1992: §5.8). Ambivalence in deciding which main-system vowel the pre-nasal vowel is to be equated with is reflected perhaps in the persistent alternation between *a* and *o* spellings, exemplified in (21):

(21) nama/noma ‘name’, mann/monn ‘man’

This ambivalence may have favoured possibly co-existing alternative interpretation. Do the *æ* spellings thus represent the umlaut of {a}, the *e* spellings the (unrounded) umlaut of {u,a}? Let us look more closely at this in the context of the analysis so far.

Suppose that {a} is, as in the major system, and as supposed above, lexically unspecified, and filled in by (5.c) as in (6.d):

(6) d. { }  $\Rightarrow$  {a}

As anticipated, spellings with *æ* before a nasal in an *i*-umlaut environment can indeed be interpreted as reflecting straightforward umlaut of {a}, as elsewhere.

The umlaut spellings with *e* for historical /a/, however, suggest, rather, as I have observed, umlaut of {u, }, followed by unrounding. This too is straightforward if the pre-nasal vowel system of (19.a) came, as a first approximation, to be re-interpreted in underspecified form, as in (22) rather than (19.b):

(22) { } ‘i’      {u} ‘u’  
                  {u, } ‘a’

i.e. with the acute vowel unspecified, and the historical {a} vowel specified as {u, }. As in the main system, {u, } will be completed as in (6.c):

(6) c. {u, }  $\Rightarrow$  {u,a}

But we would have to substitute (23) for (6.d):

(23) { }  $\Rightarrow$  {i}

(23) would replace (5.c).

However, the motivations for the non-specification and the underspecification in (22) are unclear. Notice, in particular that the underspecifications are contradictory: the non-specification in { } is filled out as {i}, but that in {u, } is filled out as {u,a}. Indeed, the redundancies in (5), if (23) is substituted for (5.c), will not produce {u,a} from {u, }, as in (6.c) but will give us {u,i}. While the filling of {i} requires (23), {u, } requires (5.c):

(5) c. { }  $\Rightarrow$  {a}

Rather than as in (22), then, the appropriate historical replacement nonspecification for (19.b) would seem to be as in (24):

- Notice that I am assuming that this pre-nasal long non-high vowel is historically { }, thus {a}. Traditionally, this vowel is said to derive from Germanic /æ:/ (ē<sup>1</sup> – see fns. 5,8). But this is to conflate the pre-nasal system with the main vowel system. This is necessary only if one assumes a monosystemic approach. Part of what I am arguing here is that this is not only contrary to the assumption of lexical minimality, and so theoretically undesirable, but it also raises unnecessary descriptive difficulties: the proposed shift of this pre-nasal vowel from [æ:] to [o:] which monosystemicity necessitates is an unnecessary complication. There is only a three-way contrast among long monophthongs before nasals in Germanic, and there is no reason to identify any of these vowels at any point with main-system /æ:/.<sup>7</sup>

Accounts of historical phonology in general that operate in terms of monosystemic inventories of vowels and consonants – and that’s most of them – are grossly misleading in this respect, not just in the present instance but in general. The basic problem is that, in general, historical linguists, encouraged by orthographic representations, have reconstructed phonemic systems for languages of the past; whereas languages have not phonemic but phonological systems, which are polysystemic to varying degrees.

To sum up. The spelling of the unumlauted short non-high vowel is varyingly *a* and *o*: recall (23). If we take the *o* possibility as indicating a {u, }-type vowel, the continuing alternation can be accounted for by continuing phonological variation or by the fact that there is no contrast between {a} and {u,a} before nasals, so that either symbol is available, and, as again observed above, the exponence of the vowel may have indeed been that associated with {a} and {u,a} elsewhere, i.e. in the main system. The more consistent spelling as *o* of the corresponding long vowel may reflect the fact that its exponent has come to be identified with that of long {u,a} in the major system, consistent with traditional views (e.g. Campbell 1959: §127). This too may underlie the tenuousness, in the case of the long vowel, of spelling evidence for a stage showing umlaut to something spelled *æ*, representing the umlaut of {a}.<sup>8</sup>

The pre-nasal vowel systems, both long and short, are not eligible for (7)’. The vowels affected are {u} and { , } (or, earlier, { }); only one of them contains **u** lexically. This again illustrates polysystemicity: the long pre-nasal system behaves like the short, and like the short main system rather than the long. Even in terms of (the rejected) underspecification (22) both pre-nasal systems would behave in the same way, as eligible for any condition on (7)/(7)’.

Anderson (1992: §3) again offers a rather different interpretation of these phenomena, less reliant on underspecification. That account also posits a symmetrical overall (monosystemic) short vowel system as input to *i*-umlaut, with the non-high vowel before a nasal spelled *a/o* constituting a distinct output. In conflating the pre-nasal and the main vowel systems and thus failing to recognise polysystemicity this account again fails to satisfy lexical minimality.

#### 4 *I*-umlaut of the diphthongs, and dialect variation

In the OE diphthong system, on Colman’s (1985, 1987, 2003) interpretation, there are three /-u/ diphthongs, short and long, as well as, in Colman (2003), (long) /ai/ (recall §2). These as represented here, with underspecification, in (28), which also indicates the spellings of the un-umlauted descendants of these vowels, for the moment of long vowels only:

(28)	a.	{i + u}	<i>io/iu</i>	<i>diore</i> ‘dear’
	b.	{i, + u}	<i>eo/eu</i>	<i>þeof</i> ‘thief’
	c.	{ , + u}	<i>ea/æa/æo/æu</i>	<i>stream</i> ‘stream’, <i>neah</i> ‘near’
	d.	{ + }	<i>a</i>	<i>lar</i> ‘learning’

The first element in (28.c) and both in (28.d) are substantively unspecified; the first element in (28.b) is underspecified. The redundancies of (5), repeated here for ease of reference, would give (29):

(5)	a.	{V{i, }}	⇒	{V{i, }}
	b.	{V{ , }}	⇒	{V{ , i }}
	c.	{V{ }}	⇒	{V{a }}

- (29) a. {i + u}  
 b. {i;a + u}  
 c. {a;i + u}  
 d. {a + a}

However, I suggest that at a pre-OE stage application of (5.c) in the case of the second vowel in (28.d) is pre-empted by application of a system-specific redundancy (i.e. in this case a redundancy specific to the diphthong system) which fills in **i** when an unspecified vowel immediately follows another, as in (30):

- (30) { + }  $\Rightarrow$  { + i}

So that we get (29)' rather than (29):

- (29)' a. {i + u}  
 b. {i;a + u}  
 c. {a;i + u}  
 d. {a + i}

The development of each of these diphthongs deserves some further comment.

The examples in (28.a) and (b) reflect (respectively) the descendants of the Germanic /iu/ and /eu/ diphthongs, which (respectively) collapsed with the diphthongs traditionally assumed to result from 'breaking' of Germanic /i:/ and /e:/ (see e.g. Hogg 1992: §§5.23, 5.25), neither of which is particularly common. The diphthong with the unspecified first element in the first example in (28.c) is a development of former { + u}, i.e. Germanic /au/, where this first element, like other **a**-vowels that do not share their nucleus with another **a** (as in (28/29.d), has undergone 'first fronting' or 'Anglo-Frisian brightening', to give **a;i** (Campbell 1959: §§131-135, Lass & Anderson: ch.I, §3, ch.II)). In West-Saxon this diphthong fell together with the 'breaking' of long {a;i}, the parallel spelling of which is exemplified in the second word in (28.c).

The acute + grave vowels in the system in (28/29(')), i.e. (29(')).a-c), are susceptible to what Lass & Anderson (1975: ch.III, §5) call diphthong height harmony (DHH), whereby the second elements of the diphthong come to agree in 'height', or proportion of **a**, with their respective first elements, as shown in (31):

- (31) a. {i + u}  $\Rightarrow$  {i + u}  
 b. {i;a + u}  $\Rightarrow$  {i;a + u;a}  
 c. {a;i + u}  $\Rightarrow$  {a;i + a;u}

This gives representations which are more directly relatable to the range of spellings, given restrictions on the spelling system. However, given that there is no contrast between /æɔ/ and /æa/, the system resulting from (31) can be, and apparently is, simplified to (32):

- (32) a. {i + u}  
 b. {i;a + u,a}  
 c. {a;i + a}



It seems, however, that the introduction of DHH did not precede that of *i*-umlaut. So, it need not directly concern us at this point. We shall return to this phenomenon below, however.

Consider finally the vowel in (29'.d). Perhaps at an earlier period the **i** in (29.d) was lexically present but came subsequently to be supplied by the system-specific redundancy of (30). Lexical omission of the **i** enhances the minimality of the representations in (28), given that it contrasts in this position only with **u**, and that (with the development of /au/ to {a;i + u}) /ai/ is indeed the most optimal, widest diphthong of the OE set. Moreover, the alignment of the original /au/ with the other diphthongs, in showing an acute + grave combination, isolates the /ai/ diphthong, as indeed does its unique lack among OE diphthongs of a short equivalent. This diphthong is ripe for non-specification, with both its features being filled in by redundancy, a combination of the system-specific redundancy (30) and (5.c).

What changes subsequently in the phonology of this vowel is simply the spread of the general default feature **a** given by redundancy (5.c) to this (second) unspecified position in the diphthong (as well as applying to the first). Thus, after the phonologisation of *i*-umlaut the diphthong is reinterpreted as a long monophthong. This account is suggesting, then, that the apparent obviousness of the umlaut of the long vowel spelled *a* (/a:/  $\Rightarrow$  /æ:/) is deceptive, since the source is indeed /ai/. We must consider now how the {a;i}/[æ:] umlaut vowel is to be derived; let us return to *i*-umlaut.

The system in (28) shows susceptible vowels which do not contain **u**, so *i*-umlaut (7), rather than (7)', will apply in the presence of an extrasegmental {i} (recall §2), despite the diphthongs we are considering being long/free – the results being:

- (33) a. {i + u} ... {i}  
 b.  $\overline{\{a;i + u\} \dots \{i\}}$   
 c. {a;i + u} ... {i}  
 d. {a + a} ... {i}

The diphthong spelled *eo* of (28/29.b) does not occur in the *i*-umlaut environment (pace Sievers 1900: 44-5, Campbell 1959: §202 – see Hogg 1992: §5.84, n.1), hence the gap in (33.b). (And the first element would be excluded anyway by condition a on (7), as containing **i**.) This means too that we should substitute (33.c)' for the representation in (33.c) in forms susceptible to umlaut, given there is no contrast between **i;a** and **a;i** in the *i*-umlaut environment:

- (33) c.' {i,a + u} ... {i}

That is, in an *i*-umlaut environment, the diphthong system is as in (28)' rather than (28):

- (28)' a. {i + u}  
 b.  $\overline{\{ , + u \}}$   
 c. { , + u}  
 d. { + }

And in this system the unspecified compound vowel which initiates (28'.c) must be filled in in the first place by a redundancy which is a compromise between (5.a) and (b):

- (5)' a/b. { , }  $\Rightarrow$  {i, }

with the **a** being filled in by (5.c), as elsewhere.

In (33.a) and (d), the realisation of **i**, of course, is not affected by *i*-umlaut, but all the other elements in (33.a,c',d) are. This means we have vowels whose exponents might be represented as in (34), which also gives some examples:

- |      |    |      |           |                               |
|------|----|------|-----------|-------------------------------|
| (34) | a. | [iy] | <i>ie</i> | <i>liehtan</i> 'light' (verb) |
|      | b. |      |           |                               |
|      | c. | [iy] | <i>ie</i> | <i>biecnan</i> 'beckon'       |
|      | d. | [ææ] | <i>æ</i>  | <i>læran</i> 'teach'          |

These are typical West-Saxon spellings.

[iy] in (34.a,c) is Luick's (1914: §191, Anm.4) and Colman's (1985, 1987) interpretation of this spelling of the umlaut of the diphthongs in (33.a,c'). The effect of the extrasegmental {i} on **u** in (31.a,c), as elsewhere, is an interpretation as equivalent to {i,u}, the [y] of (33.a,c'). So, (33.a) is expounded as [iy], as in (34.a). In (33.c') **i,a** is associated by *i*-umlaut with an extrasegmental {i}: the only way in which the **i,a** of (33.c') can be interpreted in the context of the extrasegmental {i} – thus as more *i*-like – is as represented in (34.c), i.e. as identical to (34.a). In this way, some denaturalisation is introduced, in that the source of [iy] is not determinate with respect to the derived form. The interpretation in (34.d) of **a** associated with extrasegmental {i} is straightforward, as [æi].

[æi] is not, however, the vowel we find in such forms. One might suggest, rather, that in the *i*-umlaut environment application of (30) is blocked; instead (5.c) applies, as the default. (30) would accordingly have to be modified as in (30)':

$$(30) \quad \{ + \} \Rightarrow \{ + i \}$$

$$(30)' \quad \{ + \} \Rightarrow \{ + i \} \text{ exc. in environment } \dots \{ i \}$$

(5.c) and (30)' create alternative manifestations of (the second element of) the { + } diphthong, {a + a} and {a + i}. The vowel which undergoes *i*-umlaut is the former, whose umlaut is straightforwardly realised as {æ + æ}, spelled *æ*.

Alternatively, we can avoid appeal to (30)' rather than (30) if the [æi] which would result by (30) from umlaut of /ai/ manifests itself as [ææ] as a result of DHH.<sup>9</sup>

But perhaps the most transparent account is one whereby again we need not appeal to (30)', but instead suggest that [æi] resulting from *i*-umlaut disappears as a result of the same extension, at the expense of (30), of the same general redundancy (5.c) as gives us [aa] from [ai] in unumlauted forms. That is, this vowel undergoes umlaut as [ai], and its monophthongisation as a result of the extension of (5.c) is, as in non-umlauting forms, subsequent to the introduction of *i*-umlaut.

The operation of *i*-umlaut with respect to the putative short diphthongs, represented orthographically in the same ways as the long (though there is no equivalent to (28/29'.d)), does not present new problems. However, I should fully clarify that we should be aware that what I have described is the effect of *i*-umlaut on diphthongs in West Saxon; the non-West-Saxon dialects are another story in this respect.

Firstly, in these dialects *i*-umlaut does not seem to apply to the [iu] diphthong, short or long: here non-West-Saxon *io* spellings correspond to West Saxon *ie*, where this is not obscured by later changes (or by differential application of diphthongisation by 'breaking'):

- |      |    |                                       |
|------|----|---------------------------------------|
| (35) | a. | <i>liehtan/liohtan</i> 'light' (verb) |
|      | b. | <i>gesiehð/-sioh</i> 'he sees'        |

(35.a) are long, (35.b) short (see e.g. Campbell 1959: §201). Now this is perhaps not too surprising. [iy] is scarcely an optimal diphthong, involving only the vowel colours **i** and **u** and minimal differentiation between the two elements of the diphthong: {i + i,u}. It thus falls further from optimality than even the other diphthongs posited for OE. As observed above, the optimal diphthong involves an element with **a** combined with one without, and it is ‘wide’, {a + i/u}, simple **a** plus a simple colour. The West-Saxon diphthong represented by *ie* is not particularly long-lived; and this presumably reflects its marginal nature as a diphthong, a marginality which I am suggesting perhaps underlies its absence from non-West-Saxon.

The development in an *i*-umlaut environment of the vowel that is spelled *ea* when unumlauted is, however, apparently rather more striking, in so far as we find spellings in non-West-Saxon texts (and, as with *io* for *ie*, in some West Saxon too) with *e* instead of the (usual) West Saxon *ie*, as in (36.a) (long) and (b) (short):

- (36) a. *biecnan/becnan* ‘beckon’  
 b. *hliehhan/hlehhan* ‘laugh’

(Campbell 1959: §200). These non-West-Saxon spellings might be taken to involve some denaturalisation of any output we might have expected from *i*-umlaut as formulated here so far (or anywhere else, for that matter). This seems to be the view of Luick (1914: §194, Anm.4), though he would perhaps not view the development as denaturalisation. However, let us look more carefully at the nature of these pre-umlaut diphthongs in Anglian with a view to seeing whether, after all, the spelling in (36) can be interpreted as consistent with the view of *i*-umlaut proposed above, without appeal to denaturalisation, in particular. This will involve us in a reconsideration of the treatment of the diphthong the West Saxon just suggested.<sup>10</sup>

A possible account is suggested by the first treatment of the development of the /ai/ diphthong inherited from Germanic developed immediately above. I have suggested, following Colman (2003), that this vowel was still diphthongal at the time of *i*-umlaut. I also went on to suggest, however, that its lexical representation was as in (28/28'.d):

- (28/28'.d). { + }      *a*      *lar* ‘learning’

According to the first account, this is completed by (5.c) as (29.d) in an *i*-umlaut environment, but by (30) elsewhere, as in (29'.d):

- (29) d. {a + a}  
 (29)' d. {a + i}

In this way, though there is a straightforward diphthongal realisation for this vowel, there is also a minority realisation which is realisationally equivalent to a long monophthong.

This is perhaps not the preferable account of the /ai/ vowel and its umlaut; and I supported an alternative above. But consider now such a treatment of the present case. If, on the analogy of such a diversification of specification, we were to suggest that the diphthong we are concerned with now could be represented as in (37.a) in non-West-Saxon, then we would have an excellent source for the umlauted form, which could be appropriately represented as in (37.b), which is plausibly expounded under umlaut as something to be spelled *e*:

- (37) a. { , + , }  
 b. {a;i + a;i}...{i}

(37.a) does not make a very plausible source for the major unumlauted instances of the diphthong, spelled *ea*. But if we have diversification here, with the representation in (37.a) being derived rather than itself lexical, an account of both the unumlauted and the umlauted manifestations of this diphthong becomes apparent.

I suggest, indeed, that this vowel, both long and short, be interpreted as lexically { , + }, i.e. as a diphthong involving a compound element and a simplex, both unspecified as to substance. By application of the redundancies in (5) we would derive {a;i + a}. Let us consider the desirability of this.

This is the representation for this vowel we find in (32.c), i.e. the representation which shows the results of DHH and simplification of the second element. The proposed non-West-Saxon lexical representation for this vowel is thus satisfactory if in these dialects, unlike in West Saxon, the results of DHH and the simplification resulting in (32.c) have already been assimilated into phonological representations at the time that *i*-umlaut is introduced. Rather than (28), suitable for West Saxon, we have the lexical diphthong system in (38), showing the results of DHH and simplification (32.c):

- |         |          |                    |                        |
|---------|----------|--------------------|------------------------|
| (28) a. | {i + u}  | <i>io/iu</i>       | <i>diore</i> ‘dear’    |
| b.      | {i, + u} | <i>eo/eu</i>       | <i>þeof</i> ‘thief’    |
| c.      | { , + u} | <i>ea/æa/æo/æu</i> | <i>stream</i> ‘stream’ |
| d.      | { + }    | <i>a</i>           | <i>lar</i> ‘learning’  |
- 
- |         |           |                    |                        |
|---------|-----------|--------------------|------------------------|
| (38) a. | {i + u}   | <i>io/iu</i>       | <i>diore</i> ‘dear’    |
| b.      | {i, + u,} | <i>eo/eu</i>       | <i>þeof</i> ‘thief’    |
| c.      | { , + }   | <i>ea/æa/æo/æu</i> | <i>stream</i> ‘stream’ |
| d.      | { + }     | <i>a</i>           | <i>lar</i> ‘learning’  |

However, there seems to be no independent motivation for making such a distinction between the relative chronologies of *i*-umlaut and DHH in the different dialects.

Suppose instead of this account that we retain the idea that the vowel in question is lexically { , + } but suggest that in all dialects the second unspecified element in (38.c) is again filled out not by (5.c), but, as in the case of (28/38.d) by a system-specific redundancy, which, in this case, inserts **u**. Indeed all of the second elements in both (28) and (38) can be filled out by redundancy, since the diphthongs are sufficiently distinguished by the specifications of the initial elements. The representations in (28/38) are overspecified; they can both be reduced to (39):

- |         |         |                    |                        |
|---------|---------|--------------------|------------------------|
| (39) a. | {i + }  | <i>io/iu</i>       | <i>diore</i> ‘dear’    |
| b.      | {i, + } | <i>eo/eu</i>       | <i>þeof</i> ‘thief’    |
| c.      | { , + } | <i>ea/æa/æo/æu</i> | <i>stream</i> ‘stream’ |
| d.      | { + }   | <i>a</i>           | <i>lar</i> ‘learning’  |

If the second element of a diphthong is not filled in by (30) or (30)’ (on the (rejected) first accounted of what happens to Germanic /ai/), both repeated here, which require the first element to be completely unspecified, even by a combinatory (such as ‘,’), and thus applies only to (28/29/39.d), it is specified by the more general redundancy of (40):

- (30) { + } ⇒ { + i}

(30)'            { + }    ⇒    { + i } exc. in environment ... {i}

(40)            { + }    ⇒    { + u }

All of (39.a-c) undergo (40) rather than (30) or ((30)'), which latter apply only to (39.d).

The OE system in (39) presumably evolved from the Germanic /iu, eu, au, ai/ set, given its minimal form in (41), when the /a- / of /au/ but not that of /ai/ fronted (i.e. it acquired **i**):

(40)	a.	{i + u}	[iu]
	b.	{i, + u}	[eu]
	c.	{ + u}	[æu]
	d.	{ + }	[ai]

This gave a system of diphthongs which can be represented as in (39) as contrasting in their first elements only. DHH is an extension of this evolution whereby the second elements (of the remaining diphthongs) came to agree in height with their dominant first elements.

In West Saxon umlaut of (39.c) will give (33.c)', as before, given that (39.b) is absent in an umlaut environment and that consequently (5'.a/b) applies instead of the equivalents in (5):

(5)'    a/b.    { , } ⇒ { i, }

(33)'   c.    { i,a + u } ... { i }

The resulting [iy] diphthong is spelled as in the first form in each of (36), also repeated for ease of reference:

(36)	a.	<i>biecnan/becnan</i> 'beckon'
	b.	<i>hliehhan/hlehhan</i> 'laugh'

Consider now the consequences of this proposal for an interpretation of the second, non-West-Saxon forms in each of (36).

In these forms the umlaut of { , + } is spelled *e*. This suggests a representation such as that in (41), or rather, if we assume derivation from a lexical diphthong, as in (37.b):

(42)            { i;a } ... { i }

(37)    b.    { i;a + i;a } ... { i }

In order to ensure that, all that is needed is that in the *i*-umlaut environment there applies to (39.c) a system-specific redundancy, on the model of (30)', of the form of (43):

(43)            { , + } ⇒ { , + , } / in environment ... { i }

(43) renders (39.c) symmetrical in the *i*-umlaut environment, as is (39.d) generally; and they are both, in the *i*-umlaut environment, filled out as sequences which are not 'true' diphthongs. The umlaut of the short vowel spelled *ea* accordingly collapses with that of

the unumlauted vowel spelled *æ*, both umlauts being spelled *e*; and this is appropriate given the equivalence of the {*a*; *i* + *a*; *i*} from application of (5.b) to the output to (43) and the monophthong represented *æ*.<sup>11</sup>

Moreover, application of this system-specific redundancy enables us to state as a generalisation that in non-West-Saxon dialects *i*-umlaut does not affect ‘true’ diphthongs, i.e. diphthongs in which the two elements are lexically distinct and remain so (after application of system-specific redundancies). This generalisation concerning non-West-Saxon diphthongs susceptible to *i*-umlaut allows it to apply to /ai/, that is { + }; but it excludes [iu], that is {*i* + *i*, *u*}, from *i*-umlaut, as we would wish, as well as representation (39.c), { , + }, also with distinct first and second elements, which is rescued for application of *i*-umlaut only by application of redundancy (43) (the elements of the diphthong do not remain distinct). The umlaut products of both these pre-umlaut diphthongs are the marginal diphthong [iy] in West Saxon. In non-West-Saxon these are both avoided, in slightly different ways, but in each case involving the ban on umlaut of ‘true’ diphthongs.<sup>12</sup>

In this section, then, there have been invoked not just polysystemicity but further systemic variation between dialects, in so far as the system-specific redundancy of (42) is concerned, as well as the failure of the non-West-Saxon dialects to show umlaut of ‘true’ diphthongs. Here too I have introduced the notion of system-specific redundancies, which further extend the role of polysystemicity in our account of the parts of the phonology of the OE vowel system.

## Conclusion

I have attempted to provide here a coherent analysis of the operation of *i*-umlaut in pre-OE based on lexical minimality, polysystemicity and respect for the historical data, involving in particular the avoidance of unwarranted phonetic speculations. The analysis uses essentially the apparatus provided by Anderson & Ewen (1987), and it builds on, among much else, the treatments of *i*-umlaut in Anderson (1992) and Colman (1985, 1987, 2003). *I*-umlaut involves the extrasegmental *i* of a suffix which comes to be attached to the accented node in the phonological structure of the item concerned; and it is manifested in combination with the eligible vowels in its accentual domain, variations in manifestation being associated with variability in the system of vowels in different syllable types and different dialects.

John Anderson  
Kamaria  
Methoni Messinias  
24006 Greece

e-mail: frohn@otenet.gr

## Notes

\* What follows benefited from many discussions, including on some unexpected occasions, with Fran Colman, as well as from her comments on an earlier version. This version also incorporates reactions to helpful comments from Graeme Trousdale.

1 I acknowledge here that the assumption of lexical minimality is apparently controversial. Steriade (1995: 166), for instance, is sceptical that the notion ‘lexical minimality’ will survive the idea of a ‘derivationally organized phonological component’, which she assumes to be presupposed by minimality. However, the ‘derivations’ appealed to in what follow involve the addition of redundant substantive and structural elements. Moreover, if we endeavour to include in the lexicon all aspects of phonetic substance that are phonologised – that are not entirely accounted for by perceptual and articulatory capacities – do we not thereby abandon any attempt to capture contrastivity? Is that not a goal of phonological description? If it is, how else is contrastivity to be characterised? In what follows I attempt to maximise the elimination of redundancy (and see further Anderson (in preparation)).

In relation to poly- vs. monosystemicity, I find it quaint that Hogg (1992: preface, vii-viii) should think that by taking ‘phonemic theory’, with its insistence (as practised, particularly in the English-speaking world) on monosystemicity, as the ‘foundation’ of his work he might ensure that ‘issues are not muddled by theoretical squabbles’. ‘Phonemic’ theory makes lexical much but not all that is redundant, and is thus necessarily theoretically contentious. It represents a compromise between the radically contrastive approach adopted here and the lexical exhaustiveness envisaged in the preceding paragraph. And, further, in so far as ‘phoneme theory’ can be said to be, as Firth (1948: 134) puts it, based on ‘the phonetic hypostatization of roman letters’, it is most likely to mislead, given the temptation to make simple equations between sound and spelling, when applied to languages the main testimony of which is in the form of alphabetic writing.

2 See recently, for instance, Lass & Anderson (1975: ch.IV, §2) and Hogg (1992: ch.5, §VI); for more traditional accounts see Brunner (1965: 95-107), Lehnert 1959: §31, Campbell (1959: 190-204); for succinct overviews see Luick (1914: §202), Lass (1994: §3.8). I do not attempt here to survey earlier views of the ‘process’ of *i*-umlaut, such as Sievers’ (1901: §765) ‘Mouillierungstheorie’ or his ‘epenthetic’ variant of it (Brunner 1965: §94, Anm.); for further references see e.g. Hogg (1992: §5.74, n.3). As will become apparent, I accept the modern consensus that a ‘harmony’ process is involved; and, following on particularly from Anderson & Jones (1974, 1977), Colman (1985, 1987, 2003) and Anderson (1992), I try to make precise what might be meant by this. Van der Hulst & Smith (1985: §1) describe an ‘umlaut’ in Djingili similar to the Germanic ones, which, though rather more drastic in effect, nevertheless involves a similar ‘spreading’ of an affixal {i}. See too especially Lodge (1989), who provides an analysis of *i*-umlaut in German in a historical perspective which anticipates aspects of what follows, as well as exploring the consequences of what I refer to here as denaturalisation in more detail.

There occur early spellings for the umlaut of the vowel of (1.a) with *ui*, and of (1.b) with *oe* and *oi*, as exemplified in (i.a) and (b) respectively):

- (i) a. *buiris* ‘chisel’
- b. *doehter* ‘daughter’ (dative singular), *oefest* ‘haste’, *Oidilualdo*

(see Campbell 1959: §196, Hogg 1992: §5.77). These *-i*-spellings are usually interpreted as evidence for the postulated original outputs of *i*-umlaut in these cases, i.e. front rounded vowels (Brunner 1965: §94 Anm., Hogg 1992: §2.18, Colman 2003), rather than of a diphthongal stage in the development of *i*-umlaut (Campbell 1959: §42, Jones 1989: 89-90). Jones offers the form *s<sup>u</sup>yndria* ‘separate’ (from the glosses to the *Lindisfarne Gospels*) as evidence that *ui* represents ‘a genuine diphthong which, through syllabicity shifting ... could “demote” the originally peak [u] element to the quasi-vowel [w], to realize a shape like [wi] or [wy]’. But the spelling of this form could as soon represent, for instance, rounding of the [s]-onset before a rounded vowel, as apparently we also find with Kentish *swulung/swulun(c)ga* alongside the expected *sulung* etc. ‘measure of land’ – cf. *sulh* ‘plough’.

3 However, there are some uncertainties about these usual assumptions, given the nature of the data. Consider the following observations. Except in some dialects, a vowel containing only **a** would not normally occur in the *i*-umlaut environment, and is said to occur there by ‘analogy’, so that, for instance, the assumption that the vowel in *ƿærþ* represents the umlaut of /a/ requires appeal to ‘analogical extension’ of /a/ from other parts of the paradigm (see Hogg 1992: 129). Perhaps such appeals to ‘analogy’ are acceptable, but, also, more worryingly, forms which are expected to show the result of *i*-umlaut of the {a,i} vowel of (4) are varyingly spelled with *e* (as in *eft* ‘again’) and *æ* (as in *æspe* ‘asp’) before (non-geminate) consonant clusters, with some forms (e.g. *stefnan/stæfnan* ‘to-regulate’) spelled either way.

I do not attempt to address this latter problem here. But, whatever else is going on, could it be that, given that the marginal contrastive status of the {a,i} vowel vis-à-vis {a} and the uncertainty, arising from ‘analogical restorations’, concerning the identity of the input vowel are so great (and not to mention the lack of parallelism between the ‘short’ and ‘long’ systems – see §2) that there could be doubt as to whether and how consistently to distinguish the umlauts of these vowels in the spelling?

4 This leads to a contrastive status for the front rounded vowels, while preserved (what the phonemicists interpreted as ‘phonemicisation’ – e.g. Twaddell 1938).

In the interest, I hope, of greater precision, I prefer to use the term ‘denaturalisation’ here rather than, say, ‘grammaticalisation’, because the latter has now become such a terminological cliché that, though it may – or may not – be understood as inclusive of what I intend here, it now may also bring along associations with what seem to me quite unrelated types of phenomena.

5 I neglect here Kentish, whose character in this respect has been contentious: see Crowley 1986, Hogg 1988: 194-8, 1992: §3.24, n.1, §189-91.

Hogg (1992: §3.23, n.2) gives a brief summary of the controversy concerning the development of this long vowel, Germanic *\*ē<sup>1</sup>*, spelled *æ* in West Saxon: ‘while most writers ... argue that there was a shift in G[er]m[an]ic to *\*ā* with later fronting in OE and O[ld] Fris[ian] to *æ*, *ē*, the minority view that *\*æ* remained (with later raising to *ē* in OFris and some OE) is expressed in J. Wright and Wright (1925: §119)’. And he adopts what is described as an ‘essentially neutral’ view, which ‘accepts a phonemic shift to *\*a:/* but a phonetic retention of *\*[æ]*’. However, he fails to explain why there had been a ‘phonemic shift’, a posited change which I shall ignore here. See further fn.8.

6 We can also relate the nonspecification of {a} to what is otherwise a puzzling morphological relationship. A number of weak verbs in OE are clearly based on strong verbs. Consider weak *cwellan* ‘kill’ and strong *cwelan* ‘die’. The vowel in the former shows *i*-umlaut, of {a,i}; and this {a,i} is, prior to *i*-umlaut, a phonologically determined



variant of {a}. This seems to make the most plausible source for the base of this derived weak verb the 1st and 3rd person singular preterite indicative form of the strong verb, *cwæþ*, which again shows a variant of {a}, unlike the other forms in the paradigm. Choice of such a base seems unmotivated. But the assumption of this particular base is unnecessary if {a} is lexically unspecified.

The analysis of the OE strong verb proposed in Anderson (1988b) (which develops, in terms of something like the present notation, proposals made by Anderson 1970 and Lass & Anderson 1975: ch.I) posits an unspecified vowel for the stem of such verbs throughout the paradigm: thus all of *cwelan*, *cwæþ*, *cwælon*, *cwolen* (to cite the traditional ‘principal parts’) have a stem whose vowel is { }, and that vowel is more fully specified in this case, not by a general redundancy (5.c), but mainly on the basis of the morphology and partly according to the phonological context. Thus the base for the derived weak verb is this stem with unspecified vowel. In the case of the derived verb the unspecified vowel is spelled out by the general redundancy (5.c), and then modified to { , } in this environment, and then umlauted, as alluded to in the previous paragraph.

7 This observation vitiates, for instance, Welna’s argument, in support of Luick’s proposal that /æ:/ (‘ē’ – see fn.8) in general went through a stage as a low vowel to emerge as OE /æ:/ or /e:/ (depending on dialect), as alluded to in fn.5, that ‘if a vowel /æ:/, acquires before a nasal, a back articulation, it must develop through the stage of [ɑ:], since a direct change of [æ:] to [o:] without that intermediate step is phonetically impossible’.

8 The evidence of variable *a/o* spelling in metathesised forms, where the nasal environment has been removed, perhaps suggests that a {a;u} vowel may have achieved a marginally contrastive status in the major system in some varieties of OE at least (cf. Hogg 1982, 1992: §5.4).

Concerning pre-nasal umlaut Hogg (1992: §5.78(1)) suggests that the *e*-spellings for /a/ in an *i*-umlaut environment ‘would seem to indicate a very early raising of [æ] > [e] or a raising of [æ] > [e]’, and he comments in a note to this section (note 2): ‘The raising is a normal phonetic process for nasalized vowels, and is seen frequently in G[er]m[ani]c’. He provides no evidence that these vowels were ‘nasalized’, and I am not aware of any evidence that raising of nasalised vowels in general, or vowels before nasals, is ‘a normal phonetic process’. Normally vowel systems affected by nasalisation or adjacent nasals are reduced, certainly, as in OE as described here – but not by universal raising. Generalised raising of vowels is not ‘normal’ even in Germanic.

In support of the claim that such raising is ‘frequent’ in Germanic, Hogg refers to his §§3.11-12. §3.11 is concerned with the ‘retention’ of /i/ and /u/ before /m/ and /n/, which persists through to OE, and (more pervasively in some cases) to other Germanic languages. §3.12 refers the reader to §3.5, as does §3.11. Here is presented the role in Germanic of following nasals – not ‘nasalized vowels’ – in what Hogg describes at this point as ‘inhibiting’ the ‘tendency to harmonize the short vowels \*i, u, e/ to a following vowel’, in favour of /i/ and /u/. What this has to do with the raising of [æ] to [e] is unclear, particularly since Hogg himself affirms in the same paragraph that ‘these developments before \*n, m/ are simply a matter of raising before nasals, whereby all nonlow short vowels become [+high]’. Thus the postulated ‘[æ] to [e] raising before nasals’ in the *i*-umlaut environment is not explicable in these terms.

This raising does involve system-reduction. And, as well as being dependent, as argued here, on the possible rounding/raising (i.e. acquisition of graveness) of the low vowel, it may as a consequence be associated with the transformation of the pre-nasal short-vowel system from a ‘triangular’ one – {i} ≠ {a} ≠ {u} – to a basically ‘square’ one: {i} ≠

{e} ≠ {o} ≠ {u} (with denaturalisation of the results of *i*-umlaut), together with a fifth member of tenuous existence, [y], {u,i}. This is already the character of the pre-nasal long-vowel system (which, however, subsequently acquires a fifth vowel via the monophthongisation of Germanic /ai/. However, the nature of the short vowel spelled *a/o* remains equivocal, and does not clearly detach itself from {a}, except apparently in West Mercian (Hogg 1992: §5.5); and in most varieties of Middle English it does not emerge as a rounded vowel. Hogg suggests that this sound may have achieved contrastive status in West Mercian, as /ɔ/, given the prevalence of *o* spellings in these texts; but does not argue why this is a preferable interpretation to its having merged with the other vowel spelled *o* (i.e., in the terms used here, having been unequivocally reinterpreted as {u,a} rather than {a}): given the retention of the nasal environment, such a ‘merger’ is eminently subsequently splittable; and, indeed, in this nasal context [ɔ] (or anywhere else, for that matter) is in contrast with neither /a/ nor /o/. The ‘merger’ seems to be maintained in West Midland Middle English.

As indicated, Hogg (1992: §§3.13-14, 22, 5.3-6) also supposes that these pre-nasal vowels went through a stage of nasalisation, and here he seems to be following Campbell (1959: §197), though earlier in his book (§§119, 121), Campbell talks only of nasalisation in relation to vowels after which a nasal is lost. Campbell subsequently (1959: §§127 fn.1, 130), however, introduces mention of Germanic low long and short nasalised vowels before nasals. It is unfortunate that these two suggestions – nasalisation associated with vowels lengthened by nasal loss, and pre-nasal vowels in general – tend to be conflated. The issues involved are rather different. As used by Campbell, who offers no motivation for its substance (beyond, implicitly, the nasal context), the role of this allegedly phonetic feature in relation to vowels which remain pre-nasal is essentially diacritic: it is used to keep apart vowel developments before nasals from those elsewhere, without it being shown how the ‘nasalization’ might account for these developments. But, since in the forms without nasal loss the nasal context serves to keep these vowels apart, anyway, appeal to such a diacritic is unnecessary, if all that is necessary is to distinguish these vowels from others of the same quality. Further, the instances of the long and short {i} and {u} vowels that are claimed to be nasalised do not develop distinctly from the corresponding non-nasalised, and, in particular the long /i:/ and /u:/ associated with nasal loss ‘were subsequently developed like original *ī* and *ū*’ (Campbell 1959: §119). So no appeal need be made in any of these cases to nasality of the vowel, whether the following nasal is retained or not. Only the long low ‘nasalized’ vowel shows a distinctive history even where the nasal is lost in Germanic. Let us look at this in the light of underspecification and polysystemicity.

As noted in the text of §3, before nasals in Germanic, as in OE, there is only the three-way contrast shown in (21.a). If we assume again for Germanic the nonspecification suggested there, the lengthening upon loss of the nasal before the voiceless fricative in the history of forms like *pohte* ‘he-thought’ and *oht* ‘persecution’ takes the form of (i):

$$(i) \quad \{V\} \Rightarrow \{V, V\}$$

The vowel created by (i) is now part of the main system. We can reconstruct the Germanic main system, short and long, as in (ii), with fuller specification in (iii):

$$(ii) \quad a. \quad \begin{array}{ccc} \{i\} & & \{u\} \\ & \{, \} & \\ & \{ \} & \end{array}$$

- b.        {i}                      {u}  
              {i, }                {u, }  
                      { , }
- (iii) a.        {i} = /i/                      {u} = /u/  
                  {i,a} = /e/                      {a} = /a/
- b.        {i} = /i:/                      {u} = /u/  
              {i,a} = /e:/                      {u,a} = /o:/  
              {i,a} = /æ:/

(cf. e.g. Krahe 1969: §44, Loewe 1933: 39-44, Campbell 1959: §99). The historical source and subsequent development of { , } suggests that it should be more fully specified as {a;i}, and thus that the Germanic system is asymmetrical. Further, this also argues against regarding it as the long equivalent of short {a}: I have therefore distinguished them as { , } vs. { } as well as in length.

The representations in (ii/iii.b) assume a distinction in the long system between {a;i} (‘*e*<sup>1</sup>’) and {i;a} (‘*e*<sup>2</sup>’). This is controversial, particularly the origin of the distinction, but also whether the distinction itself was not even marginal (for references on the controversy see e.g. Prokosch 1938: §39, Lehmann 1955: ch.9, Steponavičius 1987: 101-7). Even if this distinction is rejected (e.g. Lass 1994: 26), however, the system still lacks a long low vowel. Again /a/ is unspecified, as lacking a long congener, as is also /æ:/ (‘*e*<sup>1</sup>’), if present, in lacking a grave congener. (i) thus creates a new vowel, of limited membership, which nevertheless, in providing a long congener for short {a}, threatens the system of underspecification.

I suggest that this vowel is accordingly reinterpreted as an unspecified diphthong, { + }. It is, I hypothesise further, only when /ai/ is itself reinterpreted as such an unspecified diphthong that the representation for the vowel created by the lengthening in (i) is specified, and reinterpreted as {u, } in OE, where it is, as we have seen, spelled *o*, and has fallen together with the existing {u, } vowel. Now, this particular reinterpretation may have been favoured by the vowel from lengthening indeed being nasalised, given that nasalisation reinforces the lower end of the spectrum. But Campbell and Hogg do not offer such a motivation for the invoking of ‘nasalization’.

Notice, too, in support of the posited { + }/{a + a} stage, that in other Germanic languages, as acknowledged in Campbell (1959: §119, the vowel from lengthening remains unspecified and falls together with /ai/. Similarly, after the similar ‘Ingvaemonic’ loss of nasal and vowel-lengthening before other voiceless fricatives, the lengthened vowel ‘shifts’ to {u, } in OE and Frisian and collapses with existing {u, }, but remains unspecified in Old Saxon and again falls together with /ai/. The languages ‘make different choices’ concerning which vowel the one from nasal-loss lengthening collapses with.

Whatever the drawbacks of such an account as I have offered here, it avoids the arbitrary invoking of phonetic features. In this regard it has to be said that this area has attracted more than its fair share of phonetic fantasies. Consider, for instance, Sievers’ suggestion (Brunner 1965: §79, n.1) that variation in spelling of the pre-nasal short low vowel between *a* and *o* reflects the result of tonal differences (rising vs. falling). Luick, for his part, is rather vague on what *a/o* represent(s), particularly on the status of the vowel: ‘Die Verdüpfung trat ein vor Nasalen und führte zunächst zu einem zwischen *a* und *o* liegenden Laute, dessen verschiedene Schattierungen durch *ā* bezeichnet werden sollen’ (1914: §110). In this he is followed closely by Campbell, who offers: ‘before nasals the *a*

represents a lower or less advanced sound than that elsewhere' (1959: 14); or 'open full back' vs. 'open advanced back' (1959: 14-5); or simply 'a sound closely related to *a*' (1959: 74). But the 'Verdumpfung' metaphor is perhaps at least interpretable as reflecting the effect of the presence of nasal formants.

9 Such a proposal forms part of the rather different account of the development of the /ai/ diphthong offered by Colman (2003). In this also, the diphthong retains its acute second element until after the implementation of *i*-umlaut, so that with respect to this diphthong *i*-umlaut results in (i), in terms of the notation used here:

- (i) {a + i} ... {i}

which is expounded as [æi]. This account also assumes that unlike other instances of [a], the first element of this diphthong does not undergo 'first fronting', though the first element of the /au/ diphthong does, giving {a; i + u}. In Old Frisian, on the other hand, we find, apparently, the reverse: /ai/ gives [æi], and /au/ is unaffected, with both diphthongs subsequently monophthongising, to [æ:] (so-called Frisian '*e*<sup>2</sup>') and to [a:] respectively (Campbell 1939, who, for his part, attributes the failure of fronting in /au/ to chronology: monophthongisation of /au/ precedes 'first fronting', whereas that of /ai/ follows).

Colman's account is particularly distinctive in so far as it is proposed that the two diphthongs resulting from Germanic /ai/ in OE, umlauted and not, are then monophthongised as a result of the application of DHH, which, as we have seen, attributes to second elements of diphthongs the same proportion of **a** as their respective first elements, as shown schematically in (ii):

- (ii) a. iu ⇒ iu  
 b. eu ⇒ eo  
 c. æu ⇒ æo  
 d. æi ⇒ ææ  
 e. ai ⇒ aa

Colman thus adds (ii.d) and (ii.e) to the set originally suggested by Lass & Anderson (1975: ch.III, §5) as susceptible to DHH. Unlike the others these are long only and, in their case only, DHH results in monophthongisation.

Now, this scenario has the possible advantage of avoiding appeal, in the case of the descendant of Germanic /ai/, to a diphthong { + } manifested in one of its variants identically with a long monophthong. But it has the apparent disadvantage of adding to the original set of modifications, which are structure-building rather than -changing, one feature-changing operation. Compare the redundancies in (iii), corresponding to (ii.a-d), with that in (iv), corresponding to (ii.e), in this respect:

- (iii) a. {i + u} ⇒ {i + u}  
 b. {i; a + u} ⇒ {i; a + u; a}  
 c. {a; i + u} ⇒ {a; i + a; u}  
 d. {a; i + i} ⇒ {a; i + a; i}
- (iv) {a + i} ⇒ {a + a}

However, this can be remedied if lexically the /ai/ diphthong is represented as { + }, with the *i* filled in by a system-specific redundancy applying to the second element of diphthongs, as envisaged in the text, and the other nonspecification being filled in by (8.c). So that we have (v) instead of (iv):

$$(v) \quad \{ + \} \Rightarrow \{ a + i \}$$

Once DHH is implemented, i.e. is part of the phonology, the *i*-filling redundancy is redundant. One problem might be that, in order to get the correct results, the vowels of (iii.b) and (c) cannot be minimally specified when height harmony applies. Presumably, then, DHH does not persist as a part of the phonology, but its results are lexicalised; otherwise, there would have to be an appeal in the phonology to a highly marked derivationality, involving a redundancy rule which follows the elimination of underspecification.

Both this account of the development of /ai/ and that proposed in the text are preferable to e.g. the scenario advocated by Lass & Anderson (1975: ch.I, §3) involving an arbitrary ‘backness-switching’ for long low vowels, and to the phonetic contortions involved in Welna’s (1987: §2.4.1) account described in fn.10.

10 I do not attempt here to survey the various scenarios that have been proposed in relation to the umlaut of the OE diphthongs. Again, phonetic speculation is rife, particularly with respect to developments in non-West-Saxon, as exemplified by Welna’s (1987: 61) interpretation of Luick on the umlaut of what is spelled *io* in the absence of umlaut, which by Luick is hypothesised to have been in all dialects [iū] (as in Colman’s (1987) analysis of West Saxon): ‘later, the rounded segment [ū] was reduced to [ə] in West Saxon, preserving a small amount of rounding, while the process of dissimilation restored the original diphthong [iu] in non-West Saxon dialects ...’. It does not seem possible to establish whether in non-West-Saxon *i*-umlaut was simply not applied to [iu] or it was lost very early; both would reflect the marginal character of the diphthong resulting from *i*-umlaut.

Hogg (1992: §5.84) interprets the preference for *io* spellings in words like *riord* and *geriord* in certain Northumbrian texts as evidence for the operation of *i*-umlaut of the short vowel spelled *eo* when unumlauted, despite this involving an apparent change quite different from his formulations of what happens with unumlauted diphthongs in both West Saxon (see below) and with the non-West-Saxon vowel whose unumlauted congener is spelled *ea*. It is difficult to see why this suggestion should be preferred to regarding the spellings as evidence for alternative ancestors for these forms with either /i/ or /e/, despite Hogg’s insistence (1992: §3.20) that in the environment [-zd], later [-rd], despite a following high vowel, [i] is necessarily lowered ‘in the development of OE’.

Concerning the development of long and short {i + u} in West Saxon, Hogg also offers the following curious argument, based on a general formulation of umlaut of diphthongs in West Saxon: ‘... it seems likely that in *i*-umlaut the first element of the diphthong was raised where possible, and that this raising was accompanied by raising and fronting of the second element. If this is so, it implies that \*/io, ʏo/ [where the latter represents the short diphthong] was already on its way to /ēo/ [sic], since otherwise the first element of the diphthong could scarcely have been raised’. Notice in the first place that there is no independent evidence for the posited lowering at this time of long and short {i + u}. But also, since Hogg’s own formulation apparently stipulates only that the first element of a diphthong ‘was raised where possible’, there is no need to suppose that a lowering has been appealed to with respect to the operation of *i*-umlaut, and this even on

Hogg's own terms – unless it is intended that the 'raising and fronting of the second element' is tied to the presence of a positive raising of the first element; but in that case the point of the 'if possible' becomes obscure. However, Hogg goes on to claim that {i + u} in non-West-Saxon was not affected by *i*-umlaut 'because its first element has not started to lower' (1992: 122). So my suggestion about the proposed tie-up between the two elements of the diphthong as far as application of *i*-umlaut is concerned may be correct. However that may be, I cannot see this as involving anything other than an unwarranted piece of phonetic speculation, namely, as formulated by Hogg, that 'although the phonemic merger of /io/ and /eo/ was clearly later than *i*-umlaut, it is possible that some lowering had already taken place in W[est] S[axon] only' (1992: 123).

The subsequent history of Germanic /ai/ in particular has attracted a variety of phonetic fantasies. Consider again e.g. Welna (1987: §2.4.1) on the development of this vowel: 'By analogy to the development of [au], its hypothetical stages could be \*[æ > æe], but the latter diphthong could hardly monophthongise as [ai]. Apparently, W[est]G[er]m[ani]c [ai/æe] was brightened to [æe], whose components were so close phonetically that dissimilation pushed the second segment from the first towards [ə] and [a], producing the diphthong [æa] (> [æə], which later monophthongised to [a:] through progressive assimilation.' There is no evidence for any of these intervening stages or for the anthropomorphic dissimilations and assimilations invoked.

11 This collapse in exponence in non-West Saxon of the umlauts of the short vowels spelled *æ* and *ea* is not associated with the kind of denaturalisation I associated with the umlauts of the two diphthongs in West Saxon that are spelled *ie*: to the extent that the phonological conditions determining the occurrence of the short diphthong spelled *ea* rather than the monophthong spelled *æ* remain intact, the two sources of the umlauted short vowel spelled *e* are determinate. However, the unrounding of the umlaut of {u,a} introduces just such a denaturalisation, as well as rendering the application of *i*-umlaut less natural (by, as observed, adding lack of rounding as well as frontness to its manifestation).

12 There is a further twist to the story of the umlaut of the long diphthong spelled *ea* when unumlauted, *e* in non-West Saxon texts when unumlauted.

Hogg identifies three circumstances in which in early manuscripts we find *ei* instead of (the expected) *e* as a representation of the long {i;a} vowel, namely (1992: §2.18):

- (a) the umlaut of \**ea*, for example, BDS 1 *nēidfaerae* 'necessary journey'; (b) where *ē* (= *æ̃*) is in an umlauting environment, for example, CorpGl 728 *dēid* 'deed'; where *ē* (= *æ̃*) is not in an umlauting environment.

Hogg does not exemplify (c), but Brunner (1965: §94 Anm.) offers *eil* 'eel' from the Corpus glossary and (the not very early) *gebreicon* preterite plural of *brucan* 'use, enjoy', from the *Lindisfarne Gospel* gloss. Pfeiffer (1974: §39) mentions as possible examples of (b) *breitibannæ* 'frying-pan' and *felu-spreici* 'babbling' from the Erfurt glossary. Such fragmentary evidence does not admit of anything approaching a determinate phonological reconstruction. But I have constructed the following orthographic fantasy (with apologies to Steven Spielberg):

#### *EI: The Extrasegmental I*

*Ei* was possibly first used for the umlaut of Germanic /au/, as in Hogg's (a). The umlauted vowel is equivalent to a monophthong, but has a diphthongal lexical source, { , + } (39.c), derivatively { , + , } as a result of (42). The representation of the umlauted vowel (unlike

that for the unumlauted) requires only one graph, leaving one of the orthographic positions normally associated with a diphthong free. This position is filled with a representation of the extrasegmental {i} associated with the accented vowel.

This practice (of giving a distinct representation for extrasegmental {i}) spreads to, or is also associated with, other instances of this long vowel in an umlaut environment., even though the vowel, Anglian /e:/ ( $\bar{æ}_1$ ), has not undergone *i*-umlaut: Hogg's (b). The digraph then spreads to a few other items as simply an alternative to *e* as a representation of long {i;a}: Hogg's (c).

## References

- Anderson, John M. 1970. 'Ablaut' in the synchronic phonology of the Old English strong verb, *Indogermanische Forschungen* 75: 166-97
- Anderson, John M. 1987a. Gothic obstruents: The limits of reconstruction. In Ramat, A.G., O. Carruba, & G. Bernini (eds.) *Papers from the 7th international conference of historical linguistics* (= Current issues in linguistic theory 48; Benjamins). Amsterdam: John Benjamins. 1-11.
- Anderson, John M. 1987b. The limits of linearity. In Anderson, J. M. & J. Durand (eds.) *Explorations in dependency phonology*. Dordrecht: Foris. 169-90.
- Anderson, John M. 1988a. The great kEntish collapse. In Kastovsky, D. & G. Bauer (eds.) *Luick revisited*. Tübingen: Narr. 97-107.
- Anderson, John M. 1988b. Old English ablaut again: The essentially concrete character of dependency phonology. In Duncan-Rose, C. & T. Vennemann (eds.) *On language: Rhetorica, Phonologica, Syntactica – A festschrift for Robert P. Stockwell*. London: Croom Helm. 156-77.
- Anderson, John M. 1992. Exceptionality and non-specification in the history of English phonology. In Rissanen, M., O. Ihalainen, T. Nevalainen & I. Taavitsainen (eds.) *History of Englishes: New methods and interpretations in historical linguistics*. Berlin: Mouton de Gruyter. 103-16.
- Anderson, John M. 1996. The representation of vowel reduction: Non-specification and reduction in Old English and Bulgarian. *Studia Linguistica* 50: 91-105.
- Anderson, John M. in preparation. Contrastivity and analogy in phonological structure.
- Anderson, John M. & Jacques Durand 1988a. Underspecification and dependency phonology, In Bertinetto, P.M. & M. Loporcaro (eds.) *Certamen phonologicum I: Papers from the 1987 Cortona phonology meeting*. Turin: Rosenberg & Sellier. 3-36.
- Anderson, John M. & Jacques Durand 1988b. Vowel harmony and non-specification in Nez Percé. In van der Hulst, H. & N.S.H. Smith (eds.) *Features, segmental structure and harmony processes, II*. Dordrecht: Foris. 1-17.
- Anderson, John M. & Jacques Durand 1993. Segments non-spécifiés et sous-spécifiés en phonologie de dépendance: le yawelmani et les autres dialectes du yokuts. In Laks, B. & A. Rialland (eds.) *Architecture et géométrie des représentations phonologiques*. Paris: CNRS. 233-53.
- Anderson, John M. & Colin J. Ewen 1987. *Principles of dependency phonology*. Cambridge: Cambridge University Press).
- Anderson, John M. & Charles Jones 1974. Three theses concerning phonological representations. *Journal of Linguistics* 10: 1-26.
- Anderson, John M. & Charles Jones 1977. *Phonological structure and the history of English*. Amsterdam: North-Holland.
- Brunner, K. 1965. *Altenglische Grammatik (nach der angelsächsische Grammatik von Eduard Sievers neubearbeitet)*.<sup>3</sup> Tübingen: Max Niemeyer.
- Campbell, A. 1939. Some Old Frisian sound-changes. *Transactions of the Philological Society*: 78-107.



- Campbell, A. 1959. *Old English grammar*. Oxford: Clarendon Press.
- Colman, Fran 1983. Old English /a/ ≠ /æ/ or [a] ~ [æ]? *Folia Linguistica Historica* 4: 265-85.
- Colman, Fran 1985. Old English *ie*: quid est? *Lingua* 67: 1-23.
- Colman, Fran 1986. A cǣg to Old English syllable structure. In Kastovsky, D. and A. Szwedek (eds.) *Linguistics across historical and geographical boundaries, I: Linguistic theory and historical linguistics*. Berlin: Mouton de Gruyter. 225-30.
- Colman, Fran 1987. The phonology and morphology of an Old English digraph: *ie*. In Anderson, J. M. & J. Durand (eds.) *Explorations in dependency phonology*. Dordrecht: Foris. 139-58.
- Colman, Fran 1988. Luick and templates: Some (other) Old English digraphs. In Kastovsky, D. & G. Bauer (eds.) *Luick revisited*. Tübingen: Narr. 139-58.
- Colman, Fran 2003. Old English *i*-umlaut: A unitary sound-change? (unpublished).
- Crowley, J.P. 1986. The study of Old English dialects. *English Studies* 67: 97-112.
- Firth, J.R. 1948. Sounds and prosodies. *Transactions of the Philological Society*: 127-52. [Reprinted in: J.R. Firth *Papers in linguistics 1934-1951*, 121-38. Oxford: Clarendon Press, 1957.]
- Hogg, Richard M. 1982. Was there ever a /ɔ:/-phoneme in Old English? *Neuphilologische Mitteilungen* 83: 225-9.
- Hogg, Richard M. 1988. On the impossibility of Old English dialectology. In Kastovsky, D. & G. Bauer (eds.) *Luick revisited*. Tübingen: Narr. 183-203.
- Hogg, Richard M. 1992. *Old English grammar, I: Phonology*. Oxford: Blackwell.
- van der Hulst, Harry & Norval Smith 1985. Vowel features and umlaut in Djingili, Njanguwarda and Warlpiri. *Phonology Yearbook* 2: 277-303.
- Jones, Charles 1989. *A history of English phonology*. London: Longman.
- Krahe, H. 1969. *Germanische Sprachwissenschaft, I: Einleitung und Lautlehre* (ed. W. Meid).<sup>7</sup> Berlin: Walter de Gruyter.
- Lass, Roger 1994. *Old English: A historical linguistic companion*. Cambridge: Cambridge University Press.
- Lass, Roger & John M. Anderson 1975. *Old English phonology*. Cambridge: Cambridge University Press.
- Lehman, Winfred P. 1955. *Proto-Indo-European phonology*. Austin: University of Texas Press & Linguistic Society of America.
- Lehnert, Martin 1959. *Altenglisches Elementarbuch*.<sup>4</sup> Berlin: Walter de Gruyter.
- Lodge, Ken 1989. A non-segmental account of German umlaut: Diachronic and synchronic perspectives. *Linguistische Berichte* 124: 470-91.
- Loewe, Richard 1933. *Germanische Sprachwissenschaft, I: Einleitung und Lautlehre*. Berlin: Walter de Gruyter.
- Luick, Karl 1914. *Historische Grammatik der englischen Sprache, I, 1*. Leipzig: Tauchnitz.
- Pheiffer, J.D. 1974. *Old English glosses in the Épinial-Erfurt glossary*. Oxford: Oxford University Press.
- Prokosch, E. 1938. *A comparative Germanic grammar*. Baltimore: Linguistic Society of America.

- Sievers, E. 1900. *Zum ags. Vokalismus*. [Dekanatsprogramm der philos. Fakultät]. Leipzig: Schriften der Universität Leipzig.
- Sievers, E. 1901. *Grundzüge der Phonetik*. Leipzig: Breitkopf & Härtel.
- Steponavičius, A. 1987. *English historical phonology*. Moscow: Vysšaya Skola.
- Steriade, Donca 1995. Underspecification and markedness. In Goldsmith, J. A. (ed.) *The handbook of phonological theory*. Oxford: Blackwell. 114-74.
- Twaddell, W.F. 1938. A note on Old High German umlaut. *Monatshefte für deutschen Unterricht* **30**: 177-81.
- Węlna, Jerzy 1987. *A critical survey of a historical phonology of English vowels (with special reference to Karl Luick's 'Historische Grammatik der englischen Sprache')*. Warsaw: Wydawnictwa Uniwersytetu Warszawskiego.
- Wright, J. & E.M. 1925. *Old English grammar*.<sup>3</sup> Oxford: Oxford University Press.